

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

AREVA ENRICHMENT SERVICES, LLC

(Eagle Rock Enrichment Facility)

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Docket No. 70-7015-ML

APPLICANT'S PROPOSED FINDINGS OF FACT AND
CONCLUSIONS OF LAW CONCERNING UNCONTESTED SAFETY ISSUES

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I. INTRODUCTION

1.1. This Partial Initial Decision pertains to the application by AREVA Enrichment Services, LLC (“AES” or “Applicant”) to the U.S. Nuclear Regulatory Commission (“NRC”) for a license to construct and operate a uranium enrichment facility — designated the Eagle Rock Enrichment Facility (“EREF”) — near Idaho Falls, Idaho. In particular, this decision involves Atomic Safety and Licensing Board (“Board”) review of the radiological health and safety considerations specified in paragraph II.D of the Commission’s “Notice of Hearing and Commission Order” (“Hearing Notice and Order”), which was published in the *Federal Register* on July 30, 2009.¹ The Board is considering uncontested “safety” issues and uncontested “environmental” issues on separate tracks.

1.2. In accordance with Section II.F of the Hearing Notice and Order, the Board must address those safety considerations that were not the subject of any contested proceeding. Here, there was in fact no contested proceeding and therefore this partial initial

¹ 74 Fed. Reg. 38052 (July 30, 2009).

decision will be the sole decision related to safety considerations. To fulfill its responsibilities in this uncontested proceeding, the Board presents below its findings of fact on the safety matters identified by the Commission in its Hearing Notice and Order.

1.3. The Board finds that the application and the record of the proceeding contain sufficient information, and that the safety review of the application by the Staff has been adequate, to support the findings to be made by the Director of the Office of Nuclear Material Safety and Safeguards (“NMSS”), with respect to the applicable standards in 10 C.F.R. Parts 30, 40 and 70 and the Commission’s Notice and Hearing Order.

II. PROCEDURAL BACKGROUND

2.1. By application filed December 30, 2008, AES seeks a license to possess and use source, byproduct, and special nuclear material in order to enrich natural uranium to a maximum of five percent uranium-235 by the gas centrifuge process. AES proposes to construct and operate the proposed EREF near Idaho Falls, Idaho, for that purpose. The requested license, if granted, would be issued under 10 C.F.R. Parts 30, 40, and 70, and be for an initial term of thirty (30) years.

2.2. On July 30, 2009, the Commission provided notice of the receipt and availability of the AES license application and of the opportunity for a hearing on the application. The Hearing Notice and Order, as published in the *Federal Register* (74 Fed. Reg. 38052), provided interested persons with the opportunity to participate as parties in the proceeding by filing a written petition for leave to intervene in accordance with the provisions of 10 C.F.R. § 2.309.² No interested party requested a hearing on the AES application.

² As discussed further below, in the Hearing Notice and Order, the Commission also addressed the nature of the hearing to be conducted on the AES license application. The Commission identified the specific matters of fact and law to be considered by the Board.

2.3. In September 2010, the NRC Staff published the final Safety Evaluation Report for the Eagle Rock Facility in Bonneville County, Idaho (NUREG-1951). Exhs. NRC000032, NRC000033, NRC000079, NRC000080, and NRC000081.

2.4. On October 7, 2010, the Board issued a Memorandum and Order (Initial General Schedule; Revision to Uncontested/Mandatory Hearing Procedures; Inviting Written Limited Appearance Statements and Participation by Interested Governmental Entities). The Order included a schedule and related administrative directives related to uncontested hearing on safety issues.

2.5. On October 29, 2010, the Board issued a Memorandum and Order (Initial Publicly-Available Board Questions Regarding Safety Matters and Associated Administrative Directives) including written questions on safety-related topics. Both AES and the NRC Staff provided written responses to these questions on November 19, 2010. Exhs. AES000001, NRC000001.

2.6. On October 29, 2010, the Board issued a Memorandum and Order (Initial Nonpublicly-Available Board Questions Regarding Safety Matters and Associated Administrative Directives) including written questions on safety-related topics. Both AES and the NRC Staff provided written responses to these questions on November 19, 2010. Exhs. AES000018, NRC000020.

2.7. On December 3, 2010, the Board issued a Memorandum and Order (Additional Publicly-Available Board Questions Regarding Safety Matters) including written questions on safety-related topics. Both AES and the NRC Staff provided written responses to these questions on December 13, 2010. Exhs. AES000024, NRC000023.

The Commission also provided guidance on certain procedural matters and applicable

2.8. On December 3, 2010, the Board issued a Memorandum and Order (Additional Nonpublicly-Available Board Questions Regarding Safety Matters) including written questions on safety-related topics. AES provided a written response to these questions on December 13, 2010. Exh. AES000029.

2.9. On December 17, 2010, the Board issued a Memorandum and Order (Providing Presentation Topics and Administrative Directives Associated with Mandatory Hearing on Safety Issues). The Order included additional questions on safety-related topics. Both AES and the NRC Staff provided written responses to these questions on January 14, 2011. Exhs. AESR20031, NRC000027. The Order also identified presentation topics for the safety-related portion of the uncontested proceeding.

2.10. On January 21, 2011, the Board issued a Memorandum and Order (Additional Publicly-Available Question Regarding Safety Matters and Identification of “Available” AES Witnesses). The Order included an additional question regarding decommissioning financial assurance. AES and the NRC Staff provided written responses to the question on February 1, 2011. Exhs. AES000063, NRC000125.

2.11. On January 25, 2011, the Board convened the safety-related portion of the uncontested hearing in Rockville, Maryland. Pursuant to the Board’s request, AES and the NRC Staff made expert witnesses available and gave presentations on the following safety topics: Site-Specific Process-Related Hazards, Foreign Ownership and Control, License Conditions/Exemptions, and Commitment Followup/Tracking. These presentations and other exhibits, including the Final Safety Evaluation Report (“SER”) and the written responses to the Board’s questions, were admitted into evidence at the hearing.

regulatory requirements.

2.12. Subsequent to the January 25, 2011 hearing, the Board issued several orders relating to various administrative matters (*e.g.*, transcript corrections). In accordance with the Board's schedule for the safety-related portion of the uncontested hearing, on February 25, 2011, AES and the NRC Staff submitted their proposed findings of fact and conclusions of law.

III. LEGAL STANDARDS GOVERNING THE BOARD'S REVIEW

3.1. Sections II.D through II.F of the Hearing Notice and Order describe the legal determinations that the Board must make as part of the mandatory hearing. As set forth in Section II.D, with respect to uncontested matters, the Board is to determine, without conducting a *de novo* review of the license application:

(1) whether the application and record of the proceeding contain *sufficient information* to support license issuance and whether the NRC staff's review of the application has been *adequate to support findings* to be made by the Director of the Office of Nuclear Materials Safety and Safeguards, *with respect to the matters set forth in paragraph C of this section*, and (2) whether the review conducted by the NRC staff pursuant to 10 CFR Part 51 has been adequate.

74 Fed. Reg. at 38054 (emphasis added). *See also* 10 C.F.R. § 2.104(b)(2) (procedural regulation describing the determinations to be made by a licensing board in a mandatory hearing). Section II.C of the Hearing Notice and Order, in turn, states that:

The matters of fact and law to be considered are whether the application satisfies the standards set forth in this Notice and Commission Order and the *applicable standards* in 10 CFR parts 30, 40 and 70, and whether the requirements of NEPA and NRC's implementing regulations in 10 CFR Part 51 have been met.

74 Fed. Reg. at 38054 (emphasis added). We discuss the regulatory standards below in connection with our findings of fact. *See* Section IV, *infra*. As noted above, this Partial Initial Decision addresses only the "safety" aspects of the required hearing. The portion of the proceeding relating to compliance with NEPA and NRC's implementing regulations in 10 C.F.R. Part 51 will be addressed in a separate decision.

3.2. In Section II.F, the Commission explained that, to the extent that the Board has admitted intervenor contentions, the Board is to make the foregoing determinations only with respect to matters *not* covered by those contentions. *See id.* That is, in performing its “sufficiency” review of the application, the record, and the Staff’s licensing determinations, the Board is not to revisit contested issues that it has resolved on the merits. As noted above, there were, however, no admitted contentions in this proceeding.

3.3. On March 18, 2005 the Chief Administrative Judge of the Atomic Safety and Licensing Board Panel certified to the Commission six questions concerning the NRC’s statutory duty to conduct a “mandatory hearing.”³ In answering those certified questions, the Commission provided additional guidance to its licensing boards with respect to the conduct of mandatory hearings. The Commission stated that:

[W]e expect licensing boards conducting mandatory hearings on uncontested issues to take an independent “hard look” at NRC staff safety and environmental findings, but not to replicate NRC staff work. Giving appropriate deference to NRC staff technical expertise, boards are to probe the logic and evidence supporting NRC staff findings and decide whether those findings are sufficient to support license issuance.⁴

In this regard, the Commission emphasized again that “the boards should conduct a simple ‘sufficiency’ review of uncontested issues, not a *de novo* review.”⁵ With respect to uncontested matters, the Board must merely “decide whether the *staff’s* review has been adequate to support [its] findings.”⁶

³ See LBP-05-7, 61 NRC 188 (2005).

⁴ *Exelon Generation Co., LLC* (Early Site Permit for Clinton ESP Site) *et al.*, CLI-05-17, 62 NRC 5, 34 (2005).

⁵ *Id.* at 39.

⁶ *Id.* at 36 (emphasis in original) (citation omitted).

3.4. With respect to safety issues cognizable under the Atomic Energy Act (“AEA”) of 1954, as amended, the Commission noted its expectation that “boards will not follow a cursory, hands-off approach to uncontested Staff findings.”⁷ Rather, the Commission expects its boards to — as this Board has done — “carefully probe those findings by asking appropriate questions and requiring supplemental information when necessary.”⁸ This does *not* mean that the Board must inquire into “*all possible views and facts* relating in any way to the matters in question.”⁹ It is with the foregoing principles in mind that we make the findings of fact and conclusions of law set forth below.

IV. FINDINGS OF FACT

A. General Description of the Proposed Facility and the License Application

4.1. The proposed EREF will be located in Bonneville County, Idaho, about 20 miles west-northwest of the city of Idaho Falls. The primary function of the facility will be to enrich natural uranium, in the form of UF₆, from its natural isotopic concentration of about 0.7 percent uranium-235 to 5 percent uranium-235. The enrichment process uses fast-rotating cylinders (centrifuges) at subatmospheric conditions to generate centrifugal forces that separate the various uranium isotopes based on their differing molecular weights. The enrichment process yields two streams: a product stream consisting of enriched UF₆ and a byproduct stream consisting of depleted UF₆. *See* Exh. NRC000032 at 1-1.

