Request for Additional Information (Public)

AREVA Enrichment Services LLC
Eagle Rock Enrichment Facility License Application
Docket: 70-7015

August 26, 2009

General Information (Chapter 1)

GI-1 Table 1.2-1

Table 1.2-1 provides information on the types of materials proposed for use. The applicant should provide total quantities of licensed materials to be possessed, including any calibration sources proposed to be used and proposed possession limits.

Regulations in 10 *Code of Federal Regulations* (10 CFR) 70.22(a)(4) require an applicant to identify the name, amount, and specification of the material proposed for use.

GI-2 Safety Analysis Report, Section 1.3.3.2, Annual Precipitation—Amounts and Forms

Provide analysis for determining the ground snow load (44.2 lb/ft^2) for the Eagle Rock Enrichment Facility (EREF).

This information is needed to assess whether the ground snow load estimated by the applicant is appropriate.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against natural phenomena in its design of the facility.

GI-3 Safety Analysis Report, Section 1.3.4.5, Design Basis Flood Events Used for Accident Analysis; Integrated Safety Analysis Summary Section 3.2.4.3, Floods; and Environmental Report Sections 3.4.12.2 and 3.4.12.3

Justify that a potential flood with the 1.0×10^{-5} annual probability is not a safety concern that needs to be included in the facility design and Integrated Safety Analysis (ISA).

AREVA Enrichment Services (AES) appears to exclude flooding as a potential external hazard from further consideration for facility design and in the ISA for the proposed EREF. AES based this determination on the fact that the proposed facility will be located above the Federal Emergency Management Agency estimated 100-year and 500-year flood elevations for the region. AES does not consider a potential flood with the 1.0×10^{-5} annual probability (highly unlikely probability defined by the applicant for its ISA) in making its decision to exclude a flood hazard.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an ISA that identifies potential accident sequences caused by credible external events.

Financial Qualifications (Chapter 1, Section 1.2.2, Financial Information)

FQ-1 Section 1.2.2

Provide the proposed financial plan for the construction and operation of EREF (i.e., the proposed percentages of debt and equity to be used in the financing of the project, a brief statement on any long-term contracts in place or under negotiation, a brief statement on which entity is considered the parent company with respect to financial qualifications).

The license application (in Section 1.2.2) states:

> There are financial qualifications to be met before a license can be issued. AES acknowledges the use of the following Commission-approved criteria as described in Policy Issues Associated with the Licensing of a Uranium Facility; Issue 3, Financial Qualifications (LES, 2002) in determining if the project is financially feasible:
>
> Construction of the facility shall not commence before funding is fully committed. Of this full funding (equity and debt), the applicant must have in place before constructing the associated capacity: (a) a minimum of equity contributions of 30% of project costs from the parents and (b) firm commitments ensuring funds for the remaining project costs.
>
> AES shall not proceed with the project unless it has in place long-term enrichment contracts (i.e., five years) with prices sufficient to cover both construction and operation costs, including a return on investment for the entire term of the contracts.

The application, however, does not provide the supporting basis for the staff to determine if the financial qualifications can be met.

10 CFR 70.22(a)(8) requires financial qualifications of the applicant "Where the nature of the proposed activities is such as to require consideration of the applicant's financial qualifications to engage in the proposed activities in accordance with the regulations in this chapter...."

Special Exemptions and Special Authorizations (Chapter 1, Section 1.2.5)

SE-1 Safety Analysis Report, Section 1.2.5 and Section 10.2.1

In Section 10.2.1, the Safety Analysis Report states: "Since, AES intends to sequentially install and operate the Separations Building Modules over time, financial assurance for decommissioning will be provided during the operating life of the EREF at a rate that is in proportion to the decommissioning liability for these facilities as they are phased in. Similarly, AES will provide decommissioning funding assurance for disposition of depleted tails at a rate in proportion to the amount of accumulated tails onsite up to the maximum amount of the tails as described in Section 10.3, Tails Disposition. An exemption request to permit this incremental financial assurance is provided in Section 1.2.5, 'Special Exemptions or Special Authorizations.'"

Provide a schedule for the phase in of construction and operations, including projected dates for: commencement of operations of the first module; commencement of operations of subsequent modules; first receipt of licensed material; subsequent receipt(s) of licensed material; the initial generation of depleted uranium tails; and the accumulation of tails.

Provide a schedule for submitting the initial and subsequent executed financial assurance instruments in terms of the phases of the construction and operation as well as a breakdown of the percentage of the full decommissioning funding corresponding to each phase of the construction and operations. The cost estimate for each phase must cover the full decontamination and decommission costs for that phase plus the 25 percent contingency factor. Confirm that the total decommissioning cost estimate contains the 25 percent contingency factor for each phase.

In Section 1.2.5, AES "commits to updating the decommissioning cost estimates on an annual forward looking incremental basis and to providing the U.S. Nuclear Regulatory Commission (NRC) revised funding instruments that reflect these projections of depleted uranium tails production." Until the facility is at full operation, confirm that the decommissioning funding estimates and revised funding instruments would be provided annually on a forward-looking basis to reflect the aggregate cost of any facility module that would be currently in operation; that has been in operation and has not been fully decontaminated and decommissioned as approved by NRC, or would be in operation within the next 12 months; to reflect the accumulated depleted uranium tailings onsite and a projection of the amount that would be onsite within the next year; and to include the 25 percent contingency factor.

Safety Programs (Chapter 3)

Structural Design Criteria

SP-1 Safety Analysis Report, Section 3.3.4, Structural Design Criteria, and Integrated Safety Analysis Summary Section 3.2.3.4.4, Extreme Precipitation

Define normal roof design live load for Separations Building Modules; Blending, Sampling, and Preparation Building; Cylinder Receipt and Shipping Building; and Technical Support Building.

