NRC000037

AREVA

10 CFR 70.5

June 15, 2010

AES-O-NRC-10-00374

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

AREVA Enrichment Services LLC
Eagle Rock Enrichment Facility
NRC Docket No: 70-7015

Subject: Follow-up Response to Quality Assurance Requirements for Fire Protection Items Relied On For Safety (TAC NO. 32707)

On May 28, 2010, AREVA Enrichment Services (AES) submitted a response (Reference 1) to the NRC Letter dated March 25, 2010 (Reference 2) regarding Quality Assurance (QA) requirements and grading of fire protection Items Relied On For Safety (IROFS) with respect to the Eagle Rock Enrichment Facility (EREF) Quality Assurance Program Description (QAPD). The AES response designated those automatic fire suppression systems installed in buildings and/or over areas containing licensed material-at-risk as IROFS to satisfy 10 CFR 70.64(b) requirements.

In response to recent conference calls with the NRC, the attached markup pages to Revision 2 of the EREF License Application contained in Enclosures 2 and 3 provide the detailed changes discussed in Reference 1. A new IROFS has been added to the Integrated Safety Analysis Summary (ISAS) to include automatic pre-action fire sprinkler systems in areas containing uranic material. A new QA designation of QA Level Fire Protection has also been added to the QAPD to describe the QA requirements for these systems. Additional conforming changes to the license application reflect these changes. The markup pages in Enclosures 2 and 3 will be incorporated into the next revision of the EREF License Application.

The markup changes for the QAPD include new QA Level Fire Protection (QA Level FP) requirements. The proposed changes to the QAPD do not constitute a reduction in commitment.

Enclosure 2 provides the markup pages of the EREF License Application Revision 2 that do not contain any proprietary or security-related sensitive unclassified non-safeguards information (SUNSI).

Enclosure 3 provides the markup pages of the EREF License Application that contain either proprietary or SUNSI information that AES is requesting be withheld from public disclosure in

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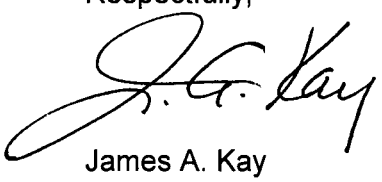
accordance with 10 CFR 2.390. In accordance with 10 CFR 2.390(b) an affidavit supporting our request to withhold this proprietary and SUNSI information is provided in Enclosure 1.

If you have any questions regarding this submittal, please contact me at (508) 573-6554.

Respectfully,



James A. Kay
Licensing Manager

References:

1) J. Kay (AES) Letter to the U.S. NRC dated May 28, 2010, Subject: Response to NRC Letter dated March 25, 2010, ML 100560385, Quality Assurance Requirements for Fire Protection Items Relied On For Safety - AREVA Enrichment Services LLC License Application for the Eagle Rock Enrichment Facility (TAC NO. 32707)

2) B. Reilly (NRC) Letter to J. Kay (AES), March 25, 2010, Subject: Quality Assurance Requirements for Fire Protection Items Relied On For Safety – AREVA Enrichment Services LLC License Application for the Eagle Rock Enrichment Facility (TAC NO. 32707)

Enclosures:

1) Affidavit of James A. Kay
2) Markup Pages of the SAR and QAPD - SAR Revision 2 and QAPD Revision 3.
3) Markup Pages of the ISAS and EP - Revision 2

Commitment:

1) The markup pages contained in Enclosures 2 and 3 will be included in the next revision of the EREF License Application.

cc:

Breeda Reilly, U.S. NRC Senior Project Manager

a) I am the Licensing Manager for the AREVA Enrichment Services LLC (AES), and as such have the responsibility of reviewing the proprietary and confidential information sought to be withheld from public disclosure in connection with our application to construct and operate a uranium enrichment facility. I am authorized to apply for the withholding of such proprietary and SUNSI information from public disclosure on behalf of AES.

b) I am making this affidavit in conformance with the provisions of 10 CFR 2.390 of the regulations of the Nuclear Regulatory Commission (NRC), and in conjunction with AES's request for withholding, which is accompanied by this affidavit.

c) I have knowledge of the criteria used by AES in designating information as proprietary or SUNSI.

d) By this submittal, AES seeks to protect from disclosure certain proprietary and SUNSI information contained in the EREF License Application Revision 2. The license application contains commercial information that is not public. Disclosure of this information could create inappropriate financial or other speculation regarding AES generally and the proposed enrichment facility specifically. This affidavit discusses the bases for withholding the markup pages of the ISA Summary and Emergency Plan, as indicated therein, from public disclosure. The ISAS and Emergency Plan also contain SUNSI that the NRC has previously determined to be withheld from public disclosure.

e) Pursuant to the provisions of 10 CFR 2.390(b)(4), the following is furnished for consideration by the NRC in determining whether the proprietary and SUNSI information sought to be protected should be withheld from public disclosure.

1. The information for which protection from disclosure is sought has been held in confidence by AES. This information is proprietary to AES, and AES seeks to protect it as such. The information proprietary to AES is found in the documents listed in paragraph (d), above. AES has separated the proprietary information and SUNSI from non-proprietary information in these documents. Therefore, AES seeks to protect the separated information from public disclosure.

2. The information sought to be withheld is of a type that would customarily be held in confidence by AES. The information consists of commercial information that provides a competitive advantage to AES.

3. The NRC has previously determined that the SUNSI should be withheld from public disclosure.

4. The information sought to be withheld is being provided to the NRC in confidence, and, under the provisions of 10 CFR 2.390, it is to be received in confidence by the NRC.

5. The information sought to be withheld is not available in public sources, to the best of AES's knowledge and belief.

6. Public disclosure of the proprietary information AES seeks to protect is likely to cause substantial harm to AES's competitive position within the meaning of 10 CFR 2.390(b)(4)(v). The proprietary information has substantial commercial value to AES.

For all of the reasons discussed above, AES requests that the identified proprietary and SUNSI information be withheld from public disclosure.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 15, 2010: J. A. Kay

Mr. James A. Kay
Licensing Manager of AES LLC
400 Donald Lynch Boulevard
Marlborough, MA 01752

Barbara Ann Lema
Notary Public 6/15/2010

Barbara Ann Lema, Notary Public
Commonwealth of Massachusetts
My Commission Expires 8/20/2010

Summary of Changes - EREF SAR Revision 2 and QAPD Revision 3

SAR Changes
Section 3.1.1 (page 3.1-3 and insert)
Section 3.3.1 (page 3.3-2)
Section 3.3.2 (page 3.3-4)
Section 3.3.7 (page 3.3-14)
Section 7.0 (page 7.0-1 and insert)
Sections 7.1 and 7.1.1 (page 7.1-1 and insert)
Section 7.3.8 (page 7.3-5 and insert)
Section 7.5.1.1.3 (page 7.5-2 and insert)
Section 7.5.1.4 (page 7.5-3 and insert)
Section 7.5.1.5 (page 7.5-4 and insert)
Section 11.0 (page 11.1-1 and insert)
Section 11.1 (pages 11.1-3 through 11.1-13)
Section 11.2 (pages 11.2-14 through 11.2-18, 11.2-20 through 11.2-24)
Section 11.3 (pages 11.3-26, 11.3-27, 11.3-35, 11.3-36)
Section 11.4 (pages 11.4-37 through 11.4-40, 11.4-42, 11.4-43)
Section 11.5 (page 11.5-44)
Section 11.5.3 (page 11.5-46)
Section 11.8 (page 11.8-54)

QAPD Changes
Table of Contents (page iii)
Section 2 (pages 7, 8, 9)
Inserts for QAPD and New Appendix A (4 pages)

the license submittal for this facility is not yet at the detailed design stage, detailed in-situ combustible loading and in-situ combustible configuration information is not yet available. Therefore, in order to place reasonable and conservative bounds on the fire scenarios analyzed, the ISA Team estimated in-situ combustible loadings based on information of the in-situ combustible loading for facilities of comparable capacity and configuration.

Further, preliminary layouts of the facility were used to identify where bulk electrical cabling routings would be expected and which areas, based on operations present, might use/store combustible materials in significant quantity. This is in addition to the reviews described in the NEF SAR. Combustible loading in areas where bulk UF_6 storage/handling occurs are expected to be very low.

The Fire Safety Management Program will limit the allowable quantity of transient combustibles in critical plant areas (i.e., uranium areas). Nevertheless, the ISA Team still assumed the presence of moderate quantities of ordinary (Class A) combustibles (e.g., trash, packing materials, maintenance items or packaging, etc.) in excess of anticipated procedural limits. This was not considered a failure of the associated administrative IROFS feature for controlling/ minimizing transient combustible loading in all radiation/uranium areas. Failure of the IROFS is connoted as the presence of extreme or severe quantities of transients (e.g., large piles of combustible solids, bulk quantities of flammable/combustible liquids or gases, etc.). Given the orientation and training that facility employees will receive indicating that these types of fire hazards are unacceptable, the administrative IROFS preventing severe accumulations has been assigned a high degree of reliability. Refer to the EREF ISA Summary for additional discussion.

Fires that involve additional in-situ or transient combustibles from outside each respective fire area could result in exposure of additional uranic content being released in a fire beyond the quantities assumed above. For this reason, fire barriers are needed to ensure that fires cannot propagate from non-uranium containing areas with significant combustible content into uranium (U) areas or from one U area to another U area (unless the uranium content in the space is insignificant, i.e., would be a low consequence event or the propagation of fire into the adjacent area would not result in the release of additional material). This is a change from the NEF where the combustible content and the material release were not used to determine the need for fire barriers. A more detailed evaluation of the need for fire barriers is performed by accounting for combustible content and additional material release.

Fire barriers shall be designed with adequate safety margin such that the total combustible loading (in-situ and transient) allowed to expose the barrier will not exceed 80% of the hourly fire resistance rating of the barrier.

Insert >

For external events, the impacts were evaluated for the following hazards:

External events were considered at the site and facility level versus at individual system nodes. Specific external event HAZOP guidewords were developed for use during the external event portion of the ISA. The external event ISA considered both natural phenomena and man-made hazards. During the external event ISA team meeting, each area of the plant was discussed as to whether or not it could be adversely affected by the specific external event under consideration. If so, specific consequences were then discussed. If the consequences were known or assumed to be high, then a specific design basis with a likelihood of highly unlikely would be selected.

Given that external events were considered at the facility level, the ISA for external events was completed after the ISA team meetings for all plant systems were completed. This provided the best opportunity to perform the ISA at the site or facility level. Each external event was assessed for both the uncontrolled case and then for the controlled case. The controlled cases

2d

Insert for SAR Section 3.1.1

Automatic fire suppression systems protecting buildings and/or areas containing licensed material-at-risk, which if released could exceed 10 CFR 70.61 performance requirements, have been designated as IROFS where such protection is practicable.

If at least three of the above criteria cannot be met, then the FPIN assigned to the IROFS and the associated accident sequence(s) will be re-evaluated and revised, as necessary, consistent with the overall ISA methodology.

- Upon completion of the design of IROFS, the IROFS boundaries will be defined. In defining the boundaries for each IROFS, ISA Summary Appendix A, Guidelines for Development of Boundary Definitions for IROFS will be used. These guidelines require the identification of each support system and component necessary to ensure the IROFS is capable of performing its specified safety function.

- IROFS will be designed, constructed, tested and maintained to QA Levels in accordance with the QAPD. IROFS will comply with design requirements established by the ISA and the applicable codes and standards (current approved version at the time of design). IROFS components and their designs will be of proven technology for their intended application. ~~These~~ IROFS components and systems will be qualified to perform their required safety functions under normal and accident conditions, e.g., pressure, temperature, humidity, seismic motion, electromagnetic interference, and radio-frequency interference, as required by the ISA. IROFS components and systems will be qualified using the applicable guidance in Institute of Electrical and Electronics Engineers (IEEE) standard IEEE-323, 1983, "IEEE Standard for Qualifying Class 1 E Equipment for Nuclear Power Generating Stations" (IEEE, 1983a). Furthermore, IROFS components and systems will be designed, procured, installed, tested, and maintained using the applicable guidance in Regulatory Guide 1.180, "Guidelines for Evaluating Electromagnetic and Radio-Frequency Interference in Safety-Related Instrumentation and Control Systems," Revision 1, dated October 2003 (NRC, 2003c). IROFS systems will be designed and maintained consistent with the reliability assumptions in the ISA. Redundant IROFS systems will be separate and independent from each other. IROFS systems will be designed to be fail-safe. In addition, IROFS systems will be designed such that process control system failures will not affect the ability of the IROFS systems to perform their required safety functions. Installation of IROFS systems will be in accordance with engineering specifications and manufacturer's recommendations. Required testing and calibration of IROFS will be consistent with the assumptions of the ISA and setpoint calculations, as applicable. For hardware IROFS involving instrumentation which provides automatic prevention or mitigation of events, setpoint calculations are performed in accordance with a setpoint methodology, which is consistent with the applicable guidance provided in Regulatory Guide 1.105, "Setpoints for Safety-Related Instrumentation," Revision 3, dated December 1999 (NRC, 1999).

- For IROFS that use software, firmware, microcode, programmable logic controllers, and/or any digital device, including hardware devices which implement data communication protocols (such as fieldbus devices and Local Area Network controllers), etc., design will adhere to accepted best practices in software and hardware engineering, including software quality assurance controls as discussed in the QAPD throughout the development process and the applicable guidance of the following industry standards and regulatory guides:

  a. American Society of Mechanical Engineers (ASME) NQA-1-1994, Part II, subpart Part 2.7, "Quality Assurance Requirements of Computer Software for Nuclear Facility Applications," as revised by NQA-1a-1995 Addenda of NQA-1-1994 and ASME NQA-1-1994, Part 1, Supplement 11S-2, "Supplementary Requirements of Computer Program Testing." (ASME, 1994a) (ASME, 1995) (ASME, 1994b)

or process (as applicable) involved and its relationship to facility safety. The requirements for independent verification are consistent with the applicable guidance provided in ANSI/ANS-3.2-1994 (ANSI, 1994).

- The following information related to IROFS will be available on-site in the ISA documentation once final design is completed.
  - Hardware IROFS design details, such as system schematics and/or descriptive lists, sufficient to determine the structures, system, equipment or component included within the hardware IROFS' boundary
  - Identification of essential utilities and support systems on which the IROFS depends to perform the intended safety functions
  - Operating ranges and limits for measured process variables, e.g., temperature, pressure, associated with IROFS
  - Basis for establishing the average vulnerable outage time to maintain acceptable IROFS availability
  - Safety limits and safety margins, as applicable.

3.3.2 Seismic Design

- To define the design basis earthquake (DBE) for the buildings assumed to withstand seismic events in the ISA, information from ASCE 43-05, Standard Seismic Design Criteria (ASCE, 2005b) was considered along with the results of the seismic portion of the ISA and the site-specific probabilistic seismic hazard analysis performed for the EREF site.

  The ASCE standard outlines a methodology to demonstrate compliance to a target performance goal of 1.0E-05 annual probability by designing to a seismic hazard of 1.0E-04 annual probability. The difference between the design level and the performance target is accounted for in the detailed design process by confirmatory calculations.

  Based on these approaches, the DBE for the EREF buildings assumed to withstand seismic events in the ISA has been selected as the 10,000-year (1.0E-04 mean annual probability) earthquake. For the EREF, following the ASCE approach provides a risk reduction ratio of design to target performance of 10 (1.0E-04/1.0E-05). This DBE for the buildings will be used in the detailed design process to demonstrate compliance with the overall ISA performance requirements. This will be accomplished by confirmatory seismic performance calculations for the seismic Items Relied on for Safety (IROFS) during detailed design. The ASCE standard addresses design and evaluation of structures, systems, and components (SSCs). The equivalents of SSCs for the EREF are considered to be the IROFS and the items that may affect the function of IROFS. The objective of the EREF seismic design approach is to demonstrate that use of this DBE for the buildings achieves a likelihood of unacceptable performance of less than approximately 1.0E-05 per year, by introducing sufficient design safety margins, i.e., conservatism, during the design process to allow for demonstration of compliance to the target performance goal. The ASCE standard implements this objective with the end result of demonstrating compliance to the target performance goal.