4.2. AES prepared its application to conform with, to the extent practicable, the format and substantive guidance contained in NUREG-1520, “Standard Review Plan for the

⁷ *Id.* at 40.

⁸ *Id.*

⁹ *See* CLI-05-17, 62 NRC at 41-42 (emphasis in original).

Review of a License Application for a Fuel Cycle Facility” (March 2002) (“SRP”). *See* Exh. NRC000031. The license application for the EREF consists of the following principal documents: a Safety Analysis Report (“SAR”), an Emergency Plan, an Environmental Report (“ER”), a Fundamental Nuclear Material Control Plan, a Physical Security Plan, and a Standard Practice and Procedures Plan for the Protection of Classified Matter. AES also prepared and submitted, along with the EREF license application, an Integrated Safety Analysis (“ISA”) Summary. The EREF ISA Summary also conforms, to the extent practicable, to the format and substantive guidance contained in the SRP.

B. Thoroughness of the NRC Staff’s Licensing Review Process

4.3. In evaluating AES’s license application and preparing its SER, the NRC Staff relied in principal part on the review guidance contained in the SRP (*i.e.*, NUREG-1520; Exh. NRC000031). The primary purpose of the SRP, which the NRC Staff developed after extensive interactions with fuel cycle licensees to ensure comprehensiveness, is to facilitate quality and uniformity in NRC Staff reviews of such applications. Exh. NRC000031 at iii. It also serves as guidance to applicants. *Id.* Because the SRP is a guidance document, the information presented in it does not preclude applicants from suggesting alternative approaches to those specified in the SRP to demonstrate compliance with applicable regulations. *Id.* Therefore, when an applicant suggests alternative approaches, the NRC Staff must make an independent determination as to the adequacy of the applicant’s proposed approaches. *Id.*

4.4. Given that NRC Staff has reviewed other enrichment facility applications in recent years, the Board sought clarification from the NRC Staff as to the differences between the AES application and Louisiana Energy Services’ application for the National Enrichment Facility (“NEF”). *See* Board Order, dated October 29, 2010, at 1. To this end, the Board

directed the parties to identify (a) significant safety-related differences between the AES and LES applications; (b) lessons learned from the construction and operation of the NEF as applied to the EREF; and (c) any locality-specific factors at the EREF Idaho site that could adversely affect safety at the EREF site, but that are generally not considered potential threats to safety in Europe. *Id.*; *see also* Board Order, dated December 3, 2010, at 3. In their pre-filed and live testimony, the AES and NRC Staff witnesses responded to the Board's questions in full.

4.5. First, the NRC Staff explained that it conducted its safety review of the Applicant's proposed equipment, facility design, safety programs, and commitments in accordance with NUREG-1520, Revision 0 (Exh. NRC000031). Because the AES application was submitted in December 2009 and the NRC Staff review was underway prior to issuance of Revision 1 (Exh. NRC000070) in May 2010, the NRC Staff used Revision 0 for its review of the AES application. Exh. NRC000001 at 25. The NRC Staff provided additional information regarding the changes in NRC guidance between Revision 0 and Revision 1 of NUREG-1520. The NRC Staff explained that Revision 1 did not create new guidelines for reviewers and that the changes in Revision 1 consisted mostly of editorial and formatting changes for consistency, updates to references, and expanded technical rationale concerning the acceptance criteria, including incorporation of NRC interim staff guidance ("ISG") and internal guidance issued to NRC Staff. *Id.* The NRC Staff also provided a summary of the changes in Revision 1. *Id.* at 26.

4.6. In conducting the review, the NRC Staff did not specifically identify differences between the AES and LES applications, although the previous LES licensing review did inform the reviewer's evaluations. Exh. NRC000001 at 1. Although there are differences in the respective license applications, the NRC Staff found that each applicant's descriptions of its proposed equipment, facilities, safety programs, specifications, and analyses provide an adequate

basis for safety and safeguards of the facility operations and that operation of each facility would not pose an undue risk to worker and public health and safety. *Id.* The NRC Staff also highlighted several safety-associated differences between the two applications in the areas of quality assurance, safe-by-design Items Relied on for Safety (“IROFS”), and automatic fire suppression system. Based on the NRC’s review of the AES Quality Assurance Program Description (“QAPD”), safe-by-design IROFS, and automatic fire suppression system, the NRC identified no additional license conditions. *Id.* at 2-4. The NRC Staff described in greater detail one exemption requested by AES regarding several definitions in 10 C.F.R. Part 21. *Id.* at 3; *see also* Exh. NRCR00104 at 20.

4.7. Second, the NRC explained that it considered several lessons learned from the construction and operation of the NEF facility during its safety review of the EREF application. Exh. NRC000001 at 4-6. For example, at the time of the AES license application and review, the IROFS were in a general design phase and the NRC will review the IROFS in more detail during the operational readiness review (“ORR”). *Id.* at 4. The NRC’s inspection of IROFS and the application of management measures requires a clear understanding of the definition or scope of each IROFS. In Section 3.3.1 of the SAR (Exh. AES000037), AES states that upon completion of the design of IROFS, the IROFS boundaries¹⁰ will be defined and that ISA Summary, Appendix A (Exh. NRC000046), Guidelines for Development of Boundary

¹⁰ The IROFS boundary includes everything necessary for the IROFS to perform its intended safety function. For example: (1) the boundary of an enhanced administrative IROFS includes all instrumentation (sensors, annunciators, circuitry, any controls activated by the operator, etc.) relied on to trigger the operator action; (2) the boundary of a simple administrative control includes the equipment necessary to correctly perform the action; and (3) the boundary of an active engineered control includes the attendant instrumentation, sensors, essential utilities, and any auxiliary equipment needed to perform its safety function. The reliability and availability qualities of every component

Definitions for IROFS, will be used. One of the lessons learned for an enrichment facility is that in implementing its boundary definition package, an applicant should ensure that the resulting IROFS boundaries meet the guidance provided in ISG-01, “Methods for Qualitative Evaluation of Likelihood” (Exh. NRC000047). *Id.* at 5. The NRC will therefore impose a license condition requiring AES to conform to NRC guidance and acceptance criteria on IROFS boundaries. *Id.*; Exh. NRCR00104 at 10.

4.8. Another lesson from the NEF experience relates to changes to the SAR prior to NRC approval. The AES SAR contains the information and commitments regarding nuclear criticality safety methodologies and technical practices that define the approved margin of subcriticality for safety, required by 10 C.F.R. § 70.61(d), that AES will use. To maintain the margin of subcriticality, AES requested a special authorization that identifies the criteria that AES will use to make changes to the SAR without prior NRC approval. In Section 1.2.4.2.2 of the SER (Exh. NRC000032), the NRC Staff granted the authorization, which will be formalized through a license condition that identifies the scope of changes and criteria to be applied in determining whether prior NRC approval is necessary. Exh. NRC000001 at 6; NRCR00104 at 21. Records of such changes must be maintained, including technical justification and management approval, in dedicated records to enable NRC inspection. A report containing a description of each such change, and appropriate revised sections to the license application, must be submitted to the NRC within three months of implementing the change. *Id.*; *see also* Tr. at 240-242, 246-247.

4.9. Third, the NRC Staff and AES provided information regarding locality-specific factors at the EREF Idaho site that could adversely affect safety at the EREF site, but

within the IROFS boundary must be considered in evaluating the total IROFS likelihood.

that are generally not considered potential threats to safety in Europe. Three AES experts, George Harper, Chris Andrews, and Scott Tyler, testified as to the methods used by AES to identify site-specific hazards. Exh. AES000061. The AES experts explained that AES used NUREG-1520 (Exh. NRC000031) guidance to develop process-related hazards analyses and Idaho-specific external events analyses. Tr. at 167-170. The process-related hazards analysis used existing vendor Hazards and Operability Studies (“HAZOPs”) as a starting point, which were modified by the EREF ISA teams using HAZOP “guidewords” to address process deviation initiators and site-specific external events. Exh. AES000037 at 3.1-5. Although AES did not perform an explicit comparison to European or LES centrifuges because the process was independent of other applications, ISA team members representing the centrifuge vendor participated in process-related hazard analyses for other sites including those in Europe and in North America. Tr. at 170.

4.10. The AES ISA team did not identify any unique process-related hazards specific to Idaho relative to any other centrifuge site. The AES experts explained that the centrifuges are in a closed system (*i.e.*, under vacuum) and are not sensitive to locality-related differences. Tr. at 173-176. The AES experts noted that instrument setpoints, which are only relevant for operational considerations, will be adjusted to account for differences in site elevation. In contrast with process-related hazards, the ISA team did identify unique site-specific external events, including volcano, seismic, fire, tornado, transportation accident, and snow and ice. These external events were identified through independent analysis by ISA team members and expert consultants, as well as through a comparison with external event analyses used for other enrichment facilities (*e.g.*, the NEF). Tr. at 172.

Exh. NRC000001 at 4-5.

4.11. For its part, the NRC Staff explained that it looked first to the guidance in NUREG-1520 in reviewing the application's discussion of process-related hazards and external events. Tr. at 170. The NRC Staff experts, Breeda Reilly and Rex Wescott, explained that the NRC Staff also applied its knowledge from other safety reviews when reviewing the AES application. *Id.* at 170-171. The NRC Staff explained that, for example, it looked at consistency among enrichment facility applications, including whether different accident analyses or plant equipment were used in the AES application relative to other facilities. The NRC Staff found AES's approach acceptable. Exh. NRC000032 at 3-14, 6-8; Tr. at 171.

4.12. Based upon our review of the SER and the record of the proceeding, the Board is satisfied that the Staff conducted a thorough and adequate review of the AES license application. Specifically, by following relevant guidance and acceptance criteria of the SRP, the NRC Staff utilized a reasonable and logical approach to reviewing the application. Where appropriate, the NRC Staff ensured that differences between prior enrichment facility applications and the AES application were considered and adequately justified. The Staff's review, in other words, has been adequate to support the safety findings to be made by the Director of NMSS for purposes of license issuance.

C. Adequacy of the Application and the Record of the Proceeding

4.13. The Commission's Hearing Notice and Order also requires the Board to decide whether the application and the record of the proceeding contain *sufficient information* to support the Staff's findings relative to compliance with all applicable standards.¹¹ We identify below the relevant standards and describe, in brief, the Staff's findings relative to those

¹¹ The specific standards (*e.g.*, technical qualifications) enumerated in Sections 30.33 and 40.32, which relate to byproduct material and source material, respectively, mirror those contained in Section 70.23, albeit they are fewer in number.

standards. With respect to those matters on which the Board sought testimony and evidence from the NRC Staff and/or AES to supplement the record, the Board elaborates, as needed, upon its rationale for certain findings. In summary, the Board finds that AES has provided sufficient information relative to the safety of the proposed facility, and that the NRC Staff's review of that information has been adequate, to support the Staff's specific findings and license issuance.