Qualitative design criteria are discussed in both the SAR and ISA Summary. AES uses the term normal roof design live load. However, AES does not indicate what the roof design live load is. 10 CFR 70.64(a)(2) requires the applicant to include adequate protection against natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an ISA that identifies potential accident sequences caused by credible external events.

SP-2 Safety Analysis Report, Section 3.3.4, Structural Design Criteria, and Integrated Safety Analysis Summary Section 3.2.3.4.4, Extreme Precipitation

Provide numerical value for the Extreme Environmental Rainfall.

SAR Section 3.3.4 indicates that roofs will be designed to avoid water ponding due to extreme local precipitation to a depth exceeding the extreme environmental rainfall. As stated in the ISA Summary Section 3.2.3.4.4, there are three types (1, 24, and 48 hours)

of all-season extreme local precipitation hazards for the annual probability of 1.0×10^{-5}. It is not clear which of the three all-season extreme local precipitations is the extreme environmental rainfall.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against natural phenomena in its design of the facility.

External Events and Structures

SP-3 Integrated Safety Analysis Summary, Section 3.2.3.4.4, Extreme Precipitation

Provide technical basis for the 1, 24, and 48 hours all-season extreme local precipitation estimates.

This information is needed to assess whether the extreme load precipitations the applicant estimated are appropriate.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against credible natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an integrated safety analysis that identifies potential accident sequences caused by credible external events.

SP-4 Integrated Safety Analysis Summary, Section 3.2.6.1, Probabilistic Seismic Hazard Analysis Results

Provide a description of the methodology and the resulting analyses used to develop scaled earthquake time histories.

The information is needed to assess the applicant's seismic design.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against credible natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an integrated safety analysis that identifies potential accident sequences caused by credible external events.

SP-5 Integrated Safety Analysis Summary, Section 3.2.6.3, Selection of the Design-Basis Earthquake

Provide a calculation showing how the methodologies in ASCE 43-05 will be implemented to determine the design basis earthquake and to demonstrate compliance with the target seismic performance goals.

The information is needed to assess the applicant's seismic design and integrated safety analysis results.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against credible natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an integrated safety analysis that identifies potential accident sequences caused by credible external events.

SP-6 Integrated Safety Analysis Summary, Section 3.2.8, Site-Specific Volcanic Hazard Analysis

Provide technical basis to characterize the potential hazards from ash eruptions of Cascade Range volcanoes.

The information is needed to assess the potential roof loads from a Cascade Range eruption.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against credible natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an integrated safety analysis that identifies potential accident sequences caused by credible external events.

SP-7 Integrated Safety Analysis Summary and Environmental Report Appendix F, Probabilistic Seismic Hazard Assessment

Provide a complete list of the reference earthquake catalogs used to compile the list of earthquakes in Appendix F, Table 3 that the applicant used in the probabilistic seismic hazard assessment.

The information is needed to assess the results of the applicant's probabilistic seismic hazard assessment.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against credible natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an integrated safety analysis that identifies potential accident sequences caused by credible external events.

SP-8 Environmental Report Section 3.3.7, Seismic Hazard Assessment, and Appendix F, Probabilistic Seismic Hazard Assessment

Verify the tentatively worded conclusions in the Environmental Report and Appendix F that explain why the applicant's seismic hazard assessment results in smaller ground motion amplitudes than the ground motions the U.S. Geological Survey predicted in the 2008 U.S. National Seismic Hazard Maps.

The information is needed to assess the results of the applicant's probabilistic seismic hazard analysis.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against credible natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an ISA that identifies potential accident sequences caused by credible external events.

SP-9 Integrated Safety Analysis Summary, Section 3.3.1.1, Separations Building Modules

Provide drawings showing the vertical cross-sections of the basement floor slab of the uranium hexafluoride (UF_6)Handling Area.

AREVA provided a basement floor plan for the Separations Buildings Modules in Figure 3.3-21. Vertical cross-sections in the longitudinal and transverse directions are needed

to assess the applicant's design of the basement floor slabs of the UF_6 Handling Area.

10 CFR 70.64(a)(2) requires the applicant to include adequate protection against credible natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an integrated safety analysis that identifies potential accident sequences caused by credible external events.

SP-10 Integrated Safety Analysis Summary, Section 3.3.1.1.2, Functional Areas and Major Components

Provide a description of the seismic base isolators, the seismic isolator slab, and the precast floor mounting elements (flomel) to be used in the Separations Buildings Modules in Figure 3.3-21, including design specifications.

This information is needed to assess the applicant's design of seismic isolators to analyze the building structures.

10 CFR 70.64(a)(2) and 70.64(a)(4) require the applicant to include adequate protection against credible natural phenomena in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an ISA that identifies potential accident sequences caused by credible external events.

SP-11 Integrated Safety Analysis Summary, Section 3.3.2.3, Structural Design Loads

Provide a description of the methodology to be used for the structural analyses of items relied on for safety buildings for the design loads.

This information is needed to assess the applicant's approach to analyze the building structures.

10 CFR 70.64(a)(2) and 70.64(a)(4) require the applicant to include adequate protection against credible natural phenomena, environmental conditions, and dynamic effects in its design of the facility. In addition, 10 CFR 70.62(c)(iv) requires the applicant to conduct and maintain an integrated safety analysis that identifies potential accident sequences caused by credible external events.

Human Factors Engineering

HFE-1

Describe the process that will be used to conduct a "human factors engineering review of the human-system interfaces" for those items relied on for safety (IROFS) requiring operator actions.

The license application states, on page 3.3-1:

> For those IROFS requiring operator actions, a human factors engineering review of the human-system interfaces shall be conducted using applicable guidance in NUREG-0700, "Human-System Interface design Review Guidelines," Revision 2, dated May 2002 (NRC, 200a), and NUREG-0711, "Human Factors Engineering Program Review Model," Revision 2, dated February 2004 (NRC, 2004a).