  The ASCE approach is based on achieving the target performance goal annual frequencies by incorporating sufficient conservatism in the seismic demand and structural capacity evaluations to achieve both of the following:

QA Level 1 and QA Level 2 2g

3.3.7 Utility and Support Systems Requirements

- The applicable codes and standards for the Cylinder Evacuation System are reflected in Table 3.3-9.
- The applicable codes and standards for utility and support systems, except for the portions of the Cylinder Preparation Systems addressed in Table 3.3-9, are reflected in Table 3.3-10.
- Exhaust flow from the potentially contaminated rooms (i.e., Decontamination Workshop, Chemical Trap workshop, Mobile Unit Disassembly & Reassembly Workshop, Valve & Pump Dismantling Workshop and Maintenance Facility) of the TSB is filtered by a pre-filter, HEPA filter, activated carbon filter and HEPA filter and is then released through an exhaust vent. The exhaust flow is continuously monitored for alpha and HF. The exhaust air is periodically sampled. The continuous monitoring and periodic sampling is in accordance with the guidance in Regulatory Guide 4.16 (NRC, 1985).
- The Electrical System design complies with the following codes and standards:
  - IEEE C2-2007, National Electrical Safety Code (IEEE, 2007a)
  - NFPA 70, National Electric Code (NFPA, 2008)
  - NFPA 70E, Standard for Electrical Safety Requirements for Employee workplaces (NFPA, 2004)
  - IEEE 80-2007, Guide for Safety in AC Substation Grounding (IEEE, 2000)
  - IEEE 81-1983, Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potential of a Ground System (IEEE, 1983b)
  - IEEE 142-2007, Grounding of Industrial and Commercial Power Systems (IEEE, 2007b)
- On a loss of electrical power, the systems associated with items relied on for safety (IROFS) will be designed such that the safety function is maintained or the feature fails-safe.
- The potential for hydrogen accumulation and explosion will be evaluated as part of final design. The number of batteries, battery type, and charge rate information is required to determine hydrogen generation potential. Once this information is known, the ability of the room or area housing the batteries to develop an ignitable mixture of hydrogen will be evaluated and will identify appropriate features required to prevent or mitigate the effects of hydrogen ignition.
- The ventilation control of hydrogen gas will be provided in accordance with National Fire Protection Association (NFPA) 70E–2004, Standard for Electrical Safety in the Workplaces, (NFPA, 2004) and the Institute of Electrical and Electronics Engineers (IEEE) C2-2007, National Electrical Safety Code (IEEE, 2007a).
- Based on the current level of design, battery control systems have been identified for use by the 13.8 kV switchgear systems. The control system requirements for the 480/440 V switchgear have not been fully developed. This system will require further definition during detailed design to determine the control power scheme to be utilized.
- The Communication and Alarm Annunciation Systems Design complies with the following Codes and Standards:
  - NFPA 70 – 2008. National Electric Code (NFPA, 2008)
  - NFPA 72 – 2007. National Fire Alarm Code (NPFA, 2007)
  - 29 CFR Part 1910.7. Occupational Safety and Health Standards (CFR, 2008e)

QA Level 1 and QA Level 2

7.0 FIRE SAFETY

This chapter documents the Eagle Rock Enrichment Facility (EREF) fire safety program. The fire safety program is part of the overall facility safety program and is intended to reduce the risk of fires and explosions at the facility. The facility safety program is described in Chapter 3, Integrated Safety Analysis (ISA) Summary. The fire safety program documents how the facility ensures fire safety.

The EREF fire safety program meets the acceptance criteria in Chapter 7 of NUREG-1520 (NRC, 2002) and is developed, implemented and maintained in accordance with the requirements of 10 CFR 70.62(a) (CFR, 2008a), 10 CFR 70.22 (CFR, 2008b), and 10 CFR 70.65 (CFR, 2008c). In addition, the fire safety program complies with 10 CFR 70.61 (CFR, 2008d), 10 CFR 70.62 (CFR, 2008a), and 10 CFR 70.64 (CFR, 2008e). NUREG/CR-6410 (NRC, 1998), NUREG-1513 (NRC, 2001), NRC Generic Letter 95-01 (NRC, 1995), and NFPA 801 (NFPA, 2008e) were utilized as guidance in developing this chapter.

The comparative differences between the EREF Fire Safety Program and measures prescribed for the National Enrichment Facility are as follows:

- The EREF will have automatic fire sprinkler coverage throughout the process facility structures except in those specific areas where safety analysis shows moderator control requirements take precedence.
- The EREF will provide limited standpipe coverage in the SBM and TSB/OSB to facilitate fire department response.

The basis for providing automatic sprinkler protection in process areas is to meet International Building Code requirements and to conform to recommendations of NFPA 801 to use sprinklers as the preferred type of automatic fire system – to the extent such use is consistent with criticality safety limits. Additionally, the off-site fire department response time to the site is longer than the NEF. Automatic sprinkler protection reduces the need to rely on fire brigade and fire department response and provides defense-in-depth. Insert 1

Standpipes are being proposed to facilitate deployment of hose streams by the off-site fire department, again consistent with criticality safety limits.

The NEF and EREF also differ due to site characteristics including property boundary, facility layout, variations in building and area names, more exterior cylinder storage pads, different building construction types due to differing building code requirements and natural phenomenon hazard (NPH) parameters, as well as minor differences in UF_6 operations and process layout.

The NEF provided fire-rated enclosures to separate sodium fluoride chemical traps from adjacent spaces and provided gaseous fire suppression systems in these enclosures. The EREF does not have similar provisions. The Separations Building Modules, where the sodium fluoride traps are located, is already classified as an H-4 occupancy under the International Building Code due to the inventory of UF_6. The presence of the sodium fluoride chemical traps does not change this occupancy classification nor increase the fire hazard in the space, therefore, the separating enclosures and fire suppression systems are not required.

The information provided in this chapter, the corresponding regulatory requirement and the section of NUREG-1520 (NRC, 2002), Chapter 7 in which the Nuclear Regulatory Commission (NRC) acceptance criteria are presented is summarized below:

Insert for SAR Section 7.0

Automatic fire suppression systems protecting buildings and/or over areas containing licensed material-at-risk have been designated as IROFS where such protection is practicable. These systems meet the QA Level Fire Protection (FP) requirements in order to meet 10 CFR 70.61 performance requirements.

7.1 FIRE SAFETY MANAGEMENT MEASURES

Fire safety management measures establish the fire protection policies for the site. The objectives of the fire safety program are to prevent fires from starting and to detect, control, and extinguish those fires that do occur. The fire protection organization and fire protection systems at the EREF provide protection against fires and explosions based on the structures, systems, and components (SSC) and defense-in-depth practices described in this chapter. Select fire barriers ~~and~~, administrative controls, and pre-action fire sprinkler systems are considered fire protection items relied on for safety (IROFS).

7.1.1 Fire Protection IROFS

Fire protection items relied on for safety (IROFS) are identified in Section 3.8 of the EREF Integrated Safety Analysis (ISA) Summary. Insert

7.1.2 Management Policy and Direction

AREVA Enrichment Services, LLC (AES) is committed to ensuring that the IROFS, as identified in the ISA Summary, are available and reliable, and that the facility maintains fire safety awareness among employees, controls transient ignition sources and combustibles, and maintains a readiness to extinguish or limit the consequences of fire. The facility maintains fire safety awareness among employees through its General Employee Training Program. The training program is described in Chapter 11, Management Measures.

The responsibility for fire protection rests with the Environmental Health, Safety & Licensing Manager who reports to the President. The Environmental Health, Safety & Licensing Manager is assisted by the Safety, Security, and Emergency Preparedness Manager whose direct responsibility is to ensure the day-to-day safe operation of the facility in accordance with occupational safety including the fire safety program. The personnel qualification requirements for the Environmental Health, Safety & Licensing Manager and the Safety, Security, and Emergency Preparedness Manager are presented in Chapter 2, Organization and Administration. Fire protection engineering support is provided by the engineering manager. The Safety, Security, and Emergency Preparedness Manager is assisted by fire safety personnel who are trained in the field of fire protection and have practical day-to-day fire safety experience at nuclear facilities. The fire protection staff is responsible for the following:

- Fire protection program and procedural requirements
- Fire safety considerations
- Maintenance, surveillance, and quality of the facility fire protection features
- Control of design changes as they relate to fire protection
- Documentation and record keeping as they relate to fire protection
- Fire prevention activities (i.e., administrative controls and training)
- Organization and training of the fire brigade
- Pre-fire planning.

The facility maintains a Safety Review Committee (SRC) that reports to the President. The SRC performs the function of a fire safety review committee. The SRC provides technical and

Insert for SAR Section 7.1.1

Fire Protection IROFS are categorized as either administrative to control transient combustibles, passive engineered controls for fire barriers between fire areas designated in the Fire Hazards Analysis, or active engineered controls for automatic fire suppression systems located in buildings and/or areas containing licensed material-at-risk in order to meet 10 CFR 70.61 performance requirements. The safety aspects of fire protection IROFS are controlled as follows:

- The Fire Safety Management Program along with employee training on this program will limit the allowable quantity of transient combustibles in uranium areas.

- Fire barriers shall be designed with adequate safety margin such that the total combustible loading allowed to expose the barrier will not exceed 80% of the hourly fire resistance rating of the barrier.

- Pre-action fire sprinkler systems are designed for protected areas by hazard class (NFPA) and include:

  - Area-wide smoke and/or fire detectors and fire alarm control panels,

  - Fire protection water supply including fire water storage tanks, fire pumps, fire pump controllers, and underground main and hydrant distribution system,

  - Fire sprinkler piping, sprinklers,

  - Circuitry, wiring, raceways, electronic hardware and software, and primary and secondary power supplies for all systems and sub-components listed above, and

  - Primary power supply boundaries ending at the first upstream supply breaker from the fire protection component being supplied (i.e., electric fire pump, local fire alarm panels, fire pump controller). These components will not be powered from the Short Break Load System and the Process UPS (No Break) System. The electric fire pump is supplemented by a separate diesel-driven fire pump and fire alarm control panels have integral batteries for secondary power per NFPA requirements. Breaker design for the normal alternating current supplies will be consistent with NFPA 70, National Electrical Code.

Fire protection IROFS physical components will be designed to a performance level equivalent to the Natural Phenomena Hazards required by the International Building Code; the edition of record will be that in effect when said features are submitted to the State of Idaho for construction permitting. Quality Assurance program requirements provide assurance that fire protection IROFS are designed, fabricated, erected, tested, maintained, and operated so that they will function as intended.

containment configuration will be addressed during the detailed design phase and the Safety Analysis Report will be revised, as appropriate. Water runoff from the Full Tails Cylinder, Full Feed Cylinder, Full Product Cylinder and Empty Cylinder Storage Pads will be collected in the Cylinder Storage Pads Stormwater Retention Basins. Liquid effluent monitoring associated with the Cylinder Storage Pads Stormwater Retention Basins is discussed in the Environmental Report.

7.3.7 Lightning Protection

Lightning protection for the facility is in accordance with NFPA 780 (NFPA, 2008d).

7.3.8 Criticality Concerns

Criticality controls will be provided by employing the basic principals of criticality safety. The premise of nuclear criticality prevention is that at least two, unlikely, independent, and concurrent changes in process conditions must occur before a criticality accident is possible. This double contingency principal is described in ANSI/ANS-8.1-1998 (ANSI, 1998). Controls or systems of controls are used to limit process variables in order to maintain safe operating conditions.

Insert

Moderation control is applied for criticality safety of UF_6 at the EREF. Automatic sprinkler systems will be provided in all process-related structures where required by the FHA. These systems are designed consistent with moderator control limitations to satisfy criticality safety criteria. The EREF FHA contains a methodology for the comparative evaluation of fire risk versus criticality risk for areas where moderator control is required. The methodology consists of decision-making hierarchy which systematically evaluates: 1) in-situ combustible quantities/configuration, 2) presence of transient combustibles, 3) presence of ignition sources, 4) presence of fissile materials, their quantity and configuration, 5) potential for water ingress in fissile containers, 6) potential to impact critically safe attributes (geometry, shapes, arrays, etc.), 7) reflection from external water spray, and 8) barriers that prevent inadvertent moderator introduction including their resilience under applicable design basis events. The completed analyses will be reviewed and approved by a criticality safety engineer.

Where double contingency principle cannot be satisfied (e.g., where fire might initiate a sprinkler activation concurrent with causing a leak in an enriched UF_6 vacuum piping system) or water is otherwise determined unacceptable by analysis, automatic sprinkler protection will be omitted or limited in coverage to ensure criticality safety is maintained or alternate fire protection measures will be taken. Figure 7.5-2 identifies those structures where sprinklers are proposed and moderator control is required. Nuclear Criticality Safety Analyses (NCSAs) will be performed to determine the specific moderator control attributes and sprinkler limitations.

With respect to fire hose streams, procedures and training for both onsite fire brigade and offsite fire department emphasize the need for moderator control in these areas. A criticality safety officer will be present anytime fire hose streams are to be deployed in a moderator control area. See Section 7.5 for additional information.

Fire protection concerns are also addressed in the moderation control areas by the fire protection program. The program includes administrative controls which limit the transient and in situ combustibles, controls ignition sources in these areas, and isolates these areas from other areas of the plant with appropriately rated fire barriers to preclude fire propagation to or from these areas. There are automatic detection and manual alarm systems located in these areas to ensure prompt response. Those elements of the fire protection program that are

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Insert for SAR Section 7.3.8

In areas containing licensed material-at-risk, which if released could exceed 10 CFR 70.61 performance requirements, the pre-action fire sprinkler systems have been designated as IROFS.

met with the hydraulically shortest flow path assumed to be out of service. Sectional control valves are arranged to provide adequate sectional control of the fire main loop to minimize protection impairments. All fire protection water system control valves are monitored under a periodic inspection program and their proper positioning is supervised in accordance with NFPA 801 (NFPA, 2008e). Exterior fire hydrants, equipped with separate shut-off valves on the branch connection, are provided at intervals to ensure complete coverage of all facility structures, including the Full Tails Cylinder, Full Feed Cylinder, Full Product Cylinder, and Empty Cylinder Storage Pads Cylinder Storage Pads.

The fire pumps are separated from each other by fire-rated barrier construction. One fire pump is electric-motor driven and one is diesel engine-driven to avoid common mode failure (e.g., bad fuel). The electric fire pump is powered from a normal (non-diesel backed) power supply. A dedicated diesel fuel tank is provided in or adjacent to the fire pump building for the diesel-engine driven pump and is sized to provide a minimum eight hour supply of fuel in accordance with NFPA 20 (NFPA, 2007d). The diesel fuel tank will have suitable spill containment.

Each pump is equipped with a dedicated listed controller. The pumps are arranged for automatic start functions upon a drop in the system water pressure as detected by pressure switches contained within the pump controllers. Use of start delay timers prevents simultaneous start of both pumps. Both pumps are maintained in the automatic start condition at all times, except during periods of maintenance and testing. Each fire pump controller interfaces with the site-wide fire alarm system, which is monitored and annunciated in the Control Room, for all alarm and trouble conditions required by NFPA 20 (NFPA, 2007d). Remote manual fire pump start switches are provided in the Control Room. Once activated, the fire pumps can only be shut-off at the pump controller location. Pumps, suction and discharge piping and valves are provided and arranged in accordance with NFPA 20 (NFPA, 2007d). The Fire Pump Building is provided with automatic sprinkler protection.

A jockey pump is provided in the Fire Pump Building to maintain pressure in the fire protection system during normal operation.

7.5.1.1.2 System Interfaces

The Fire Water Supply System interfaces with the site well water supply that supplies fill and make up water to the fire water supply storage tanks.

7.5.1.1.3 Safety Considerations

Failure of the Fire Water Supply System will not endanger public health and safety. The system is designed to assure water supply to automatic fire protection systems, standpipe systems and to fire hydrants located around the facility. This is accomplished by providing redundant water storage tanks and redundant fire pumps which are not subject to a common failure, electrical or mechanical. Insert

7.5.1.2 Standpipe and Hose Systems

As required by the FHA, standpipe systems and interior fire hose stations are provided and installed in accordance with NFPA 14 (NFPA, 2007c) in the following locations:

- Class I standpipe systems for fire brigade and the offsite fire department use are provided in the stairwells of the Process Service Corridor of the SBMs and the stairwells in TSB and OSB.