1. *Authorized Use of AEA-Regulated Materials*

4.14. NRC regulations require that the license application be for a purpose authorized by the AEA. *See* 10 C.F.R. § 70.23(a)(1). AES is proposing to use special nuclear material and source material in the enrichment of uranium. The uranium enrichment services would be sold to clients for the production of low-enriched uranium, which, in turn, ultimately would be used in the manufacture of fuel for commercial nuclear power plants. *See* Exh. NRC000032 at 1-3. Byproduct material, as defined in 10 C.F.R. Part 30, would be used in instrument-calibration sources, and may be present as contamination as a consequence of the historical feed of recycled uranium at other enrichment facilities. (However, feed cylinders that have been previously used to transport or store recycled uranium must be decontaminated before being allowed on the facility site.) *See id.* at 1-11. The record is sufficient to support the Staff's conclusion that the foregoing uses (or types of possession) of nuclear material are authorized by the AEA. *See also* 42 U.S.C. §§ 2073, 2093, 2111, 2243.

2. *Technical Qualifications*

4.15. An applicant must be qualified by reason of training and experience to use the material for the purpose requested. *See* 10 C.F.R. § 70.23(a)(2). The record is sufficient to support the NRC Staff's conclusion that AES has adequately described the responsibilities and associated resources for the design, construction, and operation of the proposed EREF and its

plans for managing the project. AES identified and functionally described the specific organizational groups that are responsible for managing the design, construction, and operation of the facility, (2) organizational charts, and (3) plans to commission the facility's startup and operation, including the transition from the startup phase to operations, under the direct supervision of the Applicant's personnel responsible for safe operations. Further, the record contains a reasonable basis for the Staff's conclusion that the plans and commitments described in the application provide reasonable assurance that an acceptable organization, administrative policies, and sufficient competent resources have been established or committed for the design, construction, and safe operation of the facility. *See generally* Exh. NRC000032 at Chapter 2.

4.16. The Board requested supplemental information from the NRC Staff and AES regarding technical qualifications. In response to a Board question regarding the relationship between the AES parent corporations and AES, the AES expert, Sam Shakir, who is the President and Chief Executive Officer of AES, explained that the AES President is the top executive of AES LLC (Exh. AES000001). Exh. AESR00062 at 5; Tr. at 194. The AES President is responsible for operating EREF in compliance with Federal, State, and local safety, security, environmental, and financial requirements. Exh. AESR00062 at 5; Tr. at 194. The AES President has sole responsibility and decision-making authority for: (1) operating EREF in compliance with Federal, State, and local safety, security, environmental, and financial requirements (Exh. AES000001); (2) safety in design, construction, operation and decommissioning of the EREF (Exhs. AES000001; AES000037); and (3) quality assurance related to design, construction, operation and decommissioning of the EREF (Exh. AES000001). *See generally* Exh. AESR00062.

4.17. In response to Board questions (Board Order, dated December 3, 2010, at 2), the NRC Staff and AES also explained the basis for the qualifications of certain positions at the EREF. The NRC Staff noted that NUREG-1520, Section 11.4.3.3, page 11-15 (Exh. NRC000031), identifies acceptance criteria for managers and supervisors. AES explained that the qualifications for the Nuclear Criticality Safety Manager establish the experience level necessary for managing a technical program and ensuring compliance with applicable procedures, prioritizing work assignments, assigning qualified personnel to appropriate tasks, and undertaking other management activities. Exh. AES000001 at 18. The Nuclear Criticality Safety Manager is responsible for performing oversight of the criticality safety program but would not actually perform a nuclear criticality safety evaluation or serve as the independent reviewer of such an evaluation unless the manager had completed the specific training program for a Criticality Safety Engineer (as described in the SAR Section 2.2.4.AA) (Exh. AES000037). *Id.* The NRC Staff concluded the required qualifications for the Manager of Nuclear Criticality Safety position at EREF meets or exceeds the acceptance criteria for supervisors and managers in NUREG-1520 (Exh. NRC000031). Exh. NRC000001 at 23.

4.18. The Board also requested information regarding the initial staffing for AES' audit team. Board Order, dated October 29, 2011, at 7. AES will rely on two methods to obtain personnel with the necessary experience and qualifications to be certified as Lead Auditors in accordance with the AES QAPD Requirements. AES will either hire personnel that already have the necessary experience and prior certification as Lead Auditors to satisfy AES qualification requirements or AES will use Certified Lead Auditors from other AREVA companies or subsidiaries. Exh. AES000001 at 24-25. In conjunction with AES-specific

training, these individuals would be certified in accordance with AES Procedure QA-02-03-01, “Lead Auditor Training and Certification” (Exh. AES000052).

3. *Adequacy of AES’s Proposed Equipment, Facilities and Procedures*

4.19. An applicant’s proposed equipment, facilities, and procedures must be adequate to protect health and minimize danger to life or property. *See* 10 C.F.R. § 70.23(a)(3)-(4). Based upon a comprehensive review of the application and the record, including evidence presented by AES and the NRC Staff during the January 2011 hearing, we find that there is sufficient information in the record to support the pertinent Staff findings. As the SER reflects, the Staff’s findings in this regard encompass a number of review areas, including the integrated safety analysis, radiation protection, nuclear criticality safety, chemical process safety, decommissioning (including financial assurance), and management measures. *See* Exh. NRC000032 (particularly pages xv-xviii; Chapters 3-7, 9-11). In this regard, the Board requested additional information and explanation from the NRC Staff and AES regarding those subjects. We briefly discuss those topics and review areas below.

a. Integrated Safety Analysis

4.20. The Board sought additional information from the NRC Staff regarding management of the ISA and, in particular, the change control process. Board Order, dated October 29, 2011, at 3. The NRC Staff expert, Breeda Reilly, explained that AES will evaluate changes to the facility or activities of personnel using the criteria in 10 C.F.R. § 70.72. Exhs. NRC000001 at 17; AES000037 at Section 11.1.4, “Change Control.” The criteria from 10 C.F.R. § 70.72(c) include whether the change (a) creates a new type of accident sequence; (b) uses new processes, technologies, or control systems for which the licensee has no prior experience; (c) removes, without at least an equivalent replacement of the safety function, an

IROFS; or (d) alters any sole IROFS. The NRC Staff explained that these criteria may not be appropriate for changes in information or commitments in the SAR. As a result, AES requested a special authorization for making certain changes to the SAR that would not decrease the effectiveness of its safety commitments. Exhs. NRC000001 at 18, NRC000064. The request identified the criteria that AES would use to evaluate changes to the SAR without requiring prior NRC approval. The NRC Staff expert explained that this authorization is consistent with the approach used for 10 C.F.R. § 70.72 changes in that it parallels the three elements of section 70.72: (1) criteria to evaluate changes to determine when preapproval by the NRC is required; (2) documentation of the evaluation of changes and recordkeeping; and (3) timeliness of updates to onsite documentation and reporting of changes to the staff. Exh. NRC000032 at 1-14. The NRC Staff also noted that the authorization is similar to authorizations granted to other Part 70 licensees. Exh. NRC000001 at 18.

4.21. With respect to IROFS, the Board asked the NRC Staff to explain its inquiries into site liquefaction and settlement. Board Order, dated October 29, 2011, at 4. The NRC Staff expert, Breeda Reilly, stated that AES is still studying site liquefaction and settlement and has committed to evaluating the results of these studies based on various approved regulatory guidance documents in the context of final facility design. Exh. NRC000001 at 20. The NRC expert stated that results of these studies are important for the final design of the structure and system IROFS and to ensure that these IROFS will be able to perform their intended safety function. *Id.* The NRC Staff stated that the level of detail required for a licensing decision does not require a final facility design. Rather, the licensing decision is based, in part, on the identification of all IROFS and information about those IROFS. *Id.*

4.22. Regarding liquefaction, the NRC Staff reviewed the information that the applicant provided concerning the depth of the groundwater table and classification of soils. *Id.* The NRC Staff concurred with the Applicant's conclusion that liquefaction potential at the site is highly unlikely. *Id.* The NRC Staff also noted that AES will conduct additional site subsurface investigations and verify through investigation that soil liquefaction potential is highly unlikely in accordance with Regulatory Guide 1.1.98 "Procedures and Criteria for Assessing Seismic Soil Liquefaction at Nuclear Power Plant Sites" (Exh. NRC000069). *Id.* Regarding settlement, AES will conduct additional geotechnical investigations using standard guidance listed in Section 3.2.7 of the ISA Summary (Exh. AES000040) applicable to settlement and allowable bearing pressure. Based on AES's plans to conduct geotechnical studies and use standard guidance, the NRC Staff found the application to be acceptable under 10 C.F.R. § 70.65(b)(1).

4.23. In addition to the license application review, the NRC Staff will conduct inspections through its Regional Office to ensure that the AES's programs have been sufficiently implemented and commitments have been properly applied in the final facility design. Exh. NRC000001 at 20. Under 10 C.F.R. § 70.32(k), the NRC verifies through inspection that the facility has been constructed in accordance with the requirements of the license prior to the commencement of operations. *Id.* This requirement will be imposed as a license condition. *Id.* NRC will conduct inspections to ensure that the programmatic commitments made by the licensee are properly applied in the final design and the as-built facility.

4.24. The Board also sought information regarding the NRC Staff's hydrology analysis. Board Order, dated October 29, 2011, at 13. The NRC Staff experts, Breeda Reilly and Rex Wescott, explained that the potential for flooding as an initiating event for an accident was considered in the review of the Applicant's ISA Summary. Exh. NRC000001 at 22. As

described in Section 1.3.3.3.4 of the SER (Exh. NRC000032), the nearest large surface waters are the Snake River and Lake Wolcott, which are both tens of miles from the EREF. The NRC Staff also evaluated the potential for local site flooding. The NRC Staff found the potential for flooding to be non-credible because there are no nearby surface water bodies or streams. Exhs. NRC000001 at 22; NRC000033. The NRC Staff also concluded in Section 1.3.3.4.4 of the SER (Exh. NRC000032 at 1-34) that the liquefaction potential for the soil at EREF is highly unlikely, in part because the groundwater table is deep. Exh. NRC000001 at 22.