A detailed description is needed of how the guidance will be applied specifically to the design and implementation of the human system interfaces for the AES-EREF (i.e., a level of detail as comparable to implementation plans as described in NUREG-0711). At a minimum, the application should provide an implementation plan level of detail that addresses the criteria contained in NUREG-0711, Element 8, "Human-System Interface Design", or an alternative supported by justification determined to be acceptable by the staff.

10 CFR 70.62(d) requires, in part, that "…. ***engineered and administrative controls and control systems that are identified as items relied on for safety pursuant to § 70.61(e) of this subpart are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed,*** to comply with the performance requirements of § 70.61 of this subpart" [emphasis added].

In addition, 10 CFR 70.64(a) (10) requires that, "The design must provide for inclusion of instrumentation and control systems to monitor and control the behavior of items relied on for safety." Given that the AES-EREF application contains many IROFS that rely on human action, the instrumentation and control systems associated with these IROFS must be designed to adequately support operator task performance.

Further, staff guidance contained in NUREG-1513, "Integrated Safety Analysis Guidance Document," identifies that for administrative controls (e.g., certain human actions), "…the man-machine interface for that individual should be carefully designed."

HFE-2 Integrated Safety Analysis Summary, Section 3.3.1

Explain the purpose(s) and function(s) of the overview screen, control desk, and fire alarm system contained in the Control Room. Describe the method(s) used to design the overview screen, control desk, and fire alarm system. Describe the composition of the overview screen (e.g., the layout of the viewing area, information to be displayed, physical characteristics of the screen, etc.). Describe the composition of the control desk (e.g., presentation media used [visual display units (VDUs), soft-controls, computerized procedures, etc], information to be displayed, etc.). Describe the composition of the fire alarm system (e.g., presentation medium used, information to be displayed, etc.). The explanations and descriptions should focus on how these control room components support the role of the operator in controlling and maintaining the facility in a safe condition and under upset/accident conditions.

The ISA Summary states, on page 3.3-10,

> The OSB [Operations Support Building] contains the following functional areas located on the second floor.
>
> Control Room
>
> The Control Room is the main monitoring point for the entire facility. The Control Room provides all of the facilities for the control of the plant, operational requirements, and personnel comfort. It is a permanently staffed area that contains the following equipment:
>
> • Overview screen
> • Control desk

- Fire alarm system
- Storage facilities
- Communication systems

10 CFR 70.62(d) requires, in part, that "….***engineered and administrative controls and control systems that are identified as items relied on for safety pursuant to § 70.61(e) of this subpart are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed*****,*** to comply with the performance requirements of § 70.61 of this subpart" [emphasis added].

In addition, 10 CFR 70.64(a) (10) requires that, "The design must provide for inclusion of instrumentation and control systems to monitor and control the behavior of items relied on for safety." Given that the AES-EREF application contains many IROFS that rely on human action, the instrumentation and control systems associated with these IROFS must be designed to adequately support operator task performance.

Further, staff guidance contained in NUREG-1513, "Integrated Safety Analysis," identifies that for administrative controls (e.g., certain human actions), "…the man-machine interface for that individual should be carefully designed."

HFE-3 [Closed]

HFE-4 [Closed]

HFE-5 [Closed]

HFE-6 Integrated Safety Analysis Summary, Section 3.5.7.1.3

Explain the purpose and functions of the Alarm Annunciation System and describe the method(s) used to design it.

The license application states, on page 3.5-36,

….Facility alarm systems which provide security, safety, and environmental protection such as fire alarm, radiation monitoring, gas release, equipment failure, etc. all provide audio and visual annunciation in either the Control Room or central alarm stattion. Control Room and or security personnel will respond to the alarm condition directly and if applicable annunciate the condition over the PA system.

10 CFR 70.62(d) requires, in part, that "….***engineered and administrative controls and control systems that are identified as items relied on for safety pursuant to § 70.61(e) of this subpart are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed*****,*** to comply with the performance requirements of § 70.61 of this subpart" [emphasis added].

In addition, 10 CFR 70.64(a) (10) requires that, "The design must provide for inclusion of instrumentation and control systems to monitor and control the behavior of items relied on for safety." Given that the AES-EREF application contains many IROFS that rely on human action, the instrumentation and control systems associated with these IROFS must be designed to adequately support operator task performance.

Further, staff guidance contained in NUREG-1513, "Integrated Safety Analysis," identifies that for administrative controls (e.g., certain human actions), "… the man-machine interface for that individual should be carefully designed."

HFE-7 [Closed]

HFE-8 [Closed]

HFE-9 Integrated Safety Analysis Summary, Section 3.5.9.2.2

Explain how operator actions taken from the Local Control Centers (LCCs) are coordinated with the Central Control System (CCS).

The ISA Summary states, on page 3.5-40,

> "Each LCC has sufficient functionality to completely operate and protect its associated process system without any CCS intervention."

The application indicates that each local control station can "completely operate and protect its associated process system with out CCS intervention." What measures are in place to ensure coordination between the local control operators and control center operators (e.g., isolation devices/lock-outs present, administrative procedures, etc.).

10 CFR 70.62(d) requires, in part, that "…. ***engineered and administrative controls and control systems that are identified as items relied on for safety pursuant to § 70.61(e) of this subpart are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed*****,** to comply with the performance requirements of § 70.61 of this subpart" [emphasis added].

In addition, 10 CFR 70.64(a) (10) requires that, "The design must provide for inclusion of instrumentation and control systems to monitor and control the behavior of items relied on for safety." Given that the AES-EREF application contains many IROFS that rely on human action, the instrumentation and control systems associated with these IROFS must be designed to adequately support operator task performance.

Further, staff guidance contained in NUREG-1513, "Integrated Safety Analysis," identifies that for administrative controls (e.g., certain human actions), "…the man-machine interface for that individual should be carefully designed."