Insert for SAR Section 7.5.1.1.3

In areas containing licensed material-at-risk, the pre-action fire sprinkler systems have been designated as IROFS. These systems meet the QA Level Fire Protection (FP) requirements in order to meet 10 CFR 70.61 performance requirements. The safety aspects of fire protection IROFS are controlled as follows:

Pre-action fire sprinkler systems are designed for protected areas by hazard class (NFPA) and include:

- Area-wide smoke and/or fire detectors and fire alarm control panels,
- Fire protection water supply including fire water storage tanks, fire pumps, fire pump controllers, and underground main and hydrant distribution system,
- Fire sprinkler piping, sprinklers,
- Circuitry, wiring, raceways, electronic hardware and software, and primary and secondary power supplies for all systems and sub-components listed above, and
- Primary power supply boundaries ending at the first upstream supply breaker from the fire protection component being supplied (i.e., electric fire pump, local fire alarm panels, fire pump controller). These components will not be powered from the Short Break Load System and the Process UPS (No Break) System. The electric fire pump is supplemented by a separate diesel-driven fire pump and fire alarm control panels have integral batteries for secondary power per NFPA requirements. Breaker design for the normal alternating current supplies will be consistent with NFPA 70, National Electrical Code.

Fire protection IROFS physical components will be designed to a performance level equivalent to the Natural Phenomena Hazards required by the International Building Code; the edition of record will be that in effect when said features are submitted to the State of Idaho for construction permitting. Quality Assurance program requirements provide assurance that fire protection IROFS are designed, fabricated, erected, tested, maintained, and operated so that they will function as intended.

The systems are designed to provide a minimum flow recommended by NFPA 14 (NFPA, 2007c) for class I standpipe systems. The standpipe risers are separated from the building sprinkler system risers. The separation ensures that a single impairment will not disable both the sprinklers and the hose systems. Standpipes will be routed in a manner and suitably designed against NPH criteria to ensure their failure will not result in flooding of areas containing enriched uranium above a critical mass.

The remaining structures and areas of the site are two stories or less in height and are reachable by fire hose extended from the outside fire hydrants or fire apparatus.

In addition to fixed standpipes, the EREF will be provided with fire hose on mobile apparatus and/or at strategic locations throughout the facility. The amount of hose provided will be sufficient to ensure that all points within the facility will be able to be reached by at least two 38 mm (1½-in) diameter attack hose lines and one 64 mm (2½-in) diameter backup hose line consistent with NFPA 1410 (NFPA, 2005b). These lines are intended for use by the offsite fire response agencies in the event of a structural fire. Hydraulic margin for these hose lines will be sufficient to ensure minimum nozzle pressures of 4.5 bar (65 psig) for attack hose line(s) and 6.9 bar (100 psig) for the backup hose line.

7.5.1.3 Portable Extinguishers

Portable fire extinguishers are installed throughout all buildings in accordance with NFPA 10 (NFPA, 2007a). Multi-purpose extinguishers are provided in general areas for Class A, B, or C fires.

The portable fire extinguishers are spaced within the travel distance limitation and provide the area coverage specified in NFPA 10 (NFPA, 2007a). Specialized extinguishers are located in areas requiring protection of particular hazards. Supplemental fire extinguishers will be provided in water exclusion areas. In areas where water discharge is prohibited due to moderator control constraints, the preferred fire extinguisher agent is carbon dioxide due to its suitability for use on electrical equipment and lack of hydrogenous moderator.

7.5.1.4 Automatic Suppression Systems

Fire sprinkler systems are engineered to protect specific hazards in accordance with parameters established by the FHA. NFPA 801 (NFPA, 2008e) requires that fire sprinkler systems be provided for the nuclear related process areas of the facility except where determined unnecessary or inappropriate by the FHA. For the EREF, there are areas where sprinklers may be omitted or only provide partial coverage due to the need to mitigate the risk of criticality. In these cases, other controls to mitigate the impact of fire will be provided as required. The EREF FHA contains a methodology for comparative evaluation of fire risk and criticality risk. This methodology will be applied during detailed design to determine where sprinkler coverage should be limited or omitted and what other controls (i.e., alternate suppression, limitations on combustibles, etc.) should be applied. Insert

The areas proposed for sprinkler system coverage are shown in Figure 7.5-2, Sprinkler System Coverage including notation of structures/areas where moderator control concerns may limit sprinkler application or coverage.

Automatic preaction sprinkler systems designed and tested in accordance with NFPA 13 (NFPA, 2007b) are provided in following buildings, subject to moderator control restrictions:

- Process Service Corridor in the Separations Building Module

Insert for SAR Section 7.5.1.4

In areas containing licensed material-at-risk, the pre-action fire sprinkler systems have been designated as IROFS. These systems meet the QA Level Fire Protection (FP) requirements in order to meet 10 CFR 70.61 performance requirements.

- UF_6 Handling Area
- Technical Support Building
- Blending, Sampling and Preparation Building

Automatic wet pipe sprinkler systems, designed and tested in accordance with NFPA 13 (NFPA, 2007b) are provided in the following buildings:

- Administration Building
- Security and Secure Administration Building
- Long Term Warehouse
- Fire Pump Building
- Centrifuge Assembly Building
- Operation Support Building
- Short Term Warehouse

Water flow detection is provided to alarm and annunciate all sprinkler system actuations. Sprinkler system control valves are monitored under a periodic inspection program and their proper positioning is supervised in accordance with NFPA 801 (NFPA, 2008e) to ensure the systems remain operable.

7.5.1.5 Fire Detection Systems

Facility structures are provided with automatic fire detection installed in accordance with NFPA 72 (NFPA, 2007f) as required by the FHA or in accordance with the IBC (ICC, 2006). Automatic smoke, heat, or fire detectors are installed as appropriate to the hazard in all process structures as required by the FHA or in accordance with IBC (ICC, 2006) for early detection of fire conditions and/or to actuate preaction sprinkler valves to charge sprinkler piping in the protected areas. Insert 1

All structures protected by wet-pipe sprinkler systems will have sprinkler water flow and other system conditions monitored and alarmed in accordance with NFPA 72 (NFPA, 2007f).

7.5.1.6 Manual Alarm Systems

All facility structures are provided with manual fire alarm pull stations installed in accordance with NFPA 72, (NFPA, 2007f), NFPA 101 [Life Safety Code] (NFPA, 2006b); and as required by the FHA.

7.5.1.7 Fire Alarm System

Each building of the facility is monitored by a local fire alarm control panel (LFACP) installed in accordance with NFPA 72 (NFPA, 2007f). Each panel has a dual power supply, consisting of normal building power and backup power by either 24-hour battery or the facility UPS. The method of backup power will be determined in final design. Activation of a fire detector, manual pull station or water flow device results in an audible and visual alarm at the building control panel and the main fire alarm control panel.

The main fire alarm control panel (MFACP), located in the Control Room, is a listed, microprocessor-based addressable console connected via data highway to each individual 2a

Insert for SAR Section 7.5.1.5

In areas containing licensed material-at-risk, the pre-action fire sprinkler systems have been designated as IROFS. These systems meet the QA Level Fire Protection (FP) requirements in order to meet 10 CFR 70.61 performance requirements.

11.0 MANAGEMENT MEASURES

The management measures described in this license application are similar to those submitted for Nuclear Regulatory Commission (NRC) review in the LES license application for the National Enrichment Facility (NEF) (LES, 2005). The staff reviewed the NEF plans and commitments and concluded in the Safety Evaluation Report (SER) (NRC, 2005) that they provided assurance that IROFS will be available and reliable, consistent with the performance requirements of 10 CFR 70.61 (CFR, 2008a). The key differences between the EREF and NEF with respect to management measures are: 1) The changes to the QAPD, including the quality Level descriptions; and 2) The organization adopted by the EREF organization as described in SAR Chapter 2, Organization and Administration.

Management measures are functions applied to QA Level 1 and QA Level 2 items and activities as defined in the Quality Assurance Program Description (QAPD). These measures provide reasonable assurance that they are available and able to perform their functions when needed. QA Level 1 items and activities include those items and activities whose failure or malfunction could directly result in a condition that adversely affects public, worker and the environment as described in 10 CFR 70.61 (CFR, 2008a). The failure of a single QA Level 1 item could result in a high or intermediate consequence.

QA Level 2 items and activities include those items and activities whose failure or malfunction could indirectly result in a condition that adversely affects public, worker and the environment as described in 10 CFR 70.61 (CFR, 2008a). The failure of a QA Level 2 item, in conjunction with the failure of an additional item, could result in a high or intermediate consequence. All building and structure IROFS associated with credible external events are QA Level 2. QA Level 2 items and activities also include those attributes of items and activities that could interact with IROFS due to a seismic event, and result in high or intermediate consequences as described in 10 CFR 70.61 (CFR, 2008a).

This chapter addresses each of the management measures included in the 10 CFR 70.4 (CFR, 2008h) definition of management measures.

Management measures are implemented through a quality assurance (QA) program described in the AREVA Enrichment Services, LLC (AES) QAPD. The QA program also provides additional measures for ensuring that the design, construction, operation and decommissioning of QA Level 1 and QA Level 2 items and activities are controlled commensurate with their importance to safety.

AES maintains full responsibility for assuring that the Eagle Rock Enrichment Facility (EREF) is designed, constructed, tested, and operated in conformance with good engineering practices, applicable regulatory requirements and specified design requirements and in a manner to protect the health and safety of the public. The management measures described herein meet the requirements of 10 CFR 70.62(d) (CFR, 2008g) and are applied, as appropriate, during design, construction, pre-operational testing, and operation of the facility. AES and its contractors implement these management measures through the use of approved procedures. The information provided in this chapter, the corresponding regulatory requirement, and the section of NUREG-1520 (NRC, 2002), Chapter 11 in which the NRC acceptance criteria are presented is summarized below.

Insert for SAR Section 11.0

QA Level FP items include automatic fire suppression systems located in buildings and/or over areas containing licensed material-at-risk, which if released could exceed 10 CFR 70.61 performance requirements. QA Level FP activities include those actions needed to design, maintain and support operation of the automatic fire suppression systems located in buildings and/or over areas containing licensed material-at-risk.

configuration management system in accordance with approved AES procedures. Design changes undergo formal review, including interdisciplinary reviews as appropriate, in accordance with these procedures. These interdisciplinary reviews include, as a minimum, the review for ISA impacts.

Configuration management provides the means to establish and maintain the essential features of the design basis of QA Level 1, ~~and~~ QA Level 2 items and activities, including the ISA. As the project progresses from the design and construction phase to the operation phase, configuration management is maintained by the Engineering organization as the overall focus of activities changes. Procedures will define the turnover process and responsibilities as construction continues on new work modules during operation.

During the design phase of the project, configuration management is based on the design control provisions and associated procedural controls over design documents to establish and maintain the technical baseline. Design documents, including the ISA, provide design input, design analysis, or design results specifically for QA Level 1, ~~and~~ QA Level 2 items and activities and ~~are~~ identify the appropriate QA Level. These design documents undergo interdisciplinary review during the initial issue and during each subsequent revision. During the construction phase of the project, changes to drawings and specifications issued for construction, procurement, or fabrication are systematically reviewed and verified, evaluated for impact, including impact to the ISA, and approved prior to implementation. Proper implementation is verified and reflected in the design basis documentation.

In order to provide for the continued safe and reliable operation of the facility structures, systems and components, measures are implemented to ensure that the quality of these structures, systems and components is not compromised by planned changes (modifications). After issuance of the Operating License, the Engineering Manager is responsible for the design of and modifications to facility structures, systems or components. The design and implementation of modifications are performed in a manner so as to assure quality is maintained in a manner commensurate with the remainder of the system which is being modified, or as dictated by applicable regulations.

The administrative instructions for modifications during the operations phase are contained in procedures that are approved, including revisions, by the Engineering Manager. The modification procedure contains the following items necessary to ensure quality in the modification program:

- The technical and quality requirements which shall be met to implement a modification
- The requirements for initiating, approving, monitoring, designing, verifying, and documenting modifications. The facility modification procedure shall be written to ensure that policies are formulated and maintained to satisfy the AES QA Program, as applicable.

Each change to the facility or to activities of personnel shall have an evaluation performed in accordance with the requirements of 10 CFR 70.72 (CFR, 2008b), as applicable. Each modification shall also be evaluated for any required changes or additions to the facility's procedures, personnel training, testing program, or regulatory documents.

For any change (i.e., new design or operation, or modification to the facility or to activities of personnel, e.g., site structures, systems, components, computer programs, processes, operating procedures, management measures), that involves or could affect uranium on site, a Nuclear Criticality Safety (NCS) evaluation and, if required, an NCS analysis shall be prepared and approved. Prior to implementing the change, it shall be determined that the entire process will be subcritical (with applicable margin for safety) under both normal and credible abnormal conditions.

Each modification is also evaluated and documented for radiation exposure to minimize worker exposures in keeping with the facility as low as reasonably achievable (ALARA) program, criticality and worker safety requirements and/or restrictions. Other areas of consideration in evaluating modifications may include, but are not limited to the review of:

- Modification cost
- Lessons learned from similar completed modifications
- QA requirements
- Potential operability or maintainability concerns
- Constructability concerns
- Post-modification testing requirements
- Environmental considerations
- Human factors
- Integrated safety analysis.

After completion of a modification to a structure, system, or component, the Engineering Manager, or designee, shall ensure that all applicable testing has been completed to ensure correct operation of the system(s) affected by the modification and documentation regarding the modification is complete. In order to ensure operators are able to operate a modified system safely, when a modification is complete, all documents necessary, e.g., the revised process description, checklists for operation and flowsheets are made available to operations and maintenance departments prior to the start-up of the modified system. Appropriate training on the modification is completed before a system is placed in operation. A formal notice of a modification being completed is distributed to all appropriate managers. As-built drawings incorporating the modification are completed in accordance with the design control procedures. These records shall be identifiable and shall be retained in accordance with the records management procedures.

11.1.1.1 Scope of Structures, Systems, and Components

The scope of SSC's under configuration management includes all QA Level 1, ~~and~~ QA Level 2 and QA Level FP items and activities. Design documents subject to configuration management include calculations, safety analyses, design criteria, engineering drawings, system descriptions, technical documents, and specifications that establish design requirements for QA Level 1, ~~and~~ QA Level 2 items and activities. During the design phase, these design documents are maintained under configuration management when initially approved.

and QA Level FP

The scope of documents included in the configuration management program expands throughout the design process. As drawings and specification sections related to QA Level 1, ~~and~~ QA Level 2 items and activities are prepared and issued for procurement, fabrication, or construction, these documents are included in configuration management.

During construction, initial startup, and operations, the scope of documents under configuration management similarly expands to include, as appropriate: vendor data; test data; inspection data; initial startup, test, operating and administrative procedures as applicable to QA Level 1, ~~and~~ QA Level 2 items and activities; and nonconformance reports. These documents include documentation related to QA Level 1, ~~and~~ QA Level 2 items and activities that is generated through functional interfaces with QA, maintenance, and training and qualifications of personnel.

and QA Level FP

Configuration management procedures will provide for evaluation, implementation, and tracking of changes to QA Level 1, ~~and~~ QA Level 2 items and activities, and processes, equipment, computer programs, and activities of personnel that impact QA Level 1, ~~and~~ QA Level 2 items and activities.