4.25. The Board sought additional information regarding two other external events: wildland fires and volcanism hazards. Section 3.1.1 of the SAR (Exh. AES000037) discusses the potential threat to the EREF from an external off-site wildland fire. Based on this evaluation, AES concluded that it is not credible for the rangeland or agricultural vegetation proximate to the EREF site to reach a fire severity that will threaten a process structure or cylinder storage area. Exh. AES000001 at 2-4. For the cylinder storage area, AES established an IROFS based on a minimum separation distance for stored cylinders in the Cylinder Receipt and Shipping Building (“CRSB”) from a fire involving a cylinder delivery truck. *Id.* For a wildland fire, the distance from a possible source (*i.e.*, vegetation) to the closest cylinder storage pad (30 m) is an order of magnitude greater than that of the hydrocarbon fire exposure. AES also determined that a wildland fire is not a credible threat to process structures. All process structures are built of non-combustible materials (*i.e.*, metal panel on metal structural frame and non-combustible insulation) with composite built-up roofing over non-combustible strata (*i.e.*, concrete slab or metal deck with non-combustible insulation). *Id.*; *see also*, Exh. AES000041 (ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings*). In addition, there are no structures, systems, or components credited as IROFS that would be affected by a wildland

fire. IROFS are designed to “fail-safe” upon loss of power (*e.g.*, a wildfire causing a loss of off-site power). The NRC Staff concurred with this event-specific assessment as described in the SER, Section 7.3.4.1 (Exh. NRC000032).

4.26. Regarding volcanism, the Board sought additional information regarding the Probabilistic Volcanic Hazard Analysis (“PVHA”) used by AES. Specifically, the Board requested an explanation regarding (a) the probability of an eruption in the Hell’s Half Acre volcanic field using different models, (b) the site-inundation recurrence interval used in the PVHA, and (c) preparations and procedures that would be undertaken to minimize the potential release of hazardous materials if precursor events, such as seismic activity or volcanic gas emissions, indicated an imminent eruption of basaltic lava that could threaten the EREF. Board Order, dated October 29, 2011, at 4.

4.27. First, in response to the Board’s questions, AES analyzed several alternate hypothetical scenarios, expressed as calculations of inundation probabilities for the purpose of comparing these scenarios to the approach taken in the EREF SAR. The alternate calculations addressed the significance of most recent Pleistocene and Holocene volcanism in the vicinity of the EREF site. The alternate calculations demonstrate that the approach taken in the EREF application is appropriately conservative. Exh. AES000001 at 7. Specifically, the AES expert, William Hackett, explained that Holocene and latest Pleistocene events account for less than ten percent of the total volcanic events in the axial volcanic zone and that there is no appreciable difference between the proportion of latest Pleistocene and Holocene volcanic events to total events for the entire axial volcanic zone, or in that proportion within the area near the EREF site. *Id.* Further, the assertion that the axial volcanic zone (“AVZ”) is spatially homogeneous is supported by visual examination of the volcanic vent locations in the AVZ generally, as well as

in the vicinity of the EREF site. *Id.* Based on the general spatial pattern of latest Pleistocene and Holocene volcanism, future volcanism in the AVZ is more likely to erupt from vents along the central topographic axis or on the southern flank of the AVZ and such lavas would be likely to flow southward away from the broad topographic crest of the AVZ and away from the EREF site. *Id.*; *see also*, Exh. NRC000001 at 18-20.

4.28. Second, although the EREF PVHA and the borehole investigation of Champion et al. (2002) (Exh. AES000047) both report inundation probabilities, the two investigations are not easily compared for several general reasons, including the fact that the data sets and methodologies are different, the respective regions of interest are different, and the EREF PVHA assumes a homogeneous temporal model of volcanism. The AES expert explained that the advantages of the PVHA analysis are that it is simple, logical, and probabilistic in its approach, and emphasizes recent volcanism as revealed by the surficial geology of the AVZ in which the EREF is situated. Exh. AES000001 at 12. AES presented alternative calculations of inundation intervals using the hypothetical scenarios. *Id.* The NRC Staff also noted that even if the recurrence interval for future volcanism in Champion (Exh. AES000047) is used as the best estimate of future activity in the vicinity of the site, disruption of the facility by volcanism would still be highly unlikely. Exh. NRC000001 at 20.

4.29. Third, with respect to responses to volcanic activity, AES noted that most lava flows are expected to give at least a few weeks of advanced warning, depending on magma ascent rate and proximity of the eruptive vents. Exh. AES000001 at 16-17. Mitigation measures might include construction of rock-rubble berms around critical portions of the facility. These berms could be constructed of rock and soil excavated from the nearby land surface. *Id.*; *see also*, Exh. AES000046 at 193. Additional mitigation measures include placing the facility in a

safe mode and consolidating storage areas for material that could be released. Exh. AES000001 at 17. In addition, the topography around the EREF provides substantial natural barriers (elevation) to inundation at the site. *Id.*

4.30. The Board posed several non-publicly available questions to the NRC Staff and AES related to the ISA, including questions related to the process for identifying accident sequences and the potential for criticality events. Non-Public Board Order, dated October 29, 2010, at 1.

Withheld pursuant to 10 CFR 2.390

4.31.

Withheld pursuant to 10 CFR 2.390

Withheld pursuant to 10 CFR 2.390

4.32. Based on the above, the Board finds that the record provides a reasonable basis for the Staff's conclusion regarding the adequacy of the ISA, including both process hazards and external events.

b. Radiation Protection

4.33. Because the NRC Staff's review encompassed radiation protection, the Board sought clarification regarding AES' commitment to apply "as low as reasonably achievable" ("ALARA") principles to EREF personnel. The NRC Staff expert, Greg Chapman, explained that the use of a 1 rem/year administrative limit (*see* Exh. AES000037 at Table 4.1-1), which represents twenty percent of the annual NRC limit of 5 rem/year given in 10 C.F.R. § 20.1201, is appropriate prior to beginning operations because it is significantly below the regulatory limit. Exh. NRC000001 at 24. The NRC Staff further explained that, after operations have begun, AES is expected to generate administrative controls and goals within the radiation monitoring and ALARA programs to both ensure that the regulatory limit is not exceeded and

that operations are ALARA consistent with 10 C.F.R. § 20.1101(b). *Id.* As discussed in Section 4.2.1 of the EREF SAR (Exh. AES000037), the AES Safety Review Committee (“SRC”) would regularly review the effectiveness of the ALARA program and determine if exposures, releases, and contamination levels are in accordance with the ALARA concept. *Id.* The SRC would also periodically review the goals and objectives of the ALARA program. *Id.* These goals and objectives will be revised to incorporate, as appropriate, new technologies or approaches and operating procedures or changes that cost-effectively reduce potential radiation exposures. *Id.*

4.34. AES provided additional information regarding the administrative limit based on operating experience at other enrichment facilities. AES explained that the 1 rem/year Total Effective Dose Equivalent (“TEDE”) administrative dose limit is intended to cap individual doses well below the regulatory limit of 5 rem/year. Exh. AES000001 at 21. This provides for operational flexibility to address abnormal exposure conditions, if such conditions were to occur, while still maintaining individual doses well below regulatory limits. *Id.* The administrative limit (1 rem/year) is not treated as ALARA itself. Operational history at the Capenhurst facility indicates that both the annual maximum and average worker doses are well below the 1 rem/year administrative criteria. *Id.* at 22. The EREF commitment to an ALARA program in Section 4.2 of the EREF SAR (Exh. AES000037) will implement comprehensive operational controls by procedure and design features to ensure that all doses are reduced and maintained to the lowest extent practical (*i.e.*, below the 1 rem/year limit). *Id.*

4.35. The Board posed non-publicly available questions to the NRC Staff and AES regarding several analyses in the SER. Non-Public Board Order, dated October 29, 2010, at 2.

Withheld pursuant to 10 CFR 2.390

Withheld pursuant to 10 CFR 2.390

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Withheld pursuant to 10 CFR 2.390

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Withheld pursuant to 10 CFR 2.390

4.41. Based on the above, the Board finds that the record provides a reasonable basis for the Staff's conclusions regarding radiation protection.

c. Nuclear Criticality Safety

4.42. The Board also examined the NRC Staff's review of criticality issues. Board Order, dated October 29, 2011, at 2. The NRC Staff noted that the Applicant's SAR states that centrifuge array criticality is precluded by a probability argument with multiple operational procedure barriers. *See* Exh. NRC000001 at 12 (citing Exh. AES000037 at 5.1-3). The NRC Staff explained that AES relied on qualitative arguments to demonstrate criticality safety in the centrifuge arrays. *Id.* Criticality in a single centrifuge machine would require a massive operational upset, which would involve a build-up of sufficient mass, the introduction of sufficient moderator, and exceeding the design safe diameter of the equipment (*see* Exh. NRC000058).

4.43. With regard to mass, in the enrichment process, gas centrifuges are operated at low density and low mass per machine, such that there is insufficient mass available

to sustain criticality. Exh. NRC000001 at 12. With regard to moderator, the UF₆ gas reacts vigorously with any water and the chemical reaction would eliminate much of the water introduced, removing the hydrogen bound in water as gaseous HF, and would also produce UO₂F₂ deposits within the cascade (*see* Exh. NRC000056). Exh. NRC000001 at 12. With regard to geometry, centrifuges and other cascade equipment (*e.g.*, chemical traps, cold traps, and pumps) will be designed to have conservative diameters relative to the safe values in Table 5.1-1 of the SAR (Exh. AES000037). *Id.* As a result of these factors, the occurrence of a sufficiently large failure of mass, moderation, and geometry conditions within a single centrifuge *concurrently* has been qualitatively determined to be extremely unlikely. *Id.* Conditions within the cascade (*e.g.*, pressures, flow rates, and enrichment) are monitored continuously by instruments and overseen in the control room. A massive upset would be noticed by control room operators and addressed prior to any criticality. *Id.*

4.44. The NRC Staff noted that an array of centrifuge machines is not necessarily geometrically safe, due to the possibility of neutron interaction. Exh. NRC000001 at 13. However, any such interaction is expected to be very weak, due to the separation between centrifuges, which will serve to cut down interaction between units through neutron absorption. *Id.* Criticality in an array of centrifuges would also require an upset similar to that described for a single centrifuge to occur in more than one centrifuge. *Id.* Because the accumulation of sufficient mass and moderator in a single machine is highly unlikely, the likelihood of occurrence in multiple machines is even more unlikely.

4.45. The Board also queried AES regarding quantification of its probability arguments as reflected in the ISA Summary. Board Order, dated December 3, 2010, at 2. The AES expert, Chris Andrews, explained that AES has not quantified the probabilities involved in

its probabilistic analysis. Instead, AES performed a qualitative probabilistic analysis, as presented in ISA Summary, Section 3.4.3.8.1 (Exh. AES000040). Exh. AES000024 at 1. This qualitative analysis is considered sufficient based on the criteria in the ISA Summary, Section 3.1.1.3.2 (adopted from NUREG-1520), which defines non-credible events to include “process deviations for which there is a convincing argument, given physical laws, that they are not possible, or are unquestionably extremely unlikely.” As a result, a quantitative analysis was not necessary under those circumstances. *Id.*

4.46. AES also provided additional detail regarding the average enrichment in the cascades. Exhs. AES000018 at 3-4; AES000029 at 1-3.