Radiation Protection (Chapter 4)

RP-1 Safety Analysis Report, Sections 4.5 and 4.51

Clarify the frequency of training program evaluation and review/updates. There appears to be inconsistency in the frequency of evaluation/review/update of the Radiation Protection training program. The last two sentences of the next to last paragraph of Section 4.5 state an annual frequency while Paragraph 7 of Section 4.5.1 and Paragraph D of Section 11.3.3.1.1 state a frequency of 2 years.

RP-2 Safety Analysis Report, Sections 4.6.1

Clarify in Section 4.6.1, of the Safety Analysis Report (SAR), whether exhaust ventilation serving potentially contaminated areas of dispersible materials are treated for radiological and hydrogen fluoride (HF) contamination in the air stream via filters, similar to the Gaseous Effluent Ventilation Systems (GEVSs), and whether these filters (pre-, high efficiency particulate air (HEPA), and carbon adsorption) are continuously monitored for differential pressure and that the air stream is monitored for alpha and HF concentrations. This is needed so that staff can determine compliance with 10 CFR 20.1701, 70.23(a)(3), and NUREG-1520 Section 4.4.6.3(4) which require adequate process and engineering controls affecting the concentration of radioactive materials in air.

RP-3

Explain the effluent sampler mechanism for the Liquid Effluent Collection and Treatment System and summarize this equipment's operating history. This is needed for staff to determine compliance with 10 CFR 20.1501(a)(2), 70.23(a)(3), and NUREG-1520, Section 4.4.7.3(11) which require adequate equipment and facilities to quantify radiological hazards.

RP-4 Safety Analysis Report, Section 4.4

Section 4.4, final paragraph, of the SAR does not discuss distribution of Radiation Protection procedures in accordance with NUREG-1520, Section 4.4.4.3(2). This is needed for staff to determine compliance with 10 CFR 70.22(a)(8) which requires adequate procedures.

RP-5 Safety Analysis Report, Section 4.8.1.2

Clarify in the SAR, Section 4.8.1.2, what equipment will be used for airborne activity monitoring and, if there are alarm functions, what criteria will be used to establish alarm settings. In Section 4.8.1.2, it is unclear whether the applicant is referring to continuous air monitors (which typically provide real time analysis of airborne radioactivity with alarm capability), continuous air samplers (where filters are analyzed after being exchanged), or both. This may be indicative of some slight inconsistency with text in SAR Section 4.7, paragraphs 7 and 8. This is needed for staff to determine compliance with 10 CFR 20.1502(b), 70.23(a)(3), and NUREG-1520 Section 4.4.7.3(4) which require adequate equipment to monitor the occupation intake of radioactive material.

RP-6 Safety Analysis Report, Section 4.11.2

Section 4.11.2 of the SAR does not include reference to reporting requirements in 10 CFR 30.50 and 10 CFR 40.60, as applicable. Please revise the SAR or provide additional justification as to why this information is not needed. This is needed to confirm compliance with these reporting requirements which may differ slightly and be subject to change from those in 10 CFR 20 and 10 CFR 70.

RP-7 Safety Analysis Report, Section 4.1.1

Section 4.1.1 of the SAR does not discuss any professional staff, supervision, and/or technicians considered to be key personnel for the Radiation Protection program with

defined qualifications and responsibilities. Please revise the SAR or provide additional justification as to how 10 CFR 70.22(a) is met. This is needed for staff to determine compliance with 10 CFR 70.22(a) and NUREG-1520 Section 4.4.1.3(2) and 4.4.1.3(3) which require the licensee to specify the qualifications and responsibilities of key program personnel.

RP-8 Safety Analysis Report, Section 4.2.1

Section 4.2.1 of the SAR (or other section if appropriate) does not appear to consider guidance in Regulatory Guide 4.21 when performing facility construction or modifications. Please provide additional information or an alternate approach to Regulatory Guide 4.21. This is needed for staff to determine compliance with 10 CFR 20.1406 and 70.23(a)(3).

RP-9 Safety Analysis Report, Section 4.6.1

Revise Section 4.6.1 of the SAR to include discussion that ventilation and containment systems will be designed and sized appropriately to reduce airborne concentrations below the applicable DAC values as described in NUREG-1520 Section 4.4.6.3(1). This is needed for staff to determine compliance with 10 CFR 20.1101(b) and 70.23(a)(3) which require adequate facilities to keep public exposures ALARA and protect health and the environment.

Nuclear Criticality Safety (Chapter 5)

NCS-1 Safety Analysis Report, Section 5.2.1.5

Identify which acceptance criteria in NUREG-1520, Section 5.4.3.4 will be used to analyze nuclear criticality safety (NCS) accident sequences in operations and processes.

SAR Section 5.2.1.5 states:

> NCS analyses also meet the following: The NCS methodologies and technical practices in NUREG-1520 (NRC, 2002), Section 5.4.3.4, are used to analyze NCS accident sequences in operations and processes.

Not all the criteria in NUREG-1520, Section 5.4.3.4 appear to be applicable to NCS analyses. This information is needed to clarify a commitment made in the SAR.

NCS-2 Safety Analysis Report, Section 5.1.2

Justify the use of partial reflection (2.5 cm of water) to account for humans and other spurious reflectors. Clarify what is meant by “2.5 cm of water reflection around vessels.”

The SAR states:

> (Section 5.1.2) Partial reflection of 2.5 cm (0.984 in) of water is assumed where limited moderating materials (including humans) may be present.
> (Section 5.2.1.3.1) . . . where appropriate, spurious reflection due to walls, fixtures, personnel, etc. has been accounted for by assuming 2.5 cm (0.984 in) of water reflection around vessels.

It is not clear how partial reflection will be used in NCS analyses and that it is sufficient to account for humans or other reflectors in close proximity to SNM. 10 CFR 70.61(d)

requires all nuclear processes to be subcritical under normal and credible abnormal conditions with an approved margin of subcriticality for safety.