11.1.1.2 Interfaces with Other Management Measures

Configuration management is implemented through or otherwise related to other management measures. Key interfaces and relationships to other management measures are described below:

- **Quality Assurance -** The QA program establishes the framework for configuration management and other management measures for QA Level 1, ~~and~~ QA Level 2 items and activities.
- **Records Management -** Records associated with QA Level 1, ~~and~~ QA Level 2 items and activities are generated and processed in accordance with the applicable requirements of the QA Program and provide evidence of the conduct of activities associated with the configuration management of those QA Level 1 ~~and~~ QA Level 2 items and activities.
- **Maintenance -** Maintenance requirements are established as part of the design basis, which is controlled under configuration management. Maintenance records for QA Level 1 ~~and~~ QA Level 2 items and activities provide evidence of compliance with preventative and corrective maintenance schedules.
- **Training and Qualifications -** Training and qualification are controlled in accordance with the applicable provisions of the QA Program. Personnel qualifications and/or training to specific processes and procedures are management measures that support the safe operation, maintenance, or testing of QA Level 1, ~~and~~ QA Level 2 items and activities. Also, work activities that are themselves QA Level 1, ~~or~~ QA Level 2 items and activities, (i.e., administrative controls) are proceduralized, and personnel are trained and qualified to these procedures. Training and qualification requirements and documentation of training may be considered part of the design basis controlled under configuration management. Reference Sections 11.3.2, Analysis and Identification of Functional Areas Requiring Training, and 11.3.3, Position Training Requirements, for interfaces with configuration management.
- **Incident Investigation/Audits and Assessments -** Audits, assessments, and incident investigations are described in Sections 11.5, Audits and Assessments, and 11.6, Incident Investigations and Corrective Action Process. Corrective actions identified as a result of these management measures may result in changes to design features, administrative controls, or other management measures (e.g., operating procedures). The Corrective Action Program (CAP) is described in Section 11.6, Incident Investigations and Corrective Action Process. Changes are evaluated under the provisions of configuration management through the QA Program and procedures. Periodic assessments of the configuration management program are also conducted in accordance with the audit and assessment program described in Section 11.5.
- **Procedures -** Operating, administrative, maintenance, and emergency procedures are used to conduct various operations associated with QA Level 1, ~~and~~ QA Level 2 items and activities and will be reviewed for potential impacts to the design basis. Also, work activities that are themselves designated as QA Level 1, ~~or~~ QA Level 2 (i.e., administrative controls) are contained in procedures.

11.1.1.3 Objectives of Configuration Management

The objectives of configuration management are to ensure design and operation within the design basis of QA Level 1, ~~and~~ QA Level 2 items and activities by: identifying and controlling preparation and review of documentation associated with QA Level 1, ~~and~~ QA Level 2 items and activities; controlling changes to QA Level 1, ~~and~~ QA Level 2 items and activities; and maintaining the physical configuration of the facility consistent with the approved design.

The ETC technology transfer documentation provides the enrichment plant design, and identifies those safety trips and features credited in the European safety analyses for the core process technology. AES has contracted with an architect/engineering firm to provide preliminary design for supporting structures and systems including those credited in the safety analyses. The ISA of the design bases determines the IROFS and establishes the safety function(s) associated with procedures for controlling design, including preparation, review (including interdisciplinary review), design verification where appropriate, approval, and release and distribution for use. These determinations will be reviewed, verified or modified as necessary after detailed design is available. The detailed design will also establish the design bases for non-IROFS QA Level 1 and QA Level 2 items and activities. Engineering documents will be assessed for QA Level classification. Changes to the approved design are subject to a review to ensure consistency with the design bases of QA Level 1, ~~and~~ QA Level 2 items and activities. Configuration verification is also accomplished through design verification, which ensures that design documents are consistent and that design requirements for QA Level 1 and QA Level 2 items and activities are met. During construction and testing, this verification also extends to verification that as-built configurations are consistent with the design, and that testing that is specified to demonstrate performance of QA Level 1 and QA Level 2 items and activities is accomplished successfully. Periodic audits and assessments of the configuration management program and of the design confirm that the system meets its goals and that the design is consistent with the design bases. The corrective action process occurs in accordance with the AES QA Program and associated procedures in the event problems are identified. Prompt corrective actions are developed as a result of incident investigations or in response to audit or assessment results.

11.1.1.4 Description of Configuration Management Activities

Configuration management includes those activities conducted under design control provisions for ensuring that design and construction documentation is prepared, reviewed, and approved in accordance with a systematic process. This process includes interdisciplinary reviews appropriate to ensure consistency between the design and the design bases of QA Level 1 ~~and~~ QA Level 2 items and activities. During construction, it also includes those activities that ensure that construction is consistent with design documents. Finally, it includes activities that provide for operation of the QA Level 1 ~~and~~ QA Level 2 items and activities in accordance with the limits and constraints established in the ISA, and that provide for control of changes to the facility in accordance with 10 CFR 70.72 (CFR, 2008b).

Configuration management also includes records to demonstrate that personnel conducting activities that are associated with QA Level 1, ~~and~~ QA Level 2 items and activities are appropriately qualified and trained to conduct that work.

Implementing documents are controlled within the document control system. These documents support configuration management by ensuring that only reviewed and approved procedures, specifications and drawings are used for procurement, construction, installation, testing, operation, and maintenance of QA Level 1, ~~and~~ QA Level 2 items and activities, as appropriate.

11.1.1.5 Organizational Structure and Staffing Interfaces

The configuration management program is administered by the Engineering organization during design, construction and operations. Engineering includes engineering disciplines with responsible lead engineers in charge of each discipline, under the direction of design managers or task managers who report to the Engineering Manager. The lead discipline engineers have primary technical responsibility for the work performed by their disciplines, and are responsible for the conduct of interdisciplinary reviews as discussed previously in this section. Reviews are also conducted, as appropriate, by construction management, operations, QA, and procurement personnel. The design control process also interfaces with the document control and records management process via procedures.

The various AES departments and contractors of AES perform quality-related activities. The primary AES contractors are responsible for development of their respective QA Programs, as applicable to their scope of work or they work under the AES QA program following appropriate training. The interfaces between contractors and AES or among contractors shall be documented. AES and contracted personnel have the responsibility to identify quality problems. If a member of another area disagrees, that individual is instructed to elevate the matter to appropriate management. The disagreement may either be resolved at this Level or at any Level up to and including the AES President.

11.1.2 Design Requirements

Design requirements and associated design bases are established and maintained by the Engineering organization during design, construction and operations. The configuration management controls on design requirements and the integrated safety analysis of the design bases are described previously in this section. Design requirements are documented in a design requirements document that provides for a hierarchical distribution of these requirements through basis of design documents. The design requirements document and basis of design documents are controlled under the design control provisions of the configuration management program as described above, and are subject to the same change control as analyses, specifications, and drawings. Computer codes used in the design of QA Level 1 and QA Level 2 items and activities are also subject to these design control measures, with additional requirements as appropriate for software control, verification, and validation.

Design documents associated with QA Level 1, ~~and~~ QA Level 2 items and activities (and QA Level FP) are subject to interdisciplinary reviews and design verification, as applicable. Analyses constituting the integrated safety analysis of the design bases are subject to the same requirements. Changes to the design are evaluated to ensure consistency with the design bases.

IROFS are listed in the design requirements document. This list will be augmented and maintained current as appropriate as QA Level 1, and QA Level 2 items and activities are identified during detailed design. (and QA Level FP)

A qualified individual who specifies and includes the appropriate codes, standards, and licensing commitments within the design documents prepares each design document, such as a calculation, specification, procedure, or drawing. This individual also notes any deviations or changes from such standards within the design documentation package. Each design document is then checked by another individual qualified in the same discipline and is reviewed for concept and conformity with the design inputs. These design inputs are in sufficient detail to permit verification of the document. The manager having overall responsibility for the design function approves the document. The Engineering Manager documents the entire review process in accordance with approved procedures. These procedures include provisions to

for QA Level 1 and QA Level 2 items and activities

assure that appropriate quality standards are specified in design documents, including quantitative or qualitative acceptance criteria. The QA Manager conducts audits of the design control process using independent technically qualified individuals to augment the QA audit team.

During the design check and review, emphasis is placed on assuring conformance with applicable codes, standards and license application design commitments. The individuals in engineering assigned to perform the check and review of a document have full and independent authority to withhold approval until issues concerning the work have been resolved. Design reviews, alternative calculations, or qualification testing accomplishes verification of design. The bases for a design, such as analytical models, theories, examples, tables, codes and computer programs must be referenced in the design document if appropriate and their application verified during check and review. Model tests, when required to prove the adequacy of a concept or a design, are reviewed and approved by the responsible qualified individual. Testing used for design verification shall demonstrate adequacy of performance under conditions that simulate the most adverse design conditions. The tests used for design verification must meet all the design requirements.

Qualified individuals other than those who performed the design but who may be from the same organization perform design verification. Verification may be performed by the supervisor of the individual performing the design, provided this need is documented, approved in advance by the supervisor's management, and the supervisor did not specify a singular design approach or rule out certain design considerations, and did not establish the design inputs used in the design or, provided the supervisor is the only individual in the organization competent to perform the verification. The verification by a supervisor of their own design constraints, design input, or design work would only occur in rare instances. This would occur only when the supervisor is the only individual in the organization competent to perform the verification. These instances are authorized and documented in writing on a case-by-case basis.

Independent design verification shall be accomplished before the design document (or information contained therein) is released for use by other organizations for design work or to support other activities such as procurement, construction, or installation. When this is not practical due to time constraints, the unverified portion of the document is identified and controlled. In all cases, the design verification shall be completed before relying on the item to perform its function or installation becomes irreversible. Any changes to the design and procurement documents, including field changes, must be reviewed, checked and approved commensurate with the original approval requirements.

After design documents have been properly prepared, checked, reviewed, and approved by the appropriate parties, the responsible engineer sends the document to document control for distribution. When required, each recipient of a design document verifies receipt of such document to the document control center.

The document control center, after verification of distribution to a recipient, maintains the required documentation in its files.

When deficiencies are identified which affect the design of QA Level 1, and QA Level 2 items and activities, such deficiencies are documented and resolved in accordance with approved Corrective Action Program (CAP) procedures. In accordance with the CAP, the report is forwarded for appropriate review to the responsible manager, who coordinates further review of the problem and revises all design documents affected by the deficiency as necessary. When required, the responsible manager forwards the report to the engineers in other areas, who coordinate necessary revisions to their affected documents

Design interface is maintained by communication among the principals, including the following:

A. Design documents are reviewed by the responsible engineer or authorized representative. As appropriate, subsequent review or waiver of review by the other area engineers is documented.

B. Project review meetings are scheduled and held to coordinate design, procurement, construction and pre-operational testing of the facility. These meetings provide a primary working interface among the principal organizations.

C. Reports of nonconformances are transmitted and controlled by procedures. As required by the nonconformance procedure, the QA Manager or designee approves resolution of nonconformances.

During the operational phase, measures are provided to ensure responsible facility personnel are made aware of design changes and modifications that may affect the performance of their duties.

11.1.2.1 Configuration Management Controls on the Design Requirements

Configuration control is accomplished during design through the use of procedures for controlling design, including preparation, review (including interdisciplinary review and preparation of NCS analyses and NCS evaluations as applicable), and design verification where appropriate, approval, and release and distribution for use. Engineering documents are assessed for QA Level classification. Changes to the approved design also are subject to a review to ensure consistency with the design bases of QA Level 1, and QA Level 2 items and activities. and QA Level FP

Configuration verification is also accomplished through design verification, which ensures that design documents are consistent and that design requirements for QA Level 1 and QA Level 2 items and activities are met. During construction and testing, this verification also extends to verification that as-built configurations are consistent with the design, and that testing that is specified to demonstrate performance of QA Level 1 and QA Level 2 items and activities is accomplished successfully.

The QA Program requires procedures that specify that work performed shall be accomplished in accordance with the requirements and guidelines imposed by applicable specifications, drawings, codes, standards, regulations, quality assurance criteria and site characteristics.

Acceptance criteria established by the designer are incorporated in the instructions, procedures and drawings used to perform the work. Documentation is maintained, including test results, and inspection records, demonstrating that the work has been properly performed. Procedures also provide for review, audit, approval and documentation of activities affecting the quality of items to ensure that applicable criteria have been met.

Maintenance, modification, and inspection procedures are reviewed by qualified personnel knowledgeable in the quality assurance disciplines to determine:

A. The need for inspection, identification of inspection personnel, and documentation of inspection result

B. That the necessary inspection requirements, methods, and acceptance criteria have been identified.

Facility procedures shall be reviewed by individuals knowledgeable in the area affected by the procedure on a frequency determined by the age and use of the procedure to determine if

changes are necessary or desirable. Procedures are also reviewed to ensure that they are maintained up-to-date with facility configuration and regulatory requirements. These reviews are intended to ensure that any modifications to facility systems, structures or components are reflected in current maintenance, operations and other facility procedures.

11.1.3 Document Control

Procedures are established which control the preparation and issuance of documents such as manuals, instructions, drawings, procedures, specifications, procurement documents and supplier-supplied documents, including any changes thereto. Measures are established to ensure documents, including revisions, are adequately reviewed, approved, and released for use by authorized personnel.

Document control procedures require documents to be transmitted and received in a timely manner at appropriate locations including the location where the prescribed activity is to be performed. Controlled copies of these documents and their revisions are distributed to and used by the persons performing the activity.

Superseded documents are destroyed or are retained only when they have been properly labeled. Indexes of current documents are maintained and controlled.

Document control is implemented in accordance with procedures. An electronic document management system is used both to file project records and to make available the latest revision (i.e., the controlled copy) of design documents. The system provides an "official" copy of the current document, and personnel are trained to use this system to retrieve controlled documents. The system is capable of generating indices of controlled documents, which are uniquely numbered (including revision number). Controlled documents are maintained until cancelled or superseded, and cancelled or superseded documents are maintained as a record, currently for the life of the project or termination of the license, whichever occurs later. Hard-copy distribution of controlled documents is provided when needed in accordance with applicable procedures (e.g., when the electronic document management system is not available).

A part of the configuration management program, the document control and records management procedures, as appropriate, capture the following documents:

- Design requirements, through the controlled copy of the design requirements document
- The design bases, through the controlled copy of the basis of design documents
- The integrated safety analysis of the design bases of IROFS ~~and credited attributes of safe-by-design components~~, through the controlled copies of supporting analyses
- Nuclear Criticality Safety Analyses
- Nuclear Criticality Safety Evaluations
- As-built drawings
- Specifications
- Procedures that are IROFS
- Procedures involving training
- QA/QC documentation
- Maintenance

- Audit and assessment reports
- Emergency operating procedures
- Emergency response plans
- System modification documents
- Assessment reports
- Engineering documents including analyses, specifications, technical reports, and drawings. These items are documented in approved procedures.

11.1.4 Change Control

Procedures control changes to the technical baseline. The process includes an appropriate Level of technical, management, and safety review and approval prior to implementation. During the design phase of the project, the method of controlling changes is the design control process described in the QA Program. This process includes the conduct of interdisciplinary reviews that constitute a primary mechanism for ensuring consistency of the design with the design bases. During both construction and operation, appropriate reviews to ensure consistency with the design bases of QA Level 1, and QA Level 2, and QA Level FP items and activities and the ISA will ensure that the design is constructed and operated/modified within the limits of the design basis. Additional details are provided below.

11.1.4.1 Design Phase

Changes to the design include a systematic review of the design bases for consistency. In the event of changes to reflect design or operational changes from the established design bases, both the integrated safety analysis and other documents affected by design bases of QA Level 1, and QA Level 2, items and activities including the design requirements document and basis of design documents, as applicable are properly modified, reviewed, and approved prior to implementation. Approved changes are made available to personnel through the document control function discussed previously in this section.

During design (i.e., prior to issuance of the EREF Materials License), the method of ensuring consistency between documents, including consistency between design changes and the safety assessment, is the interdisciplinary review process. The interdisciplinary reviews ensure design changes either: (1) do not impact the ISA; (2) are accounted for in subsequent changes to the ISA; or (3) are not approved or implemented. Prior to the NRC's issuance of the Materials License, AES will submit potential changes that reduce the level of commitments or margin of safety in the design bases of QA Level 1, ~~and~~ QA Level 2, and QA Level FP items and activities to the NRC for review and approval prior to implementation of the change.

11.1.4.2 Construction Phase

When the project enters the construction phase, changes to documents issued for construction, fabrication, and procurement will be documented, reviewed, approved, and posted against each affected design document. Vendor drawings and data also undergo an interdisciplinary review when necessary to ensure compliance with procurement specifications and drawings, and to incorporate interface requirements into facility documents.