Withheld pursuant to 10 CFR 2.390

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4.53. The Board requested additional information from the NRC Staff regarding the process used by the NRC Staff to validate AES statements regarding moderation and enrichment limits in product cylinders. Board Order, dated October 29, 2011, at 2. The NRC Staff explained that the 30B and 48Y product cylinders that will be used at EREF are large geometry storage and transport containers that are certified in accordance with 10 C.F.R. Part 71 requirements. Exh. NRC000001 at 10. The cylinders are designed to comply with American National Standards Institute (“ANSI”) N14.1, “Nuclear Materials—Uranium Hexafluoride—Packaging for Transport” (Exh. NRC000050). Packages are certified in accordance with 10 C.F.R. Part 71 and must meet ANSI N14.1 to obtain certificates of compliance. *Id.* The product cylinders are designed with maximum enrichment limits: 5 wt% ²³⁵U for 30B cylinders and 4.5 wt% ²³⁵U for 48Y cylinders, for cylinders with moderation control equivalent to a UF₆ purity of 99.5% (without moderation control, the maximum permissible enrichment is 1 wt% ²³⁵U). Exhs. NRC000001 at 10; NRC000056. These cylinders, with the above limits, are widely used throughout the nuclear industry, and the NRC staff did not need to perform any specific

evaluation or analysis to have reasonable assurance of subcriticality involving the product cylinders. Exh. NRC000001 at 10.

4.54. The NRC Staff also explained that, according to the shipping limits contained in ANSI N14.1 (Exh. NRC000050), 30B cylinders would contain at most 2,277 kg UF₆, and 48Y cylinders would contain at most 12,501 kg UF₆. Exh. NRC000001 at 10. A moisture equivalent limit of 0.5 wt% would consist of 11.4 kg H₂O for a 30B cylinder and 62.5 kg H₂O for a 48Y cylinder. These limits are widely accepted as being sufficient to ensure the cylinders are safely subcritical (Exh. NRC000056). *Id.* In addition, as stated in Section 5.3.5.1 of the SER (Exh. NRC000032), product cylinders will be limited to less than 9.3 kg H₂O, which is even more conservative and represents a safety factor of about 65 percent when compared to the Applicant's safe value of 14.2 kg H₂O, as indicated in SAR Table 5.1-1, "Safe Values for Uniform Aqueous Solution of Enriched UO₂F₂" (Exh. AES000037). *Id.* The NRC Staff noted that the applicant's tabulated safe values compare favorably with the widely accepted values from ANSI/ANS-8.1-1998 (Exh. NRC000057) (*see* Table 5.3-1 of the SER (Exh. NRC000032)). The NRC Staff also stated that AES will develop written procedures governing cylinder handling and noted that the specific procedures may be inspected as part of an NRC Operational Readiness Review.

4.55. Based on the above, the Board finds that the record provides a reasonable basis for the Staff's conclusions regarding nuclear criticality.

d. Decommissioning

4.56. The Staff concluded that AES has provided an acceptable conceptual decommissioning plan that addresses both facility decommissioning and the disposition of depleted UF₆. *See* Exh. NRC000032 at 10-1 to 10-17. The Staff also accepted AES's

decommissioning funding plan, which addresses the estimated costs of decommissioning and the funding of AES's proposed financial assurance instrument. *See id.* The Board sought more information on several issues related to decommissioning financial assurance. Board Order, dated October 29, 2010, at 6; Board Order, dated January 21, 2011, at 2-3.

4.57. The Board asked the NRC Staff to explain how the exemption that allows incremental decommissioning funding, and the license condition regarding that funding regime, is different from what was approved by the NRC Staff relative to the LES application. Board Order, dated October 29, 2011, at 3. The NRC Staff explained that, as described in the SER for the NEF (NUREG-1827) (Exh. NRC000055), LES's approach for providing financial assurance, upon receipt of licensed material, was to fully fund the estimated cost of decontamination and decommissioning of the full-size facility, and to fully fund the estimated cost to disposition the depleted uranium ("DU") tails generated during the first three years of operation. Exh. NRC000001 at 15-16. This approach was reflected in license conditions 16 and 17 of the original license issued to LES on June 23, 2006 (Exh. NRC000060). *Id.* LES's license was later modified to incrementally fund operational areas and buildings as they were placed into operation, as reflected in revised license condition 16 of the LES license (Exh. NRC000061). *Id.* After initial plant production, both approaches would provide funding for DU disposition on a forward-looking basis to reflect projections of DU byproduct generation. *Id.*

4.58. The AES exemption for providing financial assurance on an incremental basis is consistent with LES's amended license. *Id.* Both LES and AES will provide financial assurance on an incremental basis as new plant areas are put into operation. *Id.* And, both LES and AES will update their DU disposition cost estimates annually on a forward looking basis after initial plant production. *Id.* In addition, AES has committed to providing NRC with more

frequent updates to the decommissioning cost estimate and DU disposition cost estimate than LES. AES committed to: (1) supplement the incremental facility decommissioning cost estimate updates with annual updates to the facility decommissioning cost estimate until the facility is at its full capacity; and (2) provide annual DU disposition cost estimate updates during initial plant production. *Id.*

4.59. In SAR Section 10.2.1 (Exh. AES000037), AES stated that it intends to sequentially install and operate the Separations Building Modules over time and will therefore provide financial assurance for decommissioning at a rate that is in proportion to the decommissioning liability for these facilities as they are phased in. Exh. AES000031 at 1. Similarly, AES will provide decommissioning funding assurance for disposition of depleted tails at a rate in proportion to the amount of accumulated tails onsite. *Id.* AES explained that the annual updated decommissioning cost estimate and the letter of credit used to provide decommissioning financial assurance will encompass the estimated maximum future cost of the following 12-month period. *Id.* The decommissioning funding estimates and revised funding instruments would also be revised annually to reflect the accumulated depleted uranium tails onsite and a projection of the amount that would be onsite within the next year. *Id.*

4.60. The Board also requested additional information regarding the source of the decommissioning cost data. Board Order, dated December 17, 2010, at 5. The decommissioning cost model described in SAR Chapter 10 (Exh. AES000037) generates estimates of the amount of labor and volume of materials necessary to support decommissioning. Exh. AES000031 at 2. Using these values as inputs into the EREF cost model in conjunction with the EREF site and facility design, AES used U.S.-specific labor rates obtained from U.S. Department of Labor, Bureau of Labor Statistics Web Site, Employment Cost Trends, Employer

Costs for Employee Compensation Summary, May 2007 (*see* Exh. AES000037 at Tables 10.1-8 and 10.1-9) and unit costs (*see id.* at Table 10.1-15) to develop the decommissioning cost estimate. *Id.* The unit costs were also developed using the U.S.-specific labor rates. Exh. AES000031 at 3. In addition, EREF waste disposal costs are calculated based on weight, volume, quantity of disposal containers, number of shipments, and waste disposal rates for U.S. disposal facilities (Exh. AES000037 at Table 10.1-10) and associated rates for transportation within the U.S. (Exh. AES000037 at Section 10.3). Costs for electricity needed for decommissioning were based on 2008 power rates provided by Rocky Mountain Power Co. (Exh. AES000037 at Table 10.1-11). Facility-specific costs related to license fees, insurance, and taxes were also estimated (Exh. AES000037 at Table 10.1-13). The decommissioning cost estimate was further adjusted to reflect NRC regulatory requirements (*e.g.*, final status surveys, decommissioning by third party, contingency). Exh. AES000031 at 3.

4.61. The Board also sought clarification regarding the potential for AES to utilize a private deconversion facility to disposition depleted uranium tails in lieu of transfer to the Department of Energy. Board Order, dated October 29, 2011, at 6. AES explained that Section 3113(a) of the USEC Privatization Act, 42 U.S.C. § 2297h-11(a), requires DOE to accept depleted uranium for disposal upon request of the operator of a uranium enrichment facility. Exh. AES000001 at 23. Transfer of the depleted UF₆ generated by the EREF to DOE for disposal is AES's current strategy. *Id.*; *see also* Exh. AES000037 at 10.0-1. AES stated that it has not made any determinations regarding possible use of the proposed International Isotopes Fluorine Products ("IIFP") commercial deconversion facility for processing depleted UF₆ produced at the EREF. Exh. AES000001 at 23. An evaluation of alternate approaches and any decision related to other commercial opportunities will be made based on facility availability and

economics. *Id.* Both the NRC Staff and AES stated that a license amendment would not be necessary in order for AES to use the IIFP facility. *Id.* at 23; Exh. NRC000001 at 25. If AES decides to consider using the IIFP facility in the future, AES would evaluate the use of the IIFP facility using the process required by 10 C.F.R. § 70.72 before making a final determination. The NRC Staff also noted that a change in the proposed decommissioning strategy could impact the cost estimates for DU disposal and stated that any change in the assumptions underlying the cost estimate for the disposition of depleted uranium would be addressed in the updates. Exh. NRC000001 at 25.

4.62. The Board also queried the NRC Staff and AES regarding the form of decommissioning financial assurance that AES intends to provide. Board Order, dated January 21, at 2-3. AES explained that it will meet its obligation to ensure that sufficient funding will be available to cover the costs of decommissioning in accordance with established and tested funding arrangements. Exh. AES000063 at 1. As stated in SAR Section 10.2 (Exh. AES000037), AES intends to utilize a Letter of Credit to provide reasonable assurance of decommissioning funding as required by 10 C.F.R. §§ 40.36(e)(2) and 70.25(f)(2). *Id.* at 2. The Letter of Credit method to be utilized by AES ensures that decommissioning costs will be paid even in the event that AES is unable to meet its decommissioning obligations at the time of decommissioning. *Id.* The Letter of Credit method will be structured and adopted consistent with applicable NRC regulatory requirements and in accordance with NRC regulatory guidance contained in NUREG-1757 (Exhibit NRC000096). This method of providing financial assurance is also consistent with the NRC-approved financial instrument used for the existing AREVA fuel fabrication facilities in Richland and Lynchburg. *Id.*

4.63. The NRC Staff experts, Roman Przygodzki, Craig Dean, and Miguel Matamoros, noted that, according to NRC guidance in NUREG-1757, Volume 3, Appendix A.10.1 (Exh. NRC000063), “[a] bank issuing a letter of credit to a licensee should be a financial institution whose operations are regulated and examined by a Federal or State agency.” The NRC Staff expert explained that three other federal agencies — the Office of the Comptroller of the Currency (“OCC”), the Federal Deposit Insurance Corporation (“FDIC”), and the Federal Reserve — perform regulatory oversight of banks issuing letters of credit at the federal level. Exh. NRC000125 at 1. The regulations of these agencies prescribe minimum capital requirements and lending limits that financial institutions must meet in order to issue a letter of credit. *Id.* at 2.