NCS-3 Safety Analysis Report, Table 5.1-2

Clarify the safety criteria for tanks listed in Table 5.1-2 to ensure consistency with other statements in the SAR.

For example, SAR Section 5.1.2 states:

> . . . the values in Table 5.1-2, Safety Criteria for Buildings/Systems/ Components, represent the limits based on 6.0 wt% enrichment except for the Contingency Dump System traps which are limited to 1.5 wt% ^{235}U.

The safety criteria for tanks listed in Table 5.1-2 is based on 5 wt% enrichment not 6 wt% enrichment. If the safety criteria for tanks will be based upon 5 wt% enrichment, justify that this is sufficiently conservative to ensure that all processes will remain subcritical.
10 CFR 70.61(d) requires all nuclear processes to be subcritical under normal and credible abnormal conditions with an approved margin of subcriticality for safety.

NCS-4 Safety Analysis Report, Section 5.2.1.3

Clarify whether or not the assumptions (other than enrichment) described in SAR Section 5.2.1.3 are used for determining the safe values of geometry or volume.

The SAR states:

> (Section 5.1.2) The safe values of geometry / volume define the characteristic dimension of importance for a single unit such that nuclear criticality safety is not dependent on any other parameter assuming 6 wt% ^{235}U for safety margin.
>
> (Section 5.1.2) The values on Table 5.1-1 are chosen to be critically safe when optimum light water moderation exists and reflection is considered within isolated systems.
>
> (Section 5.2.1.3) The NCS analyses results provide values of k-effective (k_{eff}) to conservatively meet the upper safety limit. The following sections provide a description of the major assumptions used in the NCS analyses.

The assumptions described in Section 5.2.1.3 do not appear to be entirely consistent with the statements in Section 5.1.2. For example, performing analysis with an H/U ratio up to 7 may not account for optimum moderation in all cases.
10 CFR 70.61(d) requires all nuclear processes to be subcritical under normal and credible abnormal conditions with an approved margin of subcriticality for safety.

NCS-5 Safety Analysis Report, Section 5.3

Revise the SAR to clarify the commitment to provide Criticality Accident Alarm System (CAAS) coverage.

SAR Section 5.3 states:

> Areas where Special Nuclear Material (SNM) is handled, used, or stored in amounts at or above the 10 CFR 70.24 (CFR, 2008d) mass limits are provided with CAAS coverage.

This statement is not consistent with the regulatory requirements of 10 CFR 70.24. 10 CFR 70.24 requires that licensees authorized to possess greater than a critical mass of SNM shall provide CAAS coverage in *each* area where SNM is handled, used, or stored. The license application requests authorization to possess greater than a critical mass of SNM, therefore an exemption to 10 CFR 70.24 must be requested to exclude areas from CAAS coverage where SNM is handled, used, or stored. Such a request should specify the areas where CAAS coverage may not be provided and justify that the 10 CFR 70.17 requirements for granting an exemption are met.

NCS-6

Revise the Emergency Plan to clearly identify the discussion of the CAAS. The Emergency Plan (Section 2.1.1.2) states:

> Refer to Section 6.4.1 for a description of the CAAS.

Section 6.4.1 of the Emergency Plan does not describe the CAAS. This appears to be a typographic error.

NCS-7

Describe AES's commitment to the following statements from Section 3.1.5 of the ISA Summary, and incorporate into the SAR:

a. The CAAS will be uniform throughout the facility for the type of radiation detected, the mode of detection, the alarm signal, and the system dependability.
b. The CAAS is designed to remain operational during credible events or conditions, including fire, explosion, corrosive atmosphere, or seismic shock (equivalent to the site-specific design-basis earthquake or the equivalent value specified by the uniform building code).
c. Whenever the CAAS is not functional, compensatory measures, such as limiting access and restricting SNM movement, will be implemented. Should the CAAS coverage be lost and not restored within a specified number of hours, the operations will be rendered safe (by shutdown and quarantine) if necessary. Onsite guidance is provided and is based on process-specific considerations that consider applicable risk trade-off of the duration of reliance on compensatory measures versus the risk associated with process upset in shutdown.

10 CFR 70.24 requires a CAAS be maintained in each area where SNM is handled, used, or stored for facilities authorized to possess greater than a critical mass of SNM.

NUREG-1520, Section 5.4.3.4.3 indicates that commitments similar to those statements listed above are needed to ensure a CAAS is in place that will adequately meet the requirements of 10 CFR 70.24.

NCS-8

State in the SAR that documentation will be maintained that demonstrates the CAAS meets the requirements of 10 CFR 70.24.

10 CFR 70.24 requires a CAAS be maintained in each area where SNM is handled, used, or stored for facilities authorized to possess greater than a critical mass of SNM.

This information is needed to ensure a CAAS is in place that will adequately meet the requirements of 10 CFR 70.24.

NCS-9

Commit to only use NCS controls which are capable of preventing a criticality accident, or provide and justify an alternative commitment. The SAR does not clearly state that to meet the performance requirements AREVA will only use NCS controls which can prevent a criticality accident.

10 CFR 70.61(d) requires the use of preventive controls and measures as the primary means of protecting against a nuclear criticality accident.

NCS-10

The definition of a non-interacting unit does not appear to be practical. Explain how it is determined if a unit is non-interacting when an NCS analysis (NCSA) is not performed.

SAR Section 5.1.2 states:

> A non-interacting unit is defined as a unit that is spaced an approved distance from other units such that the multiplication of the subject unit is not increased. If a unit is considered interacting, NCSAs are performed.

This definition is not practical since all units can impact the multiplication factor no matter how far apart the units are. It is unclear how a unit could be considered non-interacting if no NCSA has been performed.

10 CFR 70.61(d) requires all nuclear processes to be subcritical under normal and credible abnormal conditions with an approved margin of subcriticality for safety.