During construction, design changes will continue to be evaluated against the approved design bases. Changes are expected to the design as detailed design progresses and construction

and QA Level FP

begins. A systematic process consistent with the process described above will be used to evaluate changes in the design against the design bases of QA Level 1, ~~and~~ QA Level 2 items and activities and the ISA. Upon issuance of the EREF Materials License, the configuration change process will fully implement the provisions of 10 CFR 70.72 (CFR, 2008b), including reporting of changes made without prior NRC approval as required by 10 CFR 70.72(d)(2) and (3). Changes that require Commission approval, will be submitted as a license amendment request as required by 10 CFR 70.72(d)(1) and the change will not be implemented without prior NRC approval.

11.1.4.3 Operations Phase

During the operations phase, changes to design will be documented, reviewed, and approved prior to implementation. AES will implement a change process that fully implements the provisions of 10 CFR 70.72 (CFR, 2008b). Measures are provided to ensure responsible facility personnel are made aware of design changes and modifications that may affect the performance of their duties.

In order to provide for the continued safe and reliable operation of the facility structures, systems and components, measures are established to ensure that the quality of these structures, systems and components is not compromised by planned changes (modifications). The Engineering Manager develops all design changes to the facility. The design and implementation of modifications are performed in a manner so as to assure quality is maintained in the remainder of the system that is being modified, or as dictated by applicable regulations.

The administrative instructions for modifications are contained in a facility administrative procedure that is approved, including revisions, by the Engineering Manager with concurrence of the Quality Assurance Manager. The modification procedure contains the following items necessary to ensure quality in the modification program:

- The requirements that shall be met to implement a modification
- The requirements for initiating, approving, monitoring, designing, verifying, and documenting modifications. The facility modification procedure shall be written to ensure that policies are formulated and maintained to satisfy the quality assurance requirements specified in the AES QA Program, as applicable.

Each change to the facility or to activities of personnel shall have an evaluation performed in accordance with the requirements of 10 CFR 70.72 (CFR, 2008b), as applicable. Each modification shall also be evaluated for any required changes or additions to the facility's procedures, personnel training, testing program, or regulatory documents. For changes (i.e., new design or operation, or modification to the facility or to activities of personnel, e.g., site structures, systems, components, computer programs, processes, operating procedures, management measures) that involve or could affect uranium on site, a Nuclear Criticality Safety (NCS) evaluation and, if required, an NCS analysis shall be prepared and approved. Prior to implementing the change, it shall be determined that the entire process will be subcritical (with applicable margin for safety) under both normal and credible abnormal conditions.

Each modification is also evaluated and documented for radiation exposure to minimize worker exposures in keeping with the facility ALARA program, criticality and worker safety requirements and/or restrictions. Other areas of consideration in evaluating modifications may include, but are not limited to the review of:

- Modification cost
- Lessons learned from similar completed modifications

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- QA aspects
- Potential operability or maintainability concerns
- Constructability concerns
- Post-modification testing requirements
- Environmental considerations
- Human factors.

After completion of a modification to a structure, system, or component, the modification project engineer shall ensure that all applicable testing has been completed to ensure correct operation of the system(s) affected by the modification and documentation regarding the modification is complete. In order to ensure operators are able to operate a modified system safely, when a modification is complete, all documents necessary, e.g., the revised process description, checklists for operation and flowsheets are made available to operations and maintenance departments once the modified system becomes "operational." Appropriate training on the modification is completed before a system is placed in operation. A formal notice of a modification being completed is distributed to all appropriate managers. As-built drawings incorporating the modification are completed promptly. These records shall be identified and shall be retained for the duration of the facility license.

11.1.5 Assessments

Periodic assessments of the configuration management program are conducted to determine the system's effectiveness and to correct deficiencies. These assessments include review of the adequacy of documentation and system walk downs of the as-built facility. Such assessments are conducted and documented in accordance with procedures and scheduled as discussed in the QAPD ~~Appendix A~~, Section 18, Internal Audits.

Periodic assessments of the configuration management program and of the design confirm that the system meets its goals and that the design is consistent with the design bases. Incident investigations occur in accordance with the QA Program and associated CAP procedures in the event problems are encountered. Prompt corrective actions are developed as a result of incident investigations or in response to adverse audit/assessment results, in accordance with CAP procedures.

11.2 MAINTENANCE

This section outlines the maintenance and functional testing programs to be implemented for the operations phase of the facility. Preventive maintenance activities, surveillance, and performance trending provide reasonable and continuing assurance that QA Level 1, ~~and~~ QA Level 2, and QA Level FP items will be available and reliable to perform their safety functions.

The purpose of planned and scheduled maintenance for QA Level 1, ~~and~~ QA Level 2 items is to ensure that the equipment and controls are kept in a condition of readiness to perform the planned and designed functions when required. Appropriate ~~plant~~ management is responsible for ensuring the operational readiness of QA Level 1, ~~and~~ QA Level 2 items under this control. For this reason, the maintenance function is administratively closely coupled to operations. The Maintenance organization plans, schedules, tracks, and maintains records for maintenance activities.

In order to provide for the continued safe and reliable operation of the facility structures, systems and components, measures are established to ensure that the quality of these structures, systems and components is not compromised by planned changes (modifications) or maintenance activities. The Engineering Manager develops design changes to the facility. After issuance of the Operating License, the Plant Manager has overall responsibility for the design of and modifications to facility structures, systems or components and maintenance activities. The design and implementation of modifications are performed in a manner so as to assure quality is maintained in a manner commensurate with the remainder of the system which is being modified, or as dictated by applicable regulations.

The administrative instructions for modifications are contained in a facility administrative procedure that is approved, including revisions, by the Engineering Manager with concurrence of the Quality Assurance Manager. The modification procedure contains the following items necessary to ensure quality in the modification program:

- The requirements which shall be met to implement a modification

The requirements for initiating, approving, monitoring, designing, verifying, and documenting modifications. The facility modification procedure shall be written to ensure that policies are formulated and maintained to satisfy the quality assurance standards specified in the AES QA Program, as applicable.

Listed below are methods or practices that will be applied to the corrective, preventive, and functional-test maintenance elements. AES will prepare written procedures for performance of these methods and practices. These methods and practices include, as applicable:

- Parts lists
- As-built or redlined drawings
- A notification step to the Operations function before conducting repairs and removing an IROFS from service
- Radiation Work Permits
- Replacement with like-kind parts and the control of new or replacement parts to ensure compliance with 10 CFR 21 (CFR, 2008c)
- 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 the removal of IROFS from service
- Notification to Operations personnel that repairs have been completed.

Written procedures for the performance of maintenance activities include the steps listed above. The details of maintenance procedure acceptance criteria, reviews, and approval are provided in Section 11.4, Procedures Development and Implementation.

As applicable, contractors that work on or near IROFS identified in the ISA Summary will be required by AES to follow the same maintenance procedures described for the corrective, preventive, functional testing, or surveillance/monitoring activities listed above for the maintenance function.

Maintenance procedures involving QA Level 1, ~~and~~ QA Level 2 and QA Level FP items and activities commit to the topics listed below for corrective and preventive maintenance, functional testing after maintenance and surveillance/monitoring maintenance activities, as applicable:

- Pre-maintenance activities require reviews of the work to be performed, including procedure reviews for accuracy and completeness.
- New procedures or work activities that involve or could affect uranium on site require preparation and approval of an NCS evaluation and, if required, an NCS analysis.
- Steps that require notification of affected parties (operators and appropriate managers) before performing work and on completion of maintenance work. The discussion includes potential degradation of QA Level 1, ~~and~~ QA Level 2 and QA Level FP items and activities during the planned maintenance.
- Control of work by comprehensive procedures to be followed by maintenance technicians. Maintenance procedures are reviewed by the various safety disciplines, including criticality, fire, radiation, industrial, and chemical process safety. The procedures describe, as a minimum, the following:
    - Qualifications of personnel authorized to perform the maintenance, functional testing or surveillance/monitoring
    - Controls on and specification of any replacement components or materials to be used (this will be controlled by Configuration Management, to ensure like-kind replacement and adherence to 10 CFR 21 (CFR, 2008c))
    - Post-maintenance testing to verify operability of the equipment
    - Tracking and records management of maintenance activities
    - Safe work practices (e. g., lockout/tag out, confined space entry, moderation control or exclusion area, radiation or hot work permits, and criticality, fire, chemical, and environmental issues).

Maintenance activities generally fall into the following categories:

- Surveillance/monitoring
- Corrective maintenance
- Preventive maintenance
- Functional testing.

These maintenance categories are discussed in the following sections.

11.2.1 Surveillance/Monitoring

Surveillance/monitoring is utilized to detect degradation and adverse trends of IROF'S so that action may be taken prior to component failure. The monitored parameters are selected based upon their ability to detect the predominant failure modes of the critical components. Data sources include; surveillance, periodic and diagnostic test results, plant computer information, operator rounds, walk downs, as-found conditions, failure trending, and predictive maintenance. Surveillance/monitoring and reporting are required for items and activities that are designated as QA Level 1 ~~or~~ QA Level 2 or QA Level FP.

Plant performance criteria are established to monitor plant performance and to monitor QA Level 1 ~~and~~ QA Level 2 items and activities functions and component parameters. These criteria are established using industry experience, operating data, surveillance data, and plant equipment operating experience. These criteria ensure the reliability and availability of QA Level 1 ~~and~~ QA Level 2 items and activities. The performance criteria are also used to demonstrate that the performance or condition of a QA Level 1 ~~or~~ QA Level 2 item or activity is being effectively controlled through appropriate predictive and repetitive maintenance strategies so that they remain capable of performing their intended function.

Surveillance of QA Level 1 ~~and~~ QA Level 2 items and activities is performed at specified intervals. The purpose of the surveillance program is to measure the degree to which they meet performance specifications. The results of surveillances are trended, and when the trend indicates potential performance degradation, preventive maintenance frequencies are adjusted or other appropriate corrective action is taken.

Incident investigations may identify root causes of failures that are related to the type or frequency of maintenance. The lessons learned from such investigations are factored into the surveillance/monitoring and preventive maintenance programs as appropriate.

Maintenance procedures prescribe compensatory measures, if appropriate, for surveillance tests of QA Level 1 ~~and~~ QA Level 2 items and activities that can be performed only while equipment is out of service.

Records showing the current surveillance schedule, performance criteria, and test results for all QA Level 1 ~~and~~ QA Level 2 items and activities will be maintained in accordance with the Record Management System.

Results of surveillance/monitoring activities related to QA Level 1 ~~and~~ QA Level 2 items and activities via the configuration management program will be evaluated by all safety disciplines to determine any impact on the ISA and any updates needed.

11.2.2 Corrective Maintenance

Corrective maintenance involves repair or replacement of equipment that has unexpectedly degraded or failed. Corrective maintenance of a QA Level 1 ~~or~~ QA Level 2 item restores the equipment to acceptable performance through a planned, systematic, controlled, and documented approach for the repair and replacement activities.

Following corrective maintenance on a QA Level 1 ~~or~~ QA Level 2 item, and before returning it to operational status, functional testing, if necessary, is performed to ensure the QA Level 1 ~~or~~ QA Level 2 item performs its intended safety function.

The CAP requires facility personnel to determine the cause of conditions adverse to quality and promptly act to correct these conditions.

Results of corrective maintenance activities related to QA Level 1 ~~and~~ QA Level 2 items via the configuration management program will be evaluated by applicable safety disciplines to determine any impact on the ISA and any updates needed.

11.2.3 Preventive Maintenance

Preventive maintenance (PM) includes preplanned and scheduled periodic refurbishment, partial or complete overhaul, or replacement of QA Level 1, ~~and~~ QA Level 2 items, if necessary, to ensure their continued safety function. Planning for preventive maintenance includes consideration of results of surveillance and monitoring, including failure history. PM also includes instrument calibration and testing.

The PM program procedures and calibration standards (traceable to the national standards system or to nationally accepted calibration techniques, as appropriate) enable the facility personnel to calibrate equipment and monitoring devices important to plant safety and safeguards. Testing performed on QA Level 1, ~~and~~ QA Level 2 items that are not redundant will provide for compensatory measures to be put into place to ensure that the QA Level 1, ~~or~~ QA Level 2 function is performed until it is put back into service.

Industry experience, operating data, surveillance data, and plant equipment operating experience are used to determine initial PM frequencies and procedures. In determining the frequency of PM, consideration is given to appropriately balancing the objective of preventing failures through maintenance against the objective of minimizing unavailability of IROFS because of PM. In addition, feedback from PM and corrective maintenance and the results of incident investigations and identified root causes are used, as appropriate, to modify the frequency or scope of PM. The rationale for deviations from industry standards or vendor recommendations for PM shall be documented.

After conducting preventive maintenance on a QA Level 1 ~~or~~ QA Level 2 item, and before returning it to operational status, functional testing, if necessary, is performed to ensure the QA Level 1, ~~or~~ QA Level 2 item performs its intended safety function. Functional testing is described in detail in Section 11.2.4, Functional Testing.

Records pertaining to preventive maintenance will be maintained in accordance with the Records Management System.

Results of preventive maintenance activities related to QA Level 1, ~~and~~ QA Level 2 items via the configuration management system will be evaluated by all safety disciplines to determine impact on the ISA and any updates needed.

11.2.4 Functional Testing

Functional testing of QA Level 1, ~~and~~ QA Level 2 items is performed, as appropriate, following initial installation, as part of periodic surveillance testing, and after corrective or preventive maintenance or calibration to ensure that the item is capable of performing its safety function, when required.

The overall testing program is broken into the two major testing programs and within each testing program are two testing categories:

A. Preoperational Testing Program

1. Functional Testing
2. Initial Startup Testing.

B. Operational Testing Program

1. Periodic Testing
2. Special Testing.

and QA Level FP

Results of surveillance/monitoring activities related to QA Level 1 ~~and~~ QA Level 2 items via the configuration management program will be evaluated by all safety disciplines to determine any impact on the ISA and any updates needed.

11.2.4.1 Objectives

The objectives of the overall facility preoperational and operational testing programs are to ensure that items relied on for safety:

A. Have been adequately designed and constructed

B. Meet contractual, regulatory, and licensing requirements

C. Do not adversely affect worker or the public health and safety

D. Can be operated in a dependable manner so as to perform their intended function.

Additionally, the preoperational and operational testing programs ensure that operating and emergency procedures are correct and that personnel have acquired the correct Level of technical expertise.

Periodic testing at the facility consists of that testing conducted on a periodic basis to monitor various facility parameters and to verify the continuing integrity and capability of QA Level 1 ~~and~~ QA Level 2 items. and QA Level FP

Special testing at the facility consists of that testing which does not fall under any other testing program. This testing is of a non-recurring nature and is intended to enhance or supplement existing operational testing rather than replace or supersede other testing or testing programs.

11.2.4.2 Procedure Content

Test requirements are specified in written procedures except that, in lieu of written procedures, appropriate sections of related documents (i.e., American Society for Testing and Materials methods, external manuals, maintenance instructions, or approved drawings or travelers with acceptance criteria) may be used. Test Procedures are sufficiently detailed that qualified personnel can perform the required functions without direct supervision. The content of test procedures is uniform to the extent practicable and consists of the following:

A. Title

Each procedure contains a title descriptive of the activities to which it applies.

B. Purpose

The purpose for which the procedure is intended is stated. This statement of applicability is as clear and concise as practicable.

C. References

References are made to specific material used in the preparation and performance of a procedure. This includes applicable drawings, instruction manuals, specifications, and sections of the facility's operating license. These references are listed in a manner as to allow ready location of the material.

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M. Procedure

Procedures contain step-by-step directions in the degree of detail necessary for performing the required testing. References to documents other than the subject procedure are included, as applicable. However, references are identified within these step-by-step directions when the sequence of steps requires that other tasks (not specified by the subject procedure) be performed prior to or concurrent with a procedure step. Where witnessing of a test is required, adequate provisions are made in the test procedure to allow for the required witnessing and to document the witnessing. Cautionary notes, applicable to specific steps, are included and are distinctly identified.