4.64. OCC regulations contain highly detailed procedures for determining risk-based capital requirements, which take into account both the shareholders’ equity in the bank (tier 1 capital) and several categories of supplementary capital (tier 2 capital) and compare it to the risk-adjusted assets of the entity (*i.e.*, its outstanding loans and other obligations). *Id.* The OCC also conducts intensive on-site examinations of banks under its jurisdiction. *Id.*; *see also* Exh. NRC000130.

4.65. The FDIC addresses letters of credit specifically in its regulations in 12 C.F.R. § 337. *Id.* at 3. Under § 337.2(b), the FDIC provides that a standby letter of credit issued by an insured State bank “shall be combined with all other standby letters of credit and all loans for purposes of applying any legal limitation on loans of the bank (including limitations on loans to any one borrower, on loans to affiliates of the bank, or on aggregate loans).” *Id.* FDIC member banks are generally examined by FDIC every 12 months. *Id.*; *see also* Exh. NRC000132.

4.66. The Federal Reserve’s “Regulation H” (12 C.F.R. Part 208) addresses the capital adequacy of state banks that are members of the Federal Reserve system or applying for membership in that system. *Id.* at 4. Under section 208.4, a bank’s capital must be adequate to the character and condition of its assets and to its existing and prospective liabilities and other corporate responsibilities. *Id.* Standby letters of credit are counted by the Federal Reserve system in determining a member bank’s statutory lending limits. *Id.* State member banks are generally examined by the Federal Reserve every 12 months. *Id.*; *see also* Exh. NRC000133.

4.67. In addition to being issued by institutions subject to federal or state oversight, the letter of credit used by AES must meet the requirements set forth in 10 C.F.R. §§ 30.35(f)(2)(i)-(iii), 40.36(e)(2)(i)-(iii), and 70.25(f)(2)(i)-(iii). Exh. NRC000125 at 5. NRC guidance in NUREG-1757, Volume 3, Appendix A.10.4 (*see* Exh. NRC000063) provides model letter of credit language that the NRC would find acceptable. The language of AES’s draft LOC, consistent with NRC guidance, contains a clause wherein “[t]he [letter of credit issuer] shall give immediate notice to the applicant and NRC of any notice received or action filed alleging (1) the insolvency or bankruptcy of the financial institution or (2) any violation of regulatory requirements that could result in suspension or revocation of the [LOC issuer’s] charter or license to do business.” *See* Exh. AES000037 at 10.2-1. Such notification would provide the NRC with information needed to decide whether or not to draw on the letter of credit, and place the funds in the Standby Trust. Exh. NRC000125 at 5.

4.68. Based on the above, the Board finds that federal or state regulatory oversight is adequate and, coupled with NRC requirements and guidance, will ensure that any AES-procured LOC will be sufficient to satisfy the issuer’s obligations to the NRC to provide funds that will be adequate to cover the total cost of decommissioning and depleted uranium

disposition. The Board finds that the record provides a reasonable basis for the Staff's conclusions regarding decommissioning financial assurance.

e. Management measures

4.69. AES also clarified the processes and procedures in place to ensure that Quality Assurance, Environmental Health Safety and Licensing, Safety, Security and Emergency Preparedness, and Safeguards Managers are "independent" from the Operations Managers. Exh. AES000001 at 18-19. The reporting chain of command for these positions is separate and distinct from the reporting chain of command for the two managers whose principal responsibility is related to production (Operations Manager and Uranium Management Manager). Moreover, these positions have direct access to the Plant Manager at all times for issues within their scope of responsibility. *Id.*

4.70. In response to Board questions regarding the responsibilities of various managers in the event of an accident (Board Order, dated December 3, 2010, at 3), the AES expert, Barry Tilden, explained that, during an accident, line management is responsible for characterizing the event and determining if the event should be categorized as an emergency. Exh. AES000001 at 20. Nevertheless, depending on the nature of the event, nuclear criticality safety, radiation protection, industrial hygiene, occupational safety, or security organizations may be consulted to determine the impact of the accident on plant safety or production. Any of these organizations (through the responsible manager) may recommend actions to the Production Supervisor, up to and including stopping operations. *Id.* If there is disagreement among those organizations as to the appropriate response or if a relevant expert does not believe that adequate actions are being taken to control the event, the Environmental, Health, Safety and Licensing

Manager is authorized to stop production independent of line management (as described in Exh. NRC000032 at Section 2.2.1.D). *Id.*

4.71. AES provided supplemental information in response to Board questions (Board Order, dated October 29, 2011, at 7) regarding corrective actions and work stoppage. AES explained that it has adopted a Key Performance Indicator (“KPI”) for Significance Level 1 and 2 condition reports being open no longer than 180 days. Exh. AES000001 at 27. Starting in October 2010, AES began providing monthly reports on this KPI to the AES Management Team. *Id.* Prior to October 2010, the status of condition reports (open, closed, and overdue) was included in the monthly report to AES Management. *Id.*

4.72. AES has also issued Procedure QA-16-03-001, “Corrective Action” (Exh. AES000053). *Id.* The goal of the procedure is to ensure that adverse conditions are identified and resolved in a timely manner so as to prevent recurrence. Within this procedure, AES established timelines for the initiation, evaluation, assignment, and closure of corrective actions. QA-16-03-001 also establishes responsibilities for the QA Manager and Functional Area Managers (“FAMs”) regarding the processing of condition reports based on their significance levels. *Id.* For Significance Level 1 condition reports, the QA Manager is the Chairperson of the Corrective Action Committee (“CAC”). *Id.* The CAC is responsible for concurring with recommended corrective actions and due dates for implementation. For Significance Level 2 condition reports, the FAM establishes applicable due dates, while the QA Manager has overall responsibility to monitor compliance through audits and surveillances. *Id.*

4.73. AES has also issued Procedure QA-16-03-002, “Stop Work” (Exh. AES000054). *Id.* at 28. This procedure establishes the method used by AES to stop work when significant conditions adverse to quality are observed and it is otherwise prudent to stop work.

The procedure scope indicates that QA-16-03-002 applies to any work activities that, if allowed to continue, could compromise the quality of an item or service, render the quality of an item or service as indeterminate, compound an existing condition adverse to quality, or result in potential injury or exposure to the public, personnel, or environment. *Id.* QA-16-03-002 also permits resumption of work when sufficient corrective actions have been accomplished and/or adequate measures are put in place to control further activities. *Id.*

4.74. The QA Manager, or designee, has overall responsibility and authority to issue and close out a Stop Work Order (“SWO”). This responsibility includes approval of corrective actions to correct any deficiency and prevent recurrence. The QA Manager is also authorized to close out SWOs, thus allowing work to resume (subject to any corrective actions). *Id.* FAMs are responsible for stopping work as described in the SWO. FAMs are also responsible for acknowledging the basis for SWOs and implementing the associated corrective actions. *Id.* Individual employees are responsible for contacting QA when a situation warrants an evaluation and there is potential need to issue a SWO. *Id.* AES provided examples of situations or conditions where a SWO may be appropriate. *Id.* at 28-29.

4.75. Based on the above, the Board finds that the record provides a reasonable basis for the Staff’s conclusions regarding the adequacy of management measures.

4.76. In view of all the foregoing considerations, the Board finds that the record provides a reasonable basis for the Staff’s conclusion that the proposed equipment, facility, and operations strategy present limited hazards to workers and the public.

4. *Financial Qualifications*

4.77. An applicant also must be financially qualified to engage in the proposed activities. *See* 10 C.F.R. § 70.23(a)(5). While AES is a single purpose entity, its parent

company, AREVA SA, is a corporation of worth with sizable assets and cash flow. Exh. NRC000032 at 1-10. The AES investment in EREF will be divided into at least two phases. AES plans to fund Phase 1 of the project with a mix of debt and equity. *Id.* The equity contributions will come from AES' parent and self-generated cash during pre-production. *Id.* The debt portion will be financed through financial institutions. Once EREF operations commence and production ramps up, AES expects to generate significant revenues and profits of its own. Additionally, AES stated that, as of October 2009, 55 percent of EREF Phase 1 output is committed from 2014 to 2028 — eight major U.S. utilities with 44 percent already contracted and the remaining 11 percent committed through letters of intent and contract negotiations in the final stages. Phase 2 of the project is also expected to be financed with a mix of debt and equity from AES parent contributions and commitments and cash flow from AES operations. *Id.*; *see also* Tr. at 198-199.

4.78. Construction of each phase of the EREF shall not commence before funding is available or committed. Exhs. AES000037 at 1.2-3; NRC000032 at 1-9. AES must have in place commitments for one or more of the following: (a) equity contributions from AES or its parents; (b) a commitment from the parent company to provide the necessary funds for the project; or (c) lending and/or lease arrangements that solely or cumulatively are sufficient to ensure funding for the particular increment's construction costs. Exhs. NRC000032 at 1-9; AESR00062 at 11. Information regarding the source of funds available or committed to pay costs prior to commencement of construction of each phase will be available for NRC inspection. *Id.* The NRC Staff will impose this approach as a license condition. *Id.*; Exh. NRCR00104 at 4.

4.79. Additionally, operation of the EREF will not commence until AES has in place either (Exh. AES000037 at 1.2-3): (a) long term contracts lasting five years or more that

provide sufficient funding for the estimated cost of operating the facility for the five year period; (b) documentation of the availability of one or more alternative sources of funds that provide sufficient funding for the estimated cost of operating the facility for five years; or (c) Some combination of (a) and (b). Exh. AESR00062 at 12; AES000037 at 1.2-3. The AES expert, Sam Shakir, stated that AES already has in place several billion dollars worth of contracts with U.S. utilities, which is more than adequate to cover five years of operations. Tr. at 199-200.

4.80. Based upon the foregoing, in accordance with 10 C.F.R. § 70.23(a)(5), the Board finds the application and record of the proceeding contain sufficient information to support the Staff's finding that AES is financially qualified to construct and operate the proposed facility.