Fire Safety (Chapter 7)

FS-1 Safety Analysis Report, Section 7.1.4, p. 7.1-2

Provide detailed information on the frequency, scope, and data collected during inspections of water based fire protection systems. A referenced commitment to National Fire Protection Association (NFPA) 25, “Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,” would be sufficient.

The regulation 10 CFR 70.22(a)(8) requires the applicant to provide proposed procedures to protect health and minimize danger to life and property.

The discussion of facility design in Section 7 on fire safety does not discuss a commitment to an industry standard on the inspection of fire protection systems. Section 7.3 of NUREG 1520 states that an applicant should provide commitments pertaining to fire safety management, including inspection, testing, and maintenance.

FS-2 Safety Analysis Report, Section 7.3.1, pp. 7.3-1 through 7.3-2

Describe the types of fireproofing intended to be used on the various structural members. Describe the measures that will be employed to confirm the proper application of fireproofing during construction and that the application remains intact over the life of the building.

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities which will be used by the applicant to protect health and minimize danger to life or property.

In accordance with the International Building Code, Type 1B construction requires that various structural elements have specific fire resistance ratings. This rating may be obtained through various means (constructed coverings, spray applied coatings, etc). The discussion of building construction in Section 7 on fire safety does not discuss how the engineering calculations used to design the fire resistance are field verified, nor does it discuss how those structural elements protected are inspected over the life of the building to verify that the required rating is the maintained.

FS-3 Safety Analysis Report, Section 7.4, p. 7.4-1

Section 7.4 states that a combustible silicone oil-based heat transfer media is used by the UF6 cold traps. Provide the combustion characteristics of this oil (flash point, fire point, heat of combustion, etc). In addition, confirm that all lubricating oil is self-contained in the various pumps, fans, centrifuge drives, etc (i.e., no lube oil systems).

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities which will be used by the applicant to protect health and minimize danger to life or property. In addition, the regulation 10 CFR 70.62(c)(1)(iii) requires that the integrated safety analysis identifies facility hazards that could effect the safety of licensed materials and thus present an increased radiological risk. Additionally, 10 CFR 70.65(b)(3) requires a description of each process analyzed in the ISA in sufficient detail to understand the theory of operation.

FS-4 Safety Analysis Report, Section 7.5.1, pp. 7.5-1 to 7.5-5

Provide information on the type of tanks used for fire protection water supply. What material is the tank constructed out of? Does the design include any seismic considerations?

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property.

NFPA 22, “Standard for Water Tanks for Private Fire Protection,” provides general guidance for various tanks constructed of various materials. Not all tanks are required by NFPA 22 to have seismic loading factored into their design, therefore a commitment to NFPA 22 does not adequately explain the design of the water supply system. Section 7.3 of NUREG 1520 states that an applicant should provide commitments pertaining to fire protection systems, including water supplies.

FS-5 Safety Analysis Report, Section 7.5.1, pp. 7.5-1 to 7.5-5

Provide clarification on the occupant notification provided by the fire alarm system. Are both audible and visual notification provided to all occupants? How are hearing impaired individuals notified? Are there any areas of potentially high ambient noise levels that may require alternate notification techniques? Are all portions of the fire alarm system designed and installed in accordance with NFPA 72, "National Fire Alarm Code?"

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property. Additionally, 10 CFR 70.64(b)(1) requires the design to be based on defense-in-depth practices.

Section 7.5.1.7 of the submittal, only states that the fire alarm control panel is installed in accordance with NFPA 72. More detail is needed on the fire alarm system design to determine its robustness as a defense-in-depth measure.

FS-6 Safety Analysis Report, Section 7.5.2, pp. 7.5-5 to 7.5-7

Provide a more detailed description of the number of people trained to participate on the facility fire brigade. Is there a minimum number of trained personnel available for any given shift?

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property. In addition, 10 CFR 70.22(a)(8) requires the applicant to provide proposed procedures to protect health and minimize danger to life and property.

FS-7 Safety Analysis Report, Figure 7.5-2

Provide a detailed diagram for each building showing sprinkler system coverage.

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property. Additionally, 10 CFR 70.64(b)(1) requires the design to be based on defense-in-depth practices.

It is noted in the referenced figure that certain buildings require evaluation for moderator control and may have limited or no sprinkler coverage in select areas. Details of that evaluation and a more precise description of sprinkler system coverage are needed to determine the system's robustness as a defense-in-depth measure.

Decommissioning (Chapter 10)

D-1 Safety Analysis Report, Section 10.1.6

Section 10.1.6 states that decommissioning will take about 8 years. 10 CFR 70.38(h) requires that decommissioning be completed no later than 24 months following the initiation of decommissioning. 10 CFR 70.38(i) allows the Commission to approve a request for an alternate schedule for completion of decommissioning if the alternative is

warranted by consideration of 5 factors specified in 70.38(i)(1)-(i)(5). Request an alternate schedule for decommissioning and provide justification for the longer schedule.

D-2 Safety Analysis Report, Section 10.1.6.9

Revise the initial radiation survey performed prior to initial operation such that it is adequate to establish background for use as a reference area for the final survey at decommissioning time or provide other explanation. NUREG-1757, Consolidated Decommissioning Guidance, Volume 2 Characterization, Survey, and Determination of Radiological Criteria (Revision 1), contains guidance for performing a background survey. The 10 samples discussed in Environmental Report Sections 3.3 and 3.11 are too few and are located at the site boundary or outside it; none are located within the site itself. They are not sufficient to use for demonstration of compliance with 10 CFR Part 20 Subpart E decommissioning criteria.