N. Enclosures

Data sheets, checklists and diagrams are attached to the procedure. In particular, checklists utilized to avoid or simplify lengthy or complex procedures are attached as enclosures.

11.2.4.3 Preoperational Testing Program

Preoperational functional tests are completed prior to UF_6 introduction. Other preoperational tests, not required prior to UF_6 introduction and not related to QA Level 1, ~~and~~ QA Level 2 and QA Level FP items and activities, such as office building ventilation tests, may be completed following UF_6 introduction. Tests (or portions of tests), which are not required to be completed before UF_6 introduction are identified in the test plan.

The Preoperational testing program comprises three parts:

- Constructor turnover
- Preoperational functional testing
- Initial start up testing.

Constructor Turnover

The constructor is responsible for completion of as-built drawing verification, purging, cleaning, vacuum testing, system turnover and initial calibration of instrumentation in accordance with design and installation specifications provided by the architect engineers and vendors. As systems or portions of systems are turned over to AES, preoperational testing shall begin. The Startup Manager is responsible for coordination of the preoperational and startup test program.

The preoperational test plan including test summaries for systems is available to the NRC at least 90 days prior to the start of testing. Subsequent changes to the preoperational test plan are also made available to the NRC. Preoperational testing as a minimum includes all system or component tests required by the pertinent design code which were not performed by the constructor prior to turnover. In addition, preoperational tests include all testing necessary to demonstrate that the QA Level 1, ~~and~~ QA Level 2 and QA Level FP items are capable of performing their intended function.

Functional Testing

Preoperational functional testing at the facility consists of that testing conducted to initially determine various facility parameters and to initially verify the capability of SSC to meet performance requirements. The tests conducted are primarily associated with IROFS and certain non-IROFS QA Level 1, ~~or~~ QA Level 2 or QA Level FP items, but may also include a number of other tests of a technical or financial interest to AES.

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Preoperational functional tests are performed following constructor turnover. The major objective of preoperational functional testing is to verify that QA Level 1, ~~and~~ QA Level 2 items essential to the safe operation of the plant are capable of performing their intended function.

For items that are not QA Level 1, ~~or~~ QA Level 2, acceptance criteria are established to ensure worker-safety and compliance with Occupational Safety and Health Administration (OSHA) requirements, reliable and efficient operation of the system and to demonstrate the performance of intended functions.

Initial startup testing at the facility consists of testing which includes initial UF_6 introduction and subsequent testing through the completion of Enrichment Setting Verification for each cascade. "Enrichment Setting Verification" is the verification of a selected enrichment weight percent by measurement of a physical sample collected during the "Enrichment Setting Verification" test run.

Initial startup testing is performed beginning with the introduction of UF_6 and ending with the start of commercial operation. The purpose of initial startup testing is to ensure safe and orderly UF_6 feeding and to verify parameters assumed in the ISA. Examples of initial startup tests include passivation and the filling phase.

Records of the preoperational and startup tests required prior to operation are maintained. These records include testing schedules and the testing results for QA Level 1, and QA Level 2 items.

Initial Startup Testing

Aspects of initial startup testing are conducted under appropriate test procedures. See Section 11.4, Procedures Development and Implementation, for a detailed description of facility procedures. The use of properly reviewed and approved test procedures is required for preoperational and startup tests. The results of each preoperational test are reviewed and approved by the responsible department manager or designee before they are used as the basis of continuing the test program. The results of startup testing are reviewed and approved by the appropriate functional area manager and by the Startup Manager. In addition, the results of each individual startup test will receive the same review as that described for preoperation functional tests. A modification to a QA Level 1, ~~or~~ QA Level 2 item or activity is evaluated in accordance with 10 CFR 70.72 (CFR, 2008b) prior to making the change.

The impact of modifications on future and completed testing is evaluated during the 10 CFR 70.72 (CFR, 2008b) evaluation process and retesting is conducted as required.

Copies of approved test procedures are made available to NRC personnel approximately 60 days prior to their intended use, and not less than 60 days prior to the scheduled introduction of UF_6 for startup tests.

The overall preoperational functional testing program is reviewed, prior to initial UF_6 introduction, by the Plant Manager and all functional area managers to ensure that prerequisite testing is complete.

The facility operating, emergency and surveillance procedures are use-tested throughout the testing program phases and are also used in the development of preoperation functional testing and initial startup testing procedures to the extent practicable. The trial use of operating procedures serves to familiarize operating personnel with systems and plant operation during the testing phases and also serves to ensure the adequacy of the procedures under actual or simulated operating conditions before plant operation begins.

Procedures which cannot be use-tested during the testing program phase are revised based on initial use-testing, operating experience and comparison with the as-built systems. This ensures that these procedures are as accurate and comprehensive as practicable.

11.2.4.4 Operational Testing Program

The operational testing program consists of periodic testing and special testing. Periodic testing is conducted at the facility to monitor various facility parameters and to verify the continuing integrity and capability of facility QA Level 1, and QA Level 2 items. Special testing which may be conducted at the facility is testing which does not fall under any other testing program and is of a non-recurring nature.

The Maintenance Manager has overall responsibility for the development and conduct of the operational testing program and in conjunction with the Operations Manager and the Environmental, Health, Safety and Licensing (EHS&L) Manager ensures that testing commitments and applicable regulatory requirements are met.

The EHS&L Manager shall ensure that new surveillance requirements or testing commitments are identified to the Maintenance Manager. The Maintenance Manager shall make responsibility assignments for new testing requirements.

Surveillance commitments, procedures identified to satisfy these commitments and surveillance procedure responsibility assignments for the facility are identified in a computer database. The database is also used to ensure surveillance testing is completed in the required time interval for all departments.

Test Coordinators are also used for operational testing. The Test Coordinator has the responsibility to be thoroughly familiar with the procedure to be performed. The Test Coordinator should have an adequate period of time in which to review the procedure and the associated system before the start of the test. It is the responsibility of the appropriate section or department head to designate and ensure that each Test Coordinator meets the appropriate requirements. Operational testing is usually performed by each shift. The Test Coordinator, as part of the shift personnel, also performs regular shift duties in performance of the tests.

The Test Coordinator has the following responsibilities regarding the conduct of testing:

A. Verification of all system and plant unit prerequisites

B. Observance of all limits and precautions during the conduct of the test

C. Compliance with the requirements of the facility license and any other facility directives regarding procedure changes and documentation

D. Identifying and taking corrective actions necessary to resolve system deficiencies or discrepancies observed during the conduct of the test

E. Verification of proper data acquisition, evaluation or results, and compliance with stated acceptance criteria

F. Ensuring that adequate personnel safety precautions are observed during the conduct of the test

G. Coordinating and observing additional manpower and support required from other departments or organizations.

Periodic and special testing procedures are sufficiently detailed that qualified personnel can perform the required functions without direct supervision. The administrative requirements for

periodic and special testing procedures are the same as those used for preoperational functional test and initial startup test procedures as identified in Section 11.2.4.3, Preoperational Testing Program. Spaces for initials and dates are required for the following sections:

A. Prerequisite Tests

B. Required Facility (or Plant Unit) Status

C. Prerequisite System Conditions

D. Procedure

E. Enclosures (where calculations are made).

Whenever possible generic procedures and enclosures for recording data for periodic and special tests are used. Also whenever possible, the enclosure is designed as a self-sufficient document that can be filed as evidence that the subject test was performed. Enclosures used as self-sufficient documents should contain sign-off blanks (Initials/Date) to verify that prerequisite tests, required facility status and prerequisite facility or plant unit status and prerequisite system conditions are met before conduct of the test.

11.2.4.4.1 Periodic Testing

The periodic testing program at the facility consists of testing conducted on a periodic basis to verify the continuing capability of QA Level 1, and QA Level 2 items to meet performance requirements. The facility periodic test program verifies that the facility:

A. Complies with applicable regulatory and licensing requirements

B. Does not endanger health and minimizes danger to life or property

C. Is capable of operation in a dependable manner so as to perform its intended function.

The facility periodic testing program begins during the preoperational testing stage and continues throughout the facility's life.

A periodic testing schedule is established to ensure that required testing is performed and properly evaluated on a timely basis. The schedule is revised periodically, as necessary, to reflect changes in the periodic testing requirements and experience gained during plant operation. Testing is scheduled such that the safety of the plant is never dependent on the performance of a QA Level 1, or QA Level 2, item that has not been tested within its specified testing interval.

Periodic test scheduling is handled through the Maintenance department. The Maintenance department maintains the periodic test status index on the computer database. The purpose of this index is to assist groups in assuring that surveillances are being completed within the required test interval.

The database includes all periodic testing, calibration or inspection required by regulatory requirements or licensing commitments, and provides the following information for each surveillance:

- Test #
- Title
- Equipment #
- Work Request # (if applicable)

- Test Frequency
- Plant Cascade #
- Last date test was performed
- Next date test is due.

In the event that a test cannot be performed within its required interval due to system or plant unit conditions, the responsible department notifies the on-duty Production Manager and processes the condition in accordance with the Corrective Action program. The responsible department lists the earliest possible date the test could be performed and the latest date along with the required system or unit-mode condition. However, the responsible department will ensure that the test is performed as soon as practical once required conditions are met, regardless of the estimated date given earlier.

Periodic testing and surveillance associated with QA Level 1, ~~and~~ QA Level 2 and QA Level FP items and activities are performed in accordance with written procedures.

11.2.4.4.2 Special Testing

Special testing is testing conducted at the facility that is not a facility preoperational test, periodic test, post-modification test, or post-maintenance test. Special testing is of a non-recurring nature and is conducted to determine facility parameters and/or to verify the capability of QA Level 1, ~~and~~ QA Level 2 and QA Level FP items to meet performance requirements. Purposes of special testing include, but are not necessarily limited to, the following:

A. Acquisition of particular data for special analysis

B. Determination of information relating to facility incidents

C. Verification that required corrective actions reasonably produce expected results and do not adversely affect the safety of operations

D. Confirmation that facility modifications reasonably produce expected results and do not adversely affect systems, equipment and/or personnel by causing them to function outside established design conditions; applicable to testing performed outside of a post-modification test.

The determination that a certain plant activity is a Special Test is intended to exclude those plant activities which are routine surveillances, normal operational evolutions, and activities for which there is previous experience in the conduct and performance of the activity. At the discretion of the Plant Manager, a test may be conducted as a special test. In making this determination, facility management includes the following evaluations of characteristics of the activity:

A. Does the activity involve an unusual operational configuration for which there is no previous experience?

B. Does the activity have the propensity, if improperly conducted, to significantly affect primary plant parameters?

C. Does the activity involve seldom-performed evolutions, meeting one of the above criteria, in which the time elapsed since the previous conduct of the activity renders prior experience not useful?

Special tests are considered to be a facility change or change in process safety information that may alter the parameters of an accident sequence. As described in SAR Section 3.0.2, these

11.3 TRAINING AND QUALIFICATIONS

This section describes the training program for the operations phase of the facility, including preoperational functional testing and initial startup testing. The training program requirements apply to those plant personnel who perform activities relied on for safety.

The QA Program provides training and qualification requirements, during the design, construction, and operations phases, for QA training of personnel performing QA Level 1, ~~and~~ QA Level 2 work activities; for nondestructive examination, inspection, and test personnel; and for QA auditors. and QA Level FP

The principle objective of the AES training program system is to ensure job proficiency of all facility personnel involved in QA Level 1 ~~and~~ QA Level 2 work activities through effective training and qualification. The training program system is designed to accommodate future growth and meet commitments to comply with applicable established regulations and standards.

Qualification is indicated by successful completion of prescribed training, demonstration of the ability to perform assigned tasks and where required by regulation, maintaining a current and valid certification. Training is designed, developed and implemented according to a systematic approach. Employees are provided with formal training to establish the knowledge foundation and on-the-job training to develop work performance skills. Continuing training is provided, as required, to maintain proficiency in these knowledge and skill components, and to provide further employee development.

11.3.1 Organization and Management of the Training Function

Line managers are responsible for the content and effective conduct of training for their personnel. Training responsibilities for line managers are included in position descriptions, and line managers are given the authority to implement training for their personnel. The training organization provides support to line managers by facilitating the planning, directing, analyzing, developing, conducting, evaluating, and controlling of a systematic performance-based training process. Performance-based training is used as the primary management tool for analyzing, designing, developing, conducting, and evaluating training.

Facility administrative procedures establish the requirements for indoctrination and training of personnel performing activities relied on for safety and to ensure that the training program is conducted in a reliable and consistent manner throughout training areas. Exceptions from training requirements may be granted when justified and documented in accordance with procedures and approved by appropriate management.

Lesson plans are used for classroom and on-the-job training to provide consistent subject matter. When design changes or facility modifications are implemented, updates of applicable lesson plans are included in the change control process of the configuration management program.

Training records are maintained to support management information needs associated with personnel training, job performance, and qualifications.

The training programs at the facility are the responsibility of the Training Manager. Records are maintained on employee's qualifications, experience, training and retraining. The employee training file shall include records of general employee training, technical training, and employee development training conducted at the facility. The employee training file shall also contain records of special company sponsored training conducted by others. The training records for

individuals are maintained so that they are accurate and retrievable. Training records are retained in accordance with the records management procedures.

11.3.2 Analysis and Identification of Functional Areas Requiring Training

A needs/job analysis is performed and tasks are identified to ensure that appropriate training is provided to personnel working on tasks related to QA Level 1, and QA Level 2 items and activities. Additionally, Job Hazard Analysis (JHA), sometimes referred to as Job Safety Analysis (JSA) (i.e., a step-by-step process used to evaluate job hazards), will be used as part of on-the-job training for providing employees the skills necessary to perform their jobs safely at the EREF.

The training organization consults with relevant technical and management personnel as necessary to develop a list of tasks for which personnel training for specific jobs is appropriate. The list of tasks selected for training is reviewed and compared to the training materials as part of the systematic evaluation of training effectiveness. The task list is also updated as necessitated by changes in procedures, processes, plant systems, equipment, or job scope.

11.3.3 Position Training Requirements

Minimum training requirements are developed for those positions whose activities are relied on for safety. Initial identification of job-specific training requirements is based on experience. Entry-Level criteria (e.g., education, technical background, and/or experience) for these positions are contained in position descriptions.

The training program is designed to prepare initial and replacement personnel for safe, reliable and efficient operation of the facility. Appropriate training for personnel of various abilities and experience backgrounds is provided. The Level at which an employee initially enters the training program is determined by an evaluation of the employee's past experience, Level of ability, and qualifications.

Facility personnel may be trained through participation in prescribed parts of the training program that consists of the following:

- General Employee Training
- Technical Training
- Employee Development/Management-Supervisory Training.

Training is made available to facility personnel to initially develop and maintain minimum qualifications outlined in Chapter 2, Organization and Administration. The objective of the training shall be to ensure safe and efficient operation of the facility and compliance with applicable established regulations and requirements. Training requirements shall be applicable to, but not necessarily restricted to, those personnel within the plant organization who have a direct relationship to the operation, maintenance, testing or other technical aspect of the facility IROFS. Training courses are kept up-to-date to reflect plant modifications and changes to procedures when applicable.

Continuing or periodic retraining courses shall be established when applicable to ensure that personnel remain proficient. Periodic retraining generally is conducted to ensure retention of knowledge and skills important to facility operations. The training may consist of periodic retraining exercises, instruction, and review of subjects as appropriate to maintain proficiency of all personnel assigned to the facility. Section 7, Maintenance of Radiological Contingency

11.3.6 Evaluation of Trainee Learning

Trainee understanding and command of learning objectives is evaluated through observation/demonstration or oral or written tests as appropriate. Such evaluations measure the trainee's skills and knowledge of job performance requirements.

Evaluations are performed by individuals qualified in the training subject matter.

11.3.7 Conduct of On-the-Job Training

on QA Level FP

On-the-Job Training is an element of the technical training program (see Section 11.3.3.2.2, On-the-Job Training and Qualifications). On-the-job training is used in combination with classroom training for activities that are QA Level 1 ~~or~~ QA Level 2. Designated personnel, competent in the program standards and methods of conducting the training, conduct on-the-job training using current performance-based training materials. Completion of on-the-job training is demonstrated by actual task performance or performance of a simulation of the task with the trainee explaining task actions using the conditions encountered during the performance of the task, including references, tools, and equipment reflecting the actual task to the extent practical.