5. *Fundamental Nuclear Material Control Plan*

4.81. In accordance with 10 C.F.R. § 70.23(a)(6), the Staff concluded that the AES proposed Material Control and Accounting ("MC&A") program is adequate, *i.e.*, it complies with the applicable requirements of 10 C.F.R. Part 74. *See* Exh. NRC000032 at Appendix H. AES submitted a Fundamental Nuclear Material Control Plan ("FNMCP"), which describes the programs and procedures to be used to control and account for special nuclear material in the facility. *See id.*

4.82. In response to Board questions (Board Order, dated October 29, 2011, at 3; Board Order, dated December 3, 2010, at 3), AES explained that it will use only licensed UF₆ feed suppliers (U.S. or Canadian) that have a record of compliance with ASTM Standard C787-06, *Standard Specification for Uranium Hexafluoride for Enrichment* (Exh. AES000042) to ensure that feed material is not contaminated. Exh. AES000001 at 5. AES will also audit activities at feed suppliers' facilities to ensure that the actions required by the ASTM standard

are being implemented effectively (*e.g.*, only use cylinders for Commercial Natural UF₆ that have not previously contained reprocessed UF₆ or that have been decontaminated since containing reprocessed UF₆). *Id.* The frequency of these audits will be based on the results of prior supplier audits, but, in any event, will not exceed once every three years. In addition, the EREF FNMCP (Exh. AES000039) under “Gaseous UF₆ Sampling” will be revised to require that feed material be sampled once per feed cylinder prior to feeding the material into the enrichment system to confirm that the feed material is Commercial Natural UF₆ by ensuring that the level of ²³⁶U in this material is within the requirements of C787. Exh. AES000001 at 5.

4.83. The Board also requested additional information regarding cylinder inspections. Board Order, dated October 29, 2011, at 6. AES explained that visual inspection of tails cylinder will be conducted by trained cylinder operations personnel. Exh. AES000001 at 22. The inspectors will follow the process for routine cylinder inspections described in ANSI N14.1, *Uranium Hexafluoride - Packaging for Transport*, Section 6.3.1 and Appendix F (Exh. AES000044), and in USEC-651, *Uranium Hexafluoride: A Manual of Good Handling Practices*, Section 3.3.1 and Figures 1 and 2 (Exh. AES000045). *Id.* Over time, AES anticipates that it will be able to develop sufficient operational experience and a history of inspection results to reassess the inspection frequency. *Id.* AES expects that this data may form the based for reduced inspection frequency during facility life. *Id.*

4.84. Based on the foregoing, the Board finds that the application and record of the proceeding contain sufficient information to support the NRC Staff’s conclusion that AES’s MC&A program is adequate.

6. *Physical Protection of Special Nuclear Material in Transit*

4.85. An applicant also must submit an adequate plan for the physical protection of special nuclear material in transit. 10 C.F.R. § 70.23(a)(9). AES provided detailed information in its Physical Security Plan on the policies, methods, and procedures to be implemented to protect special nuclear material of low strategic significance in transit to and from the facility. *See* Exh. NRC000032 at 12-2. The NRC Staff focused its review on the Applicant's commitments to meet specific material transportation, material receipt, in-transit physical protection, export, import, and document retention requirements. *Id.* The NRC Staff concluded that this information is acceptable and complies with the applicable Part 73 requirements. *See id.*

4.86. The Board has reviewed the relevant portions of the application and the record and finds that they provide adequate support for the Staff's conclusion.

7. *Physical Protection and Protection of Classified Matter*

4.87. As required by Section 70.23(a)(10), the NRC Staff reviewed and approved AES's Physical Security Plan, in which the Applicant described the policies, methods, and procedures that will be implemented to protect special nuclear material of low strategic significance that is used or possessed at the proposed facility. Exh. NRC000032 at xx, 12-2. The Staff focused its review on the areas of barriers, access control, intrusion detection, response force, and event reporting. *Id.* at 12-2. The Staff concluded that the information provided by AES is acceptable and conforms to the applicable Part 73 requirements. *Id.* The Board has reviewed the relevant portions of the application and the record and finds that they provide adequate support for the Staff's conclusion.

4.88. The Applicant also provided information, including a Classified Matter Plan (“CMP”), on the protection of classified matter, including security controls and procedures, to ensure that classified matter is properly used, processed, stored, reproduced, transmitted, transported, and destroyed. The Staff concluded that the Applicant’s proposed program is acceptable and, upon implementation, will comply with the Part 95 requirements for a facility clearance. Exh. NRC000032 at 1-16. In response to questions from the Board (Board Order, dated October 29, 2011, at 3), the NRC Staff explained that little, if any, new Restricted Data (“RD”) is expected to be created at EREF. Exh. NRC000032 at 1-8. The NRC Staff stated that a Technology Guide, similar to that used for the NEF, will be used to verify whether the centrifuge machines are performing outside of the historical ranges of the machines in Europe. Any performance data found outside of the historical ranges would be considered new RD. In addition, the NRC Staff will impose the license condition (*see* NRC000032 at 1-16) to ensure that classified matter is not processed, stored, reproduced, transmitted, handled or accessed, except as permitted by the applicable personnel and facility clearances required under 10 C.F.R. Part 25, “Access Authorization,” and 10 C.F.R. Part 95.

4.89. The Board has reviewed the relevant portions of the application and the record and finds that they provide adequate support for the NRC Staff’s conclusion.

8. *Emergency Management*

4.90. In accordance with Section 70.23(a)(11), the Staff found that the Applicant has submitted an adequate Emergency Plan (“EP”). *See* Exh. NRC000032 at xix, 6-16, Chapter 8. AES will maintain and execute written procedures for responding to the hazards resulting from potential release of radioactive and/or chemically hazardous materials incident to the processing of licensed material. In reviewing the EP, the Staff focused on information

concerning the facility description; onsite and offsite emergency facilities; the types, classification, and detection of accidents; mitigation of consequences; assessments of releases and responsibilities; notification and coordination procedures; training, safe shutdown; exercises and drills; and the means by which AES will update its EP program and procedures. *See id.* at Chapter 8. The requirements of the EP are implemented through approved written procedures. Changes that decrease the effectiveness of the EP may not be made without NRC approval. *Id.* The NRC will be notified of other changes that do not decrease the effectiveness of the EP within 6 months of making the changes. *Id.* The Board has reviewed the relevant portions of the application and the record and finds that they provide adequate support for the Staff's conclusion.

4.91. In response to a Board question, AES explained that it will establish and clearly communicate the criteria for determining when an abnormal event investigation is necessary in a Conduct of Operations procedure. The criteria will be based on nuclear industry guidance documents, such as the Institute of Nuclear Power Operations' guidance in INPO 01-002, *Guidelines for the Conduct of Operations at Nuclear Power Stations* (Exh. AES000055). AES provided a list of specific examples of criteria for classifying occurrences as "abnormal" that have been derived from the INPO guidelines.

4.92. AES also described the responsibilities of various positions at EREF in responding to accidents. According to the EREF SAR, Section 2.2.2, Shift Crew Composition (Exh. AES000037), "[t]he minimum operating shift crew consists of a Production Supervisor (or Deputy Production Supervisor in the absence of the Production Supervisor), one Control Room operator, one Radiation Protection technician, one operator for each Cascade Hall and associated UF₆ handling systems, and security personnel." Because the Production Supervisor (or Deputy

Production Supervisor) position is included in the minimum operating shift crew, the Production Supervisor (or the Deputy Production Supervisor) would necessarily be present on site in the event of an accident. AES also explained that depending on the nature of the event, nuclear criticality safety, radiation protection, industrial hygiene, occupational safety, or security organizations may be consulted to determine the impact of an accident on plant safety or production. Any of these organizations (through the responsible manager) may recommend actions to the Production Supervisor, up to and including stopping operations.

4.93. The Board also posed a non-publicly available question to the NRC Staff and AES related to the Emergency Plan and associated training requirements. Non-Public Board Order, dated October 29, 2010, at 1.

Withheld pursuant to 10 CFR 2.390

4.94.

Withheld pursuant to 10 CFR 2.390

Withheld pursuant to 10 CFR 2.390

4.95. Based on the drills, training requirements, and other features of the Emergency Plan, the NRC Staff concluded that the Emergency Plan provides reasonable assurance that all of the major elements of the emergency plan and preparedness program will be exercised within a time frame that will maintain the licensee's personnel knowledge and skill to implement its emergency responsibilities. Exh. NRC000020 at 4.

4.96. Based on the above, the Board finds that the record provides a reasonable basis for the Staff's conclusions regarding emergency management.

9. *Nuclear Energy Liability Insurance*

4.97. Before issuing a license, the NRC Staff must find that the Applicant satisfies the applicable requirements of 10 C.F.R. Part 140 concerning nuclear energy liability insurance.¹² See 10 C.F.R. § 70.23(a)(12). AES stated that it intends to obtain nuclear liability

¹² Section 140.13b requires that a uranium enrichment facility carry liability insurance to cover public claims arising from any occurrence, within the U.S. that causes, within or outside the U.S., bodily injury; sickness; disease; death; loss of, or damage to, property; or loss of use of property arising from the radioactive, toxic, explosive, or other hazardous properties of chemicals containing licensed material.

insurance for EREF at a maximum policy amount of \$300 million by the time AES takes possession of source material or special nuclear material. Exh. AES000037 at 1.2-3. Because AES will provide proof of, and maintain, nuclear liability insurance in the maximum available amount, the NRC staff finds that the applicant satisfies the regulatory requirements under 10 C.F.R. 140.13(b). Exh. NRC000032 at 1-10. However, because the liability insurance coverage will not be provided until AES takes possession of source material or special nuclear material, the NRC Staff will impose a license condition that requires AES to provide proof of full liability insurance at least 30 days prior to the planned date for obtaining licensed material, so as to ensure compliance with Part 140 requirements. *See id.*

4.98. The Board requested clarification from AES and the NRC Staff regarding the scope of the liability insurance and, in particular, whether the liability insurance covers all hazardous chemicals produced from licensed materials, including hydrogen fluoride (“HF”). Board Order, dated October 29, 2011, at 3; Board Order, dated December 3, 2010, at 2. Both the NRC Staff and AES explained that the liability insurance that AREVA will obtain from American Nuclear Insurers (“ANI”) will cover hazardous chemicals produced from licensed material, including hydrogen fluoride. Exhs. NRC000001 at 14-15; AES000024 at 2.

4.99. Accordingly, the Board finds that the application and the record contain sufficient information to support the Staff’s conclusion that the liability insurance requirements referenced in Section 70.23(a)(12) have been met.

4.100. Based on all of the foregoing, the Board finds that (1) the AES application and the record of this proceeding contain sufficient information, and the NRC Staff’s review has been sufficiently adequate, to support the NRC Staff’s conclusions that the AES application complies with the requirements set forth in 10 C.F.R. Parts 30, 40, and 70; (2) AES is technically

qualified to design and construct the proposed EREF; and (3) AES is financially qualified to design and construct the proposed EREF.