D-3 Safety Analysis Report, Table 10.1-1E

The cost estimate in the SAR for decommissioning of the Separations Building Modules has been factored to address a 6.6 M SWU plant, as follows (the tables use 3 M SWU and 6 M SWU instead of 3.3 and 6.6):

- The length of piping for a 6 M SWU facility is assumed to be twice that for a 3 M SWU facility (Note 5 to Table 10.1-1A).
- The length of ventilation/ductwork for a 6 M SWU facility is assumed to be twice that for the 3 M SWU facility (Note 4 to Table 10.1-1D).
- Areas to be contaminated for a 6 M SWU facility are assumed to be twice the areas for a 3 M SWU facility (Note 5 to Table 10.1-1E).
- The amount of electricity (if used to replace natural gas) required for a 3 M SWU facility is doubled for a 6 M SWU facility (Note 2 to Table 10.1-11).
- Piping length for a 6 M SWU facility is assumed to increase by only 50% (Note 5 to Table 10.1-1E).

Provide an explanation for the different factor for piping length.

The regulations in 10 CFR 70.25 (a)(1) require applicants for a license for a uranium enrichment plant to submit a decommissioning funding plan. Section A.3 of NUREG-1757, Volume 3, outlines the level of detail that the cost estimate should contain.

D-4

The SAR does not describe any experience that Enrichment Technology Company (ETC) has in decommissioning. Provide a description of the experience, if any, that ETC may have relevant to planning and conducting decommissioning of the Separation Buildings Modules and incorporate into the SAR.

Section A.3.1 of NUREG-1757, Volume 3, indicates that an applicant should assume that a third party contractor will perform the work. The level of experience a contractor has may reflect how a contractor is able to complete the work at reasonable costs.

D-5 Safety Analysis Report, Tables 10.1-1A, 10.1-1B, 10.1-1C,10.1-1D, 10.1-1E and 10.1-1F

In several tables in the SAR, notes to the tables state that "Total dimensions not used in estimating model" (e.g., Note 4 to Table 10.1-1A; Note 1 to Table 10.1-1B; Note 1 to Table 10.1-1C; Note 1 to Table 10.1-1D; Note 1 to Table 10.1-1E; and Note 1 to Table 10.1-1F).

Frequently, these notes are associated with a statement that "1 Lot" of items will be decontaminated. These items, which include walls, floors, ceilings, tanks, valves, hand tools, consumables, scaffolding, and miscellaneous pieces of equipment, do not appear to be consistently the same size or to share other characteristics that make their decommissioning costs potentially similar. Decommissioning/decontaminating "1 lot of tanks," for example, is likely to involve significantly different costs from decommissioning "1 lot of hand tools or consumables." Another note explains, with respect to these items, that "Allocation based on European decommissioning experience."

Provide a more detailed explanation of the estimating model functions to provide a cost estimate in these cases, including what that decommissioning experience consists of, when it occurred, whether it was carried out by third parties whose costs are reflected in the estimates. Clarify whether the European decommissioning experience is a reference to ETC activities.

Section A.3 of NUREG-1757, Volume 3, outlines the level of detail that the cost estimate should contain. The labor estimates, material costs, and other factors of the cost estimate should have a clear and reasonable basis.

D-6 Safety Analysis Report, Table 10.1-1C

In Table 10.1-1C, no dimensions are provided for the Third Floor Maintenance Facility or the Third Floor Decontamination Areas in the Technical Support Building. Total dimensions are provided for other components of that building. Provide estimates of the total dimensions to be decommissioned/decontaminated for the Maintenance and Decontamination areas, or explain why no dimensions are provided.

Section A.3 of NUREG-1757, Volume 3, outlines the level of detail that the cost estimate should contain.

D-7 Safety Analysis Report, Table 10.1-3

In Table 10.1-3, Note 4, states that "Specific details of decontamination method not defined at this time." However, detailed estimates of the total hours necessary to conduct decontamination of the various components listed in the table are provided. Provide an explanation of the accurately and completeness of the estimated total hours necessary to complete tasks, given that the details of the method are not yet defined.

Section A.3 of NUREG-1757, Volume 3, outlines the level of detail that the cost estimate should contain.

D-8 Safety Analysis Report, Table 10.1-4 and 10.1-6

Notes to Tables 10.1-4 and 10.1-6 state that European experience with decommissioning gas centrifuge uranium enrichment plants has been that there is no resulting radiological contamination of the facility grounds. Provide a more detailed description of the European experience upon which these notes are based.

Section A.3 of NUREG-1757, Volume 3, outlines the level of detail that the cost estimate should contain.

D-9 Safety Analysis Report, Table 10.1-10

In Table 10.1-10, "Packaging, Shipping, and Disposal of Radioactive Waste," the multiplication of Disposal Volume in ft^3 times unit cost per ft^3 sometimes resulted in different total disposal costs from those found in the table—e.g., 30,512 x $410=$12,509,920 rather than $12,522,000; 218,951 x $220=$48,169,220 rather than $48,193,000).

If the results in the table are subject to rounding, this should be noted in the table, or provide other explanation for the discrepancies.

Section A.3 of NUREG-1757, Volume 3, outlines the level of detail that the cost estimate should contain.

D-10 Safety Analysis Report, Table 10.1-15

In Table 10.1-15, Note 4 explains that the vacuum processes in the Separations Building result in an absence of contamination of floors, walls, and ceilings. The same Note 4 also states that a conservative allowance is provided for cleaning of floors, walls, and ceilings in the final Decommissioning Facility and the Technical Support Building. Assuming that the vacuum process will not be operational in those buildings, provide a more detailed explanation for the very low estimates for cleaning ceilings, floors, and walls in those buildings.

Section A.3 of NUREG-1757, Volume 3, outlines the level of detail that the cost estimate should contain.

D-11 Safety Analysis Report, Table 10.1-16

In Table 10.1-16, no estimate is included for contingencies. Application of a 25% contingency factor is discussed Section 10.2.2 of the SAR. Revise this table to show a minimum of 25% of the costs for contingencies.

Section A.3.1.2.3 of NUREG-1757, Volume 3, specifies that the cost estimate should apply a contingency factor of 25% to the sum of all estimated decommissioning costs.