11.3.8 Evaluation of Training Effectiveness

Periodically the training program is systematically evaluated to measure the program's effectiveness in producing competent employees. The trainees provide feedback after completion of classroom training sessions to provide data for this evaluation for program improvements. These evaluations identify program strengths and weaknesses, determine whether the program content matches current job needs, and determine if corrective actions are needed to improve the program's effectiveness. The training function is responsible for leading the training program evaluations and for implementing any corrective actions. Program evaluations may consist of an overall periodic evaluation or a series of topical evaluations over a given period.

Evaluation objectives that are applicable to the training program or topical area being reviewed are developed and may address the following elements of training:

- Management and administration of training and qualification programs
- Development and qualification of the training staff
- Position training requirements
- Determination of training program content, including its facility change control interface with the configuration management system
- Design and development of training programs, including lesson plans
- Conduct of training
- Trainee examinations and evaluations
- Training program assessments and evaluations.

Evaluation results are documented, with program strengths and weaknesses being highlighted. Identified weaknesses are reviewed, improvements are recommended, and changes are made to procedures, practices, or training materials as necessary.

2 of

Periodically, training and qualifications activities are monitored by designated facility and/or contracted training personnel. The Quality Assurance Department audits the facility training and qualification system. In addition, trainees and vendors may provide input concerning training program effectiveness. Methods utilized to obtain this information include, among other things surveys, questionnaires, performance appraisals, staff evaluation, and overall training program effectiveness evaluation instruments. Frequently conducted classes are not evaluated each time. However, they are routinely evaluated at a frequency sufficient to determine program effectiveness. Evaluation information may be collected through:

- Verification of program objectives as related to job duties for which intended
- Periodic working group program evaluations
- Testing to determine trainee accomplishment of objectives
- Trainee evaluation of the instruction
- Supervisor's evaluation of the trainee's performance after training on-the-job
- Supervisor's evaluation of the instruction.

Unacceptable individual performance is transmitted to the appropriate Line Manager.

11.3.9 Personnel Qualification

The qualification requirements for key management positions are described in Chapter 2, Organization and Administration. Training and qualification requirements associated with QA personnel are provided in the QAPD. In addition, qualification and training requirements for process operator candidates shall be established and implemented in plant procedures.

11.3.10 Periodic Personnel Evaluations

Personnel performing activities relied on for safety are evaluated at least biennially to determine whether they are capable of continuing their activities that are relied on for safety. The evaluation may be by written test, oral test, or on-the-job performance evaluation. The results of the evaluation are documented. When the results of the evaluation dictate, retraining or other appropriate action is provided. Retraining is also required due to plant modifications, procedure changes, and QA program changes that result in new or revised information.

and QA Level FP

11.4 PROCEDURES DEVELOPMENT AND IMPLEMENTATION

Activities involving licensed materials or QA Level 1 and QA Level 2 items and activities are conducted in accordance with approved procedures. Before initial enrichment activities occur at the facility, procedures are made available to the NRC for their inspection. As noted throughout this document, procedures are used to control activities in order to ensure the activities are carried out in a safe manner and in accordance with regulatory requirements.

Generally, four types of plant procedures are used to control activities: operating procedures, administrative procedures, maintenance procedures, and emergency procedures.

Operating procedures, developed for workstation and Control Room operators, are used to directly control process operations. Operating procedures include:

- Purpose of the activity
- Regulations, polices, and guidelines governing the procedure
- Type of procedure
- Steps for each operating process phase:
  - Initial startup
  - Normal operations
  - Temporary operations
  - Emergency shutdown
  - Emergency operations
  - Normal shutdown
  - Startup following an emergency or extended downtime.
- Hazards and safety considerations
- Operating limits
- Precautions necessary to prevent exposure to hazardous chemicals (resulting from operations with Special Nuclear Material (SNM)) or to licensed SNM.
- Measures to be taken if contact or exposure occurs
- IROFS associated with the process and their functions
- The timeframe for which the procedure is valid.

Applicable safety limits and IROFS are clearly identified in the procedures. AES will incorporate methodology for identifying, developing, approving, implementing, and controlling operating procedures. Identifying needed procedures will include consideration of ISA results. The method will ensure that, as a minimum:

- Operating limits and IROFS are specified in the procedure
- Procedures include required actions for off-normal conditions of operation, as well as normal operations
- If needed safety checkpoints are identified at appropriate steps in the procedure
- Procedures are validated through field tests

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- Procedures are approved by management personnel responsible and accountable for the operation
- A mechanism is specified for revising and reissuing procedures in a controlled manner
- The QA elements and CM Program at the facility provide reasonable assurance that current procedures are available and used at all work locations
- The facility training program trains the required persons in the use of the latest procedures available.

Administrative procedures are used to perform activities that support the process operations, including management measures such as the following:

- Configuration management
- Nuclear criticality, radiation, chemical, and fire safety
- Quality Assurance
- Design control
- Plant personnel training and qualification
- Audits and assessments
- Incident investigations
- Record keeping and document control
- Reporting
- Procurement.

Administrative procedures are also used for:

- Implementing the Fundamental Nuclear Material Control (FNMC) Plan
- Implementing the Emergency Plan
- Implementing the Physical Security Plan
- Implementing the Standard Practice Procedures Plan for the Protection of Classified Matter.

Maintenance procedures address:

- Preventive and corrective maintenance of QA Level 1 ~~and~~ QA Level 2 (and QA Level FP) items
- Surveillance (includes calibration, inspection, and other surveillance testing)
- Functional testing of QA Level 1 ~~and~~ QA Level 2 (and QA Level FP) items as appropriate
- Requirements for pre-maintenance activity involving reviews of the work to be performed and reviews of procedures.

Emergency procedures address the preplanned actions of operators and other plant personnel in the event of an emergency.

Procedures will be established and implemented for nuclear criticality safety in accordance with ANSI/ANS-8.19-1996 (ANSI, 1996). The NCS procedures will be written such that no single, inadvertent departure from a procedure could cause an inadvertent criticality. Nuclear criticality safety postings at the EREF are established that identify administrative controls applicable and

appropriate to the activity or area in question. Nuclear criticality safety procedures and postings are controlled by procedure to ensure that they are maintained current.

Periodic reviews will be performed on procedures to assure their continued accuracy and usefulness. At a minimum, all operating procedures are reviewed every five years and emergency procedures are reviewed every year. In addition, applicable procedures will be reviewed after unusual incidents, such as an accident, unexpected transient, significant operator error, or equipment malfunction, or after any modification to a system, and procedures will be revised as needed.

11.4.1 Preparation of Procedures

Each procedure is assigned to a member of the facility staff or contractor for development. Initial procedure drafts are reviewed by other appropriate members of the facility staff, by personnel from the supplier of centrifuges (ETC), and other vendors, as appropriate for inclusion and correctness of technical information, including formulas, set points, and acceptance criteria and includes either a walkdown of the procedure in the field or a tabletop walkthrough. Procedures that are written for the operation of QA Level 1, and QA Level 2 items shall be subjected to an independent review performed by personnel not having direct responsibility for the work function under review. The designated approver shall determine whether or not any additional, cross-disciplinary review is required. The Plant Manager or designee shall approve all procedures. If the procedure involves QA directly, the QA Manager must approve the procedure.

11.4.2 Administrative Procedures

Facility administrative procedures are written by each department as necessary to control activities that support process operations, including management measures. Listed below are several areas for which administrative procedures are written, including principle features:

A. Operator's authority and responsibility: The operator is given the authority to manipulate controls which directly or indirectly affect the enrichment process, including a shut down of the process if deemed necessary by the Production Manager. The operators are also assigned the responsibility for knowing the limits and set points associated with safety-related equipment and systems as specified in designated operating procedures.

B. Activities affecting facility operation or operating indications: All facility maintenance personnel performing support functions (e.g., maintenance, testing) which may affect unit operation or Control Room indications are required to notify the Control Room Operator and/or Production Manager, as appropriate, prior to initiating such action.

C. Manipulation of facility control: Only operators are permitted to manipulate the facility controls, except for operator trainees under the direction of a qualified operator.

D. Relief of Duties: This procedure provides a detailed checklist of applicable items for shift turnover.

E. Equipment control: Equipment control is maintained and documented through the use of tags, labels, stamps, status logs or other suitable means.

F. Master surveillance testing schedule: A master surveillance testing schedule is documented to ensure that required testing is performed and evaluated on a timely basis. Surveillance testing is scheduled such that the safety of the facility is not dependent on the performance of a structure, system or component which has not been tested within its specified testing interval. The master surveillance testing schedule

identifies surveillance and testing requirements, applicable procedures, and required test frequency. Assignment of responsibility for these requirements is also indicated.

G. A Control Room Operations Logbook is maintained. This logbook contains significant events during each shift such as enrichment changes, alarms received, or abnormal operational conditions.

H. Fire Protection Procedures: Fire protection procedures are written to address such topics as training of the fire brigade, reporting of fires, and control of fire stops. The Safety, Security and Emergency Preparedness Manager has responsibility for fire protection procedures in general, with the facility's maintenance section having responsibility for certain fire protection procedures such as control of repairs to facility fire stops.

The administrative control of maintenance is maintained as follows:

A. In order to assure safe, reliable, and efficient operation, a comprehensive maintenance program for the facility's QA Level 1 ~~and~~ QA Level 2 items and QA Level FP is established.

B. Personnel performing maintenance activities are qualified in accordance with applicable codes and standards and procedures.

C. Maintenance is performed in accordance with written procedures that conform to applicable codes, standards, specifications, and other appropriate criteria.

D. Maintenance is scheduled so as not to jeopardize facility operation or the safety of facility personnel.

E. Maintenance histories are maintained on facility QA Level 1 ~~and~~ QA Level 2 and QA Level FP items.

The administrative control of facility modifications is discussed in Section 2.3.1, Configuration Management.

11.4.3 Procedures

Activities involving licensed materials or QA Level 1 ~~and~~ QA Level 2 and QA Level FP items and activities are conducted in accordance with approved procedures. These procedures are intended to provide a pre-planned method of conducting operations of systems in order to eliminate errors due to on-the-spot analysis and judgments.

Procedures are sufficiently detailed that qualified individuals can perform the required functions without direct supervision. However, written procedures cannot address all contingencies and operating conditions. Therefore, they contain a degree of flexibility appropriate to the activities being performed. Procedural guidance exists to identify the manner in which procedures are to be implemented. For example, routine procedural actions may not require the procedure to be present during implementation of the actions, while complex jobs or checking with numerous sequences may require valve alignment checks, approved operator aids, or in-hand procedures that are referenced directly when the job is conducted. In addition, procedural guidance exists to define when verification of significant steps is required.

Examples of operating activities are:

- Evacuation and Preparatory Work Before Run Up of a Cascade
- Run Up of a Cascade
- Run Down of a Cascade

Maintenance of facility structures, systems and components is performed in accordance with written procedures, documented instructions, checklists, or drawings appropriate to the circumstances (for example, skills normally possessed by qualified maintenance personnel may not require detailed step-by-step delineation in a written procedure) that conform to applicable codes, standards, specifications, and other appropriate criteria.

The facility's maintenance department under the Maintenance Manager has responsibility for preparation and implementation of maintenance procedures. The maintenance, testing and calibration of facility QA Level 1, ~~and~~ QA Level 2, and QA Level FP, as applicable, items are performed in accordance with approved written procedures.

Testing conducted on a periodic basis to determine various facility parameters and to verify the continuing capability of QA Level 1, ~~and~~ QA Level 2, and QA Level FP items to meet performance requirements is conducted in accordance with approved, written procedures. Periodic test procedures are utilized to perform such testing and are sufficiently detailed that qualified personnel can perform the required functions without direct supervision. Testing performed on IROF'S that are not redundant will provide for compensatory measures to be put into place to ensure that the IROFS performs until it is put back into service.

Periodic test procedures are performed by the Operations and Maintenance departments. The Maintenance Manager has overall responsibility for assuring that the periodic testing is in compliance with the requirements.

Chemical and radiochemical activities associated with facility IROFS are performed in accordance with approved, written procedures. The Radiation Protection/Chemistry Manager has responsibility for preparation and implementation of chemistry procedures.

Radioactive waste management activities associated with the facility's liquid, gaseous, and solid waste systems are performed in accordance with approved written procedures. The facility's operations and radiation protection/chemistry departments have responsibility for preparation and implementation of the radioactive waste management procedures.

Likewise, other departments at the facility develop and implement activities at the facility through the use of procedures.

Procedures will include provisions for operations to stop and place the process in a safe condition if a step of a procedure cannot be performed as written.

11.4.4 Changes to Procedures

Changes to procedures shall be processed as described below.

A. The preparer documents the change as well as the reason for the change.

B. An evaluation shall be performed in accordance with 10 CFR 70.72 (CFR, 2008b) as appropriate. If the evaluation reveals that NRC review and approval is required prior to implementation, the change is not implemented until approval is received from the NRC.

C. The procedure with proposed changes shall be reviewed by a qualified reviewer.

D. The Plant Manager, a functional area manager, or a designee approved by the Plant Manager shall be responsible for approving procedure changes, and for determining whether a cross-disciplinary review is necessary, and by which department(s). The need for the following cross-disciplinary reviews shall be considered, as a minimum:

1. For proposed changes having a potential impact on chemical or radiation safety, a review shall be performed for chemical and radiation hazards. Changes shall be approved by the Radiation Protection/Chemistry Manager or designee.

2. For proposed changes having a potential impact on criticality safety, an NCS evaluation and, if required, an NCS analysis shall be performed. Any necessary controlled parameters, limits, IROFS, management measures, or NCS analyses that must be imposed or revised are adequately reflected in appropriate procedures and/or design basis documents. Changes shall be independently reviewed by a criticality safety engineer, and approved by the Nuclear Criticality Safety Manager or designee.

3. For proposed changes potentially affecting nuclear material control and accounting, a material control review shall be performed. Changes shall be approved by the Measurement Control Program Manager or designee.

Records of completed cross-functional reviews shall be maintained in accordance with Section 11.7, Records Management, for all changes to procedures involving licensed materials or QA Level 1, ~~and~~ QA Level 2 items and activities. and QA Level FP

11.4.5 Distribution of Procedures

Originally issued approved procedures and approved procedure revisions are distributed in a controlled manner by document control.

Document Control shall establish and maintain an index of the distribution of copies of facility procedures. Revisions are controlled and distributed in accordance with this index. Indexes are reviewed and updated on a periodic basis or as required.

Department Managers or their designees shall be responsible for ensuring personnel doing work which require the use of the procedures have ready access to controlled copies of the procedures.

11.5 AUDITS AND ASSESSMENTS

AES will have a tiered approach to verifying compliance to procedures and performance to regulatory requirements. Audits are focused on verifying compliance with regulatory and procedural requirements and licensing commitments. Assessments are focused on effectiveness of activities and ensuring that QA Level 1, ~~and~~ QA Level 2 and QA Level FP items are reliable and are available to perform their intended safety functions. This approach includes performing Assessments and Audits on critical work activities associated with facility safety, environmental protection and other areas as identified via trends.

Assessments are divided into two categories that will be owned and managed by the line organizations as follows:

- Management Assessments conducted by the line organizations responsible for the work activity
- Independent Assessments conducted by individuals not involved in the area being assessed.

Audits of work activities associated with QA Level 1, ~~and~~ QA Level 2 and QA Level FP items and activities will be the responsibility of the QA Department.

Audits and assessments are performed to assure that facility activities are conducted in accordance with the written procedures and that the processes reviewed are effective. The audit program will apply as a minimum to radiation protection, criticality safety control, hazardous chemical safety, emergency management, quality assurance, configuration management, maintenance, training and qualification, procedures, incident investigations, records management, and industrial safety including fire protection, and environmental protection as these subjects relate to safety.

Audits and assessments shall be performed routinely by qualified staff personnel that are not directly responsible for production activities. Deficiencies identified during the audit or assessment requiring corrective action shall be forwarded to the responsible manager of the applicable area or function for action in accordance with the CAP procedure. Future audits and assessments shall include a review to evaluate if corrective actions have been effective.

The Quality Assurance Department shall be responsible for audits. Audits shall be performed in accordance with a written plan that identifies and schedules audits to be performed. Audit team members shall not have direct responsibility for the function and area being audited. Team members shall have technical expertise or experience in the area being audited and shall be indoctrinated in audit techniques. Audits shall be conducted on an annual basis.

The results of the audits shall be provided in a written report in a timely manner to the AES President, Plant Manager, the Safety Review Committee (SRC), and the Managers responsible for the activities audited. Deficiencies noted in the audits shall be responded to promptly by the responsible Managers or designees, entered into the CAP and tracked to completion and re-examined during future audits to ensure corrective action has been completed.

Records of the instructions and procedures, persons conducting the audits or assessments, and identified violations of license conditions and corrective actions taken shall be maintained.

- Scheduling and planning of the audit and assessment
- Certification requirements of audit personnel
- Development of audit plans and audit and assessment checklists as applicable
- Performance of the audit and assessment
- Reporting and tracking of findings to closure
- Closure of the audit and assessment.

The applicable procedures emphasize reporting and correction of findings to prevent recurrence.

Audits and assessments are conducted by:

- Using the approved audit and assessment checklists as applicable
- Interviewing responsible personnel
- Performing plant area walkdowns
- Reviewing controlling plans and procedures
- Observing work in progress
- Reviewing completed QA documentation.

Audit and assessment results are tracked in the Corrective Action Program. The data is periodically analyzed for potential trends and needed program improvements to prevent recurrence and/or for continuous program improvements. The resulting trend is evaluated and reported to applicable management. This report documents the effectiveness of management measures in controlling activities, as well as deficiencies. Deficiencies identified in the trend report require corrective action in accordance with the applicable CAP procedure. The QA organization also performs follow up reviews on identified deficiencies and verifies completion of corrective actions reported as a result of the trend analysis.

The audit and for assessment team leader is required to develop the audit and/or assessment report documenting the findings, observations, and recommendations for program improvement. These reports provide management with documented verification of performance against established performance criteria for QA Level 1 ~~and~~ QA Level 2 and QA Level FP items and activities. These reports are developed, reviewed, approved, and issued following established formats and protocols detailed in the applicable procedures. Responsible managers are required to review the reports and provide any required responses due to reported findings.

Corrective actions following issuance of the audit and/or assessment report require compliance with the CAP procedure. Audit reports are required to contain an effectiveness evaluation and statement for each of the applicable QA program elements reviewed during the audit. The audit/assessment is closed with the proper documentation as required by the applicable audit and assessment procedure. The QA organization will conduct follow-up audits or assessments to verify that corrective actions were taken in a timely manner. In addition, future assessments will include a review to evaluate if corrective actions have been effective.

11.5.4 Qualifications and Responsibilities for Audits and Assessments

The QA Manager initiates audits. The responsible Lead Auditor and QA Manager determines the scope of each audit. The QA Manager may initiate special audits or expand the scope of

11.8 OTHER QA ELEMENTS

The QA Program and its supporting manuals, procedures and instructions are applicable to items and activities designated as QA Level 1 and QA Level 2 and QA Level FP.

The QA Manager is responsible for developing and revising the QA Program and assuring it is in compliance with applicable regulations, codes and standards. The QA Manager approves the supporting manuals, procedures, and revisions for their respective scope of responsibility.

The QA Program specifies mandatory requirements for performing activities affecting quality and is set forth in procedures which are distributed on a controlled basis to organizations and individuals responsible for quality. Revisions to these procedures are also distributed on a controlled basis. Applicable portions of the QA Program are documented, approved and implemented prior to undertaking an activity.

A management assessment of the QA program is performed at least six months prior to scheduled receipt of licensed material on the site. Items identified as needing completion or modification are entered into the CAP and corrective action completed before scheduled receipt of licensed material. AES Management monitors the QA program prior to this initial management assessment through project review meetings and annual assessments. This management assessment along with integrated schedules and program review meetings ensure that the QA program is in place and effective prior to receiving licensed material.

The AES QA program for design, construction, and preoperational testing continues simultaneously with the QA program for the operational phase while construction activities are in progress.

Anyone may propose changes to the QA Program supporting manuals and procedures. When reviewed by the QA Manager and found acceptable and compatible with applicable requirements, guidelines and AES policy, the changes may be implemented. The QA Program and supporting manuals and procedures are reviewed periodically to ensure they are in compliance with applicable regulations, codes, and standards. New or revised regulations, codes, and standards are reviewed for incorporation into the QA Program and supporting manuals and procedures as necessary.

Personnel performing activities covered by the QA program shall perform work in accordance with approved procedures, and must demonstrate suitable proficiency in their assigned tasks. Formal training programs are established for quality assurance policies, requirements, procedures, and methods. Ongoing training is provided to ensure continuing proficiency as procedural requirements change. New employees are required to attend a QA indoctrination class on authority, organization, policies, manuals, and procedures.

Additional formal training is conducted in specific topics such as NRC regulations and guidance, procedures, auditing, and applicable codes and standards. Supplemental training is performed as required. On-the-job training is performed by the employee's supervisor in QA area-specific procedures and requirements. Training records are maintained for each person performing quality-related job functions.

The AES President assesses the scope, status, adequacy and regulatory compliance of the QA Program through regular meetings and correspondence with the Plant Manager and the AES QA organization. Additionally, AES QA, through the QA Manager, periodically informs the AES President and Plant Manager of quality concerns that need management resolution.

AES participates in the planning and scheduling for system turnover as construction is completed. Prior to system turnover, written procedures are developed for control of the transfer

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Appendix A - Quality Assurance Requirements for Fire Protection Items Relied On for Safety

2.0 QUALITY ASSURANCE PROGRAM

2.1 QA elements of this section are applied to IROFS and SSCs that could interact with IROFS due to a seismic event, to assure they will be available and reliable in performing their safety functions when needed. Subcomponents of QA items may be classified, through engineering procedures, at different QA Levels based on their critical attributes. This classification QA Levels are established as follows:

Level	Description
QA Level 1	QA Level 1 items include those items whose failure or malfunction could directly result in a condition that adversely affects public, worker and the environment as described in 10 CFR 70.61. The failure of a single QA Level 1 item could result in a high or intermediate consequence.
QA Level 2	QA Level 2 items include those items whose failure or malfunction could indirectly result in a condition that adversely affects public, worker and the environment as described in 10 CFR 70.61. The failure of a QA Level 2 item, in conjunction with the failure of an additional item, could result in a high or intermediate consequence. All building and structure IROFS associated with credible external events are QA Level 2. QA Level 2 items also include those attributes of items that could interact with IROFS due to a seismic event, and result in high or intermediate consequences as described in 10 CFR 70.61.
QA Level 3	QA Level 3 items include those items that are not classified as QA Level 1 or QA Level 2. QA Level 3 items are controlled in accordance with standard commercial practices.

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2.2 The following applicable requirements are associated with each of the QA Levels as described below:

2.2.1 QA Level 1:

- Design documentation to verify review and approval of new designs and modifications to existing designs.
- Results of reviews, audits, and monitoring of work performance.
- Documentation to verify review and approval of qualified vendors.
- Procurement documents and material certifications from qualified vendors to verify traceability.
- Qualifications of personnel with responsibilities such as welder, nondestructive examination inspector, lead QA auditor, and quality control inspector.
- Approved procedures used for design and fabrication activities such as welding, inspection, auditing, and procurement.
- List of equipment used and documentation to verify calibration.

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- Inspection and test results for qualification and facility operation activities, identification of inspectors, type of observation, acceptance criteria, and action taken in connection with any noted deficiencies.
- A commercial parts dedication program may be used, but all supporting documentation needs to be maintained.

All applicable portions of this QAPD apply to QA Level 1 items.

2.2.2 QA Level 2:

- Design documentation to verify review and approval of new designs and modifications to existing designs.
- Results of reviews, audits, and monitoring of work performance.
- Qualifications of personnel with responsibilities such as welder, nondestructive examination inspector, lead QA auditor, and quality control inspector.
- Approved procedures used for design and fabrication activities such as welding, inspection, auditing, and procurement.
- List of equipment used and documentation to verify calibration.
- Inspection and test results for qualification and production activities, identification of inspectors, type of observation, acceptance criteria, and action taken in connection with any noted deficiencies.
- A commercial parts dedication program may be used, but all supporting documentation needs to be maintained.

All applicable portions of this QAPD apply to QA Level 2 items.

2.2.3 QA Level 3:

- Controlled in accordance with standard commercial practices.

This QAPD does not apply to QA Level 3 items as they are controlled in accordance with standard commercial practices.

Insert

2.3 Compliance with QAPD requirements and associated procedures is mandatory. Questions on QAPD requirements are referred for resolution to the QA Manager, who is the final authority on QAPD requirements.

2.4 The terms used in the QAPD are as defined in 10 CFR 70.4, Definitions and American Society of Mechanical Engineers (ASME) NQA-1, Part I, Section 4, Introduction, 1994 edition. The term "design output" as used in this QAPD means "drawings, specifications, and other documents used to define technical requirements of IROFS."

2.5 Indoctrination and training of personnel performing or managing activities affecting quality is performed in accordance with approved procedures.

2.6 Quality Control personnel performing inspection and testing are qualified in accordance with approved procedures.

2.7 Personnel performing nondestructive examination are qualified in accordance with approved procedures.

2.8 Personnel performing audits are qualified in accordance with procedures.

2.9 Each manager is responsible for the applicable indoctrination, training, and qualification of their personnel.

2.10 Management of those organizations implementing the QAPD, or portions thereof, regularly assesses the adequacy of that part of the program for which they are responsible and will assure its effective implementation.

2.11 Responsible senior managers regularly assess the adequacy and effective implementation of the QA elements through methods such as review meetings, audit reports, and corrective action reports.

2.12 QA requirements for QA Level 1 and 2 items and activities are imposed on contractors and suppliers through the respective procurement documents for the particular scope of work contracted. Determination of the specific QA requirements, supplier evaluations, and proposal/bid evaluations are in accordance with the requirements of Section 4.0 and Section 7.0 of this QAPD.

Insert

Inserts for QAPD

Insert for QAPD Section 2.1

Level	Description
QA Level FP	QA Level FP items include automatic fire suppression systems located in buildings and/or over areas containing licensed material-at-risk, which if released could exceed 10 CFR 70.61 performance requirements, as IROFS to satisfy 10 CFR 70.64(b) requirements.

Insert for New QAPD Section 2.2.4

2.2.4 QA Level Fire Protection (FP):

- Designed, specified, procured, installed, and tested in accordance with requirements of the applicable NFPA code and/or standard(s)
- Listed and/or approved by an independent agency such as Underwriters Laboratories, Factory Mutual, or other acceptable agency except in cases where such listing/approval is not required by NFPA code/standard (e.g., sprinkler piping is not required to be listed)
- Inspected on receipt consistent with QAPD requirements to verify compliance to the criteria specified above.

The applicable portions of this QAPD that apply to QA Level Fire Protection IROFS are discussed in Appendix A, Quality Assurance Requirements for Fire Protection Items Relied On For Safety.

Insert for New QAPD Section 2.13

2.13 QA requirements for QA Level FP items and activities are imposed on contractors and suppliers through the respective procurement documents for the particular scope of work contracted. Determination of the specific QA requirements, supplier evaluations, and proposal/bid evaluations are in accordance with the requirements of Sections A.2.3 and A.2.6 of Appendix A of this QAPD.

Insert for New QAPD Appendix A

Appendix A Quality Assurance Requirements for Fire Protection Items Relied On For Safety

A.1 Quality Assurance program requirements provide assurance that QA Level FP IROFS are designed, fabricated, erected, tested, maintained, and operated so that they will function as intended.

Those fire protection structures, systems, and components (SSCs) designated as QA Level FP IROFS will be:

1. Designed, specified, procured, installed, and tested in accordance with requirements of the applicable NFPA code and/or standard(s) (see exceptions to IROFS commitments below)
2. Listed and/or approved by an independent agency such as Underwriters Laboratories, Factory Mutual, or other acceptable agency except in cases where such listing/approval is not required by NFPA code/standard (e.g., sprinkler piping is not required to be listed)
3. Inspected on receipt consistent with QAPD requirements to verify compliance to the criteria specified above.

A.2 The following elements of the EREF QAPD (with noted exceptions) will be implemented to satisfy Quality Assurance requirements for the designated QA Level FP IROFS:

A.2.1 Section 2.0 Quality Assurance Program

Automatic fire suppression systems located in buildings and/or over areas containing licensed material-at-risk, which if released could exceed 10 CFR 70.61 performance requirements, as IROFS to satisfy 10 CFR 70.64(b) requirements. These IROFS will be designated as QA Level Fire Protection (QA Level FP).

A.2.2 Section 3.0 Design Control

Section 3.0 of the QAPD is applicable with the following exceptions:

Standard commercial design software may be used for performance of QA Level FP design activities. The requirement for design software to be compliant with ASME NQA-1, 1994 edition, Basic Requirement 11 and NQA-1, Part II, Subpart 2.7, "QA Requirements for Computer Software for Nuclear Plant Applications" is not applicable.

The requirement for design verification in accordance with ASME NQA-1, 1994 edition, Supplement 3S-1 for: Methods of design verification shall include any one or a combination of the following, as defined in of design reviews, alternate calculations, or the performance of qualification tests is not applicable.

A.2.3 Section 4.0 Procurement Document Control

Section 4.0 is not applicable (e.g., Commercial Grade dedication and Part 21 do not apply). Procurement Document Control will be in accordance with applicable NFPA codes/standards and commercial grade practices.

A.2.4 Section 5.0 Instruction, Procedures and Drawings

Section 5.0 of the QAPD is applicable.

A.2.5 Section 6.0 Document Control

Section 6.0 of the QAPD is applicable.

A.2.6 Section 7.0 Control of Purchased Items and Services

Section 7.0 of the QAPD is not applicable. The following shall apply:

- Purchase documents shall include requirements for appropriate certifications to applicable NFPA code/standard requirements (i.e., listed and/or approved).
- Purchase documents shall be reviewed and approved by QA and personnel with sufficient experience and knowledge in the NFPA code/standard requirements.
- Receipt inspection will be performed to confirm certification of procured items as meeting applicable NFPA code/standard requirements (i.e., listed and/or approved).

A.2.7 Section 8.0 Identification and Control of Items

Section 8.0 of the QAPD is applicable.

A.2.8 Section 9.0 Control of Special Processes

Section 9.0 of the QAPD is not applicable. Control of Special Processes will be in accordance with applicable NFPA codes/standards and commercial grade practices.

A.2.9 Section 10.0 Inspection

Section 10.0 of the QAPD is not applicable. Inspection will be in accordance with applicable NFPA codes/standards and commercial grade practices.

A.2.10 Section 11.0 Test Control

Section 11.0 of the QAPD is applicable except for Paragraph 11.5 "Computer Program Testing".

A.2.11 Section 12.0 Control of Measuring and Test Equipment

Section 12.0 of the QAPD is not applicable. Control of Measuring and Test Equipment will be in accordance with applicable NFPA codes/standards and commercial grade practices.

A.2.12 Section 13.0 Handling, Storage and Shipping

Section 13.0 of the QAPD is applicable.

A.2.13 Section 14.0 Inspection, Test and Operating Status

Section 14.0 of the QAPD is applicable. Inspection, Test and Operating Status will be in accordance with applicable NFPA codes/standards and commercial grade practices.

A.2.14 Section 15.0 Control of Nonconforming Items

Section 15.0 of the QAPD is applicable.

A.2.15 Section 16.0 Corrective Actions

All requirements of Section 16.0 "Corrective Action" shall apply except reportability requirements for 10CFR Part 21.

A.2.16 Section 17.0 Quality Assurance Records

Section 17.0 of the QAPD is applicable.

A.2.17 Section 18.0 Audits

Section 18.0 of the QAPD is applicable except Section 18.2 "External Audits" is not required but may be implemented at the discretion of AES.

A.2.18 Section 19.0 Provision for Changes

Section 19.0 of the QAPD is applicable.