Management Measures (Chapter 11)

MM- 1 Safety Analysis Report, Section 11.1.4

Chapter 11.1.4, "Change Control," states that each change to the facility or activities of

personnel will be evaluated in accordance with the requirements of 10 CFR 70.72. 10 CFR 70.72(c) allows the licensee to make changes without prior NRC approval if other conditions, primarily associated with the facility's safety program established in accordance with 10 CFR 70.62, "Safety Program and Integrated Safety Analysis," are met.

What criteria will be used to evaluate changes to the facility and activities of personnel which are not included in the safety program in order to determine whether prior NRC approval is required? How will this evaluation be documented and at what frequency will these changes be provided to the NRC after implementation?

MM- 2 Safety Analysis Report, Section 11.1.4.1

Chapter 11.1.4.1, "Design Phase," states that prior to issuance of the license, AES will notify the NRC of potential changes that reduce the level of commitments or margin of safety in the design bases of QA level 1 and 2 items and activities. Please clarify that AES will provide these changes to the NRC for review and approval prior to issuance of a license.

10 CFR 70.23(a)(3) and (4) require that the NRC determine that the applicant's proposed equipment and facilities and proposed procedures are adequate to protect health and minimize danger to life or property.

MM- 3 Safety Analysis Report, Section 11.1.4.3

Chapter 11.1.4.3, "Operations Phase," describes the evaluation of modifications in accordance with 10 CFR 70.72 and states that each modification shall be evaluated for any required changes or additions to the facility's procedures, personnel training, testing program, or regulatory documents. Clarify whether regulatory documents include the ISA, ISA summary, and other safety program information developed in accordance with 10 CFR 70.62.

10 CFR 70.72(a)(6) requires that the licensee evaluate the impacts of changes on the ISA, ISA summary, and other safety program information.

MM- 4 Safety Analysis Report, Section 11.2.4.4.2

Chapter 11.2.4.4.2, "Special Testing" states that special tests may be conducted at the discretion of the Plant Manager. Please clarify the SAR to describe the requirement to evaluate the impact of the special test in accordance with 10 CFR 70.72 prior to conducting it.

MM- 5 Section 11.4

Please describe the relationship of the first paragraph in Chapter 11.4, "Procedures Development and Implementation" to this section of the SAR. This paragraph describes requirements for independent verification as being consistent with the guidance of ANSI/ANS 3.2-1994 and appears to be out of place in the SAR.

MM- 6 Safety Analysis Report, Section 11.4

Please clarify the periodicity of procedure reviews in Chapter 11.4 “Procedures Development and Implementation” to assure their continued accuracy and usefulness. NUREG-1520 recommend that operating procedures be reviewed at least every 5 years and emergency procedures be reviewed annually.

10 CFR 70.62(d) requires that management measures, which include certain procedures, shall ensure that IROFS are implemented and maintained such that they are available and reliable to perform their function when needed.

MM- 7 Safety Analysis Report, Section 11.4.3

Please revise Chapter 11.4.3 “Procedures” of the SAR to clarify that temporary changes to procedures are reviewed in accordance with 10.CFR 70.72 prior to implementation and that the temporary procedures will have an approved duration as required by 10.CFR 70.72(a)(5).

MM- 8 Safety Analysis Report, Section 11.5

Chapter 11.5, “Audits and Assessments” states that the audit and assessment program applies to quality assurance and that the Quality Assurance Department shall be responsible for audits. The SAR further states, on page 11.5-46 that personnel performing audits and assessments do not report to the production organization and have no direct responsibility for the function or area being assessed. Please clarify whether the personnel performing audits of quality assurance report to the Quality Assurance Department.

MM- 9 Safety Analysis Report, Section 11.5.4

Chapter 11.5.4, “Qualifications and Responsibilities for Audits and Assessments” describes the requirements for certification of lead auditors. Please describe the requirements for maintenance of proficiency and recertification.

10 CFR 70.62(d) requires that management measures, which include quality assurance elements such as audits and assessments, shall ensure that IROFS are designed, implemented and maintained such that they are available and reliable to perform their function when needed.

MM- 10 Safety Analysis Report, Section 11.17

Chapter 11.17 “Records” describes requirements for when a single records storage facility is used (i.e., the facility should be reviewed for adequacy by someone competent in fire protection and fire extinguishing). The QAPD, item 17.9 states that the requirements of ASME NQA-1-1994, Supplement 17S-1, Section 4.4 will be applied. Please clarify the SAR to make it consistent with the QAPD.

Quality Assurance Program Description

QA-1 Safety Analysis Report, Section 6.3

Item 6.3, Document Control, states that temporary procedure changes that do not

change the intent of procedures can be made at the work location by responsible management. This is inconsistent with the statement in Chapter 11.4.3 of the SAR that says that temporary changes to procedures must be approved by two members of management, at least one of whom is a Production Manager. Please clarify the QAPD to be consistent with the SAR. Additionally, clarify that procedure changes, including temporary changes, are subject to the requirements of 10 CFR 70.72.

QA-2 Safety Analysis Report, Section 7.4.6

Item 7.4.6, Control of Purchased Items and Services, states that acceptance of items includes one or more of the following methods: certificate of conformance, source verification, receiving inspection, post-installation test, and performance history. It further states that for QA level 1 IROFS, if performance history is used, at least one of the other acceptance methods must also be used. Please justify why performance history alone is an adequate method for acceptance of QA level 2 IROFS.

10 CFR 70.62(d) requires that management measures, which include other quality assurance elements such as procurement, shall ensure that IROFS are available and reliable to perform their function when needed.

QA-3 Safety Analysis Report, Section 7.6

Item 7.6, “Approved Suppliers List,” describes the use of an approved suppliers list for vendors for which AES has determined have an acceptable QA program. Please clarify whether the approved suppliers list will state the scope of items and services for which the supplier is approved.

10 CFR 70.62(d) requires that management measures, which include other quality assurance elements such as procurement, shall ensure that IROFS are available and reliable to perform their function when needed.