D. Foreign Ownership

4.101. In its Hearing Notice and Order, the Commission stated that Sections 57 and 69 of the AEA require, among other things, an affirmative finding by the Commission that issuance of a license for the NEF will not be “inimical to the common defense and security.” 74 Fed. Reg. at 38058. The NRC Staff made this affirmative finding on the basis of the Department of Energy’s (“DOE”) Foreign Ownership, Control, and Influence (“FOCI”) review of the LES application and the fact that both LES and AES use, or will use, the same classified technology supplied by the Enrichment Technology Company Limited (“ETC”). NRC000001 at 1-8; Tr. at 188 (“[T]he staff found that granting the license would not be inimical to common defense and security.”). Namely, the Staff received a letter from the DOE dated March 31, 2005, in which DOE recommended that the NRC waive the requirement for FOCI mitigation associated with the granting of a nuclear facility license to LES. *See id.* The NRC accepted this finding by DOE based on a May 6, 2004 Interagency Agreement between NRC and DOE. *See id.* The NRC noted that the information and technology associated with EREF that will be classified as RD in the United States are already owned and controlled by the European Governments and the foreign-controlled companies associated AREVA. The information and technology are only being classified under U.S. law by the fact that they are being introduced into the United States.

4.102. During the January 25, 2011 hearing, the NRC contrasted the foreign ownership and control requirements applicable to materials licensees, such as AES, with those applicable to power reactors. The requirements applicable to reactors are more restrictive than those applicable to Part 70 licensees. Tr. at 183-184. The NRC Staff expert, Anneliese

Simmons, explained that, under Section 103 of the Atomic Energy Act, “no license [for a power reactor] may be issued to an alien or any corporation or other entity if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.” *See* Exh. NRCR00101 at 5; Tr. at 184.

4.103. The AES expert witness, Sam Shakir, provided additional information regarding the corporate structure of AES and the inimicality finding. Exh. AESR00062. AES explained that the ultimate parent of AES is AREVA SA, which is a corporation formed under the laws of France. *See* Exhs. AES000037 at 1.2-1; NRC000032 at 1-8. AES explained that its corporate structure is similar to that of AREVA’s existing fuel fabrication facility in Richland, which is also licensed under 10 C.F.R Part 70. Exh. AESR00062 at 4. The AES expert explained that the corporate governance for AES was not dictated by foreign ownership considerations and was consistent with other NRC licensees, including those applicable to power reactors. *Id.* at 5-6, 16; Tr. at 195.

4.104. AES also provided testimony to demonstrate that the management and financial structure of AES relative to AREVA SA provides AES with appropriate management and financial independence and to describe the potential effects foreign ownership could have on the ability of AES to meet its safety, environmental, financial, and security responsibilities. Exh. AESR00062 at 5-8. The AES President has sole responsibility and decision-making authority for: operating EREF in compliance with Federal, State, and local safety, security, environmental, and financial requirements (Exh. AES000001); safety in design, construction, operation and decommissioning of the EREF (Exhs. AES000001; AES000037); and quality assurance related to design, construction, operation and decommissioning of the EREF (Exh. AES000001). Exh. AESR00062 at 5. The Management Committee, whose members represent AES’s shareholders,

oversees business and commercial activities, financial performance, organization, and other key commercial, industrial, and financial strategies (Exh. AES000001), but has no influence over safety or QA in design, construction, operation and decommissioning of the EREF, or compliance with Federal, State, and local safety, security, environmental, and financial requirements (Exh. AES000001). Exh. AESR00062 at 6; Tr. at 194-195.

4.105. The AES expert also explained that enrichment contracts are directly between AES and its customers. Exh. AESR00062 at 7. As a result, proceeds from SWU sales accrue to AES (not its parents). *Id.* Proceeds from sales are used to fund O&M and other operations expenses at EREF. *Id.* Only dividends in excess of costs are transferred to the parent. The AES expert explained that these financial arrangements are similar to project company structures used by other NRC licensees (*e.g.*, nuclear power plants). *Id.*

4.106. Based on the foregoing, the Board finds that issuance of a license to AES will not be “inimical to the common defense and security.”

E. Exemptions and Special Authorizations

4.107. In conjunction with the January 25, 2011 mandatory hearing, the Board requested that the NRC Staff summarize and explain the various license conditions, exemptions, and special authorizations associated with EREF. Board Order, dated December 17, 2010, at 3-4. The NRC Staff expert, Breeda Reilly, stated that ten license conditions were identified as listed in the SER (Exh. NRC000032) along with four “standard” license conditions. Exhs. NRCR00104 at 3; NRC000001 at 28-35. AES requested one exemption and one special authorization in its license application, along with two additional exemption requests that were submitted during the course of the licensing review. Exhs. NRCR00104 at 3; AES000037 at 1.2-4.

4.108. The proposed license conditions relate to topics that include financial assurance, nuclear liability insurance, information security, decommissioning activities, decommissioning financial assurance, IROFS, and material control and accounting. Exhs. NRCR00104 at 4-13; NRC000001 at 28-35. In addition, the NRC also plans to impose four “standard” license conditions. These conditions are necessary to “tie down” the application, to impose a requirement regarding the Operational Readiness Review, to grant the exemptions requested in the application, and to set the 30-year license period. Exh. NRCR00104 at 14-17.

4.109. The NRC Staff also discussed two exemptions requested by AES. One exemption allows AES to begin certain construction of the EREF before NRC’s environmental review is complete, provided that none of the facilities or activities will be a component of the EREF Physical Security Plan or Standard Practice Procedures Plan for the Protection of Classified Matter or otherwise subject to NRC review or approval. Exhs. NRC000037 at 9-1; NRCR00104 at 18. Another exemption would permit AES to provide forward-looking incremental funding for decommissioning. *Id.* at 19. This exemption will be included in a license condition that also addresses AES’s commitments to update the decommissioning funding plan. *Id.*

4.110. The NRC Staff experts, Breeda Reilly and Damaris Arroyo, also discussed an exemption granted to AES from the 10 C.F.R. § 21.3 definitions of commercial grade item, basic component, critical characteristic, dedication, and dedicating entity (*see* Exh. NRC000041), in response to a January 29, 2010 request from AES (*see* Exh. NRC000040). Exh. NRCR00104 at 20; Tr. at 236-239. The approval of the exemption will be captured in the list of licensing documents associated with the standard “tie-down” license condition.

4.111. AES also requested an authorization to make certain license application changes without prior NRC approval (*see* Exh. NRC000064). The NRC Staff evaluated this request and granted the authorization. Exh. NRC000032 at 1-14; Exh. NRCR00104 at 21. The staff will impose the authorization as a license condition. *Id.* The NRC Staff also presented a table comparing the exemptions and special authorizations (Exh. NRC000118) and license conditions (Exh. NRC000119) issued to LES and AES.

4.112. Based on the foregoing, the Board finds that the NRC Staff's review of exemptions and special authorizations, as well as related license conditions, has been adequate to support the NRC Staff's specific findings and license issuance.

F. Commitment Tracking/Follow-up

4.113. In conjunction with the January 25, 2011 mandatory hearing, the Board requested that the NRC Staff outline the process of construction inspections and operational readiness reviews used to ensure that AES satisfactorily meets all the commitments made in its application as the facility is constructed and prepared for operation. Board Order, dated December 17, 2010, at 4. In response, the NRC Staff expert, Deborah Seymour, presented testimony describing the full scope of the commitment followup/tracking process, including the satisfaction of license conditions, using examples from the NEF commitment followup/tracking process. Exh. NRCR00120. The NRC Staff expert provided testimony describing the management structure and associated responsibilities of the construction inspection program. *Id.* at 3-5. The NRC Staff expert also provided information regarding the number of individuals engaged in the construction inspection effort, inspection planning efforts, and the requirements and training for inspectors. *Id.* at 6-9.

4.114. The NRC Staff expert explained that the schedule for construction and Operational Readiness Review (“ORR”) inspections is detailed in an Inspection Manual Chapter. Exh. NRCR00120 at 10; *see also* Exhs. NRC000122, NRC000123, and NRC000124. Construction inspections will begin after the license is issued and once the licensee commences safety-related construction activities. The timing of completion of the construction inspections and the ORR inspections will be determined by the construction schedule. Exh. NRCR00120 at 10. The NRC will focus its inspections on IROFS. *Id.* at 12. AES has identified approximately one hundred IROFS for EREF, which will be prioritized for inspection by NRC technical staff. *Id.* Inspections are based on a sampling program, which is expanded if problems are identified, and are performed prior to operations. *Id.* The inspections are performed in phases based on program readiness and system, facility, component, and equipment readiness as associated with requirements and IROFS. *Id.* All inspection findings are documented in inspection reports for tracking and follow-up. *Id.*

4.115. The NRC Staff expert also provided the Board with some of the lessons learned from construction inspections at the NEF and the MOX Fuel Fabrication Facility. Exh. NRCR00120 at 16. The NRC expert emphasized the need for robust communications and adequate resource planning (*e.g.*, quality assurance personnel), highlighted the value of a construction Resident Inspector, and underscored the value of finalizing the detailed design. *Id.*; *see also* Tr. at 259-262.

4.116. Based on the foregoing, the Board finds that the record provides a reasonable basis for the Staff’s conclusion that the plans and commitments described in the application provide reasonable assurance that an acceptable organization and sufficient

competent resources have been established or committed for the design, construction, and safe operation of the facility.

V. CONCLUSIONS OF LAW

5.1. The Board has given careful consideration to all of the documentary and oral evidence presented by the parties. Based upon our review of the entire record of this proceeding and the foregoing findings of fact and conclusions of law, the Board makes the following determinations on the ultimate issues concerning the safety aspects of the mandatory proceeding.

5.2. With respect to safety issues, the Board has determined that the application and the record of the proceeding contain sufficient information, and that the review of the application by the Staff has been adequate, to support the findings to be made by the Director of NMSS, with respect to the standards set forth in the Hearing Notice and Order and the applicable standards in 10 C.F.R. parts 30, 40, and 70. The Board also determined, based on the record of the proceeding, that AES is technically and financially qualified to design, construct, and operate the proposed EREF. Therefore, the Board concludes that issuance of a permit for the construction and operation of the proposed EREF will not be, on the basis of any of the foregoing factors, inimical to the common defense and security or to the health and safety of the public.

Respectfully submitted,

/s/ signed electronically by

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Dated at San Francisco, California
this 25th day of February 2011

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:)
)
AREVA ENRICHMENT SERVICES, LLC) Docket No. 70-7015-ML
)
(Eagle Rock Enrichment Facility))

CERTIFICATE OF SERVICE

I hereby certify that copies of “AREVA ENRICHMENT SERVICES’ PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW CONCERNING UNCONTESTED SAFETY ISSUES” in the captioned proceeding have been served via the Electronic Information Exchange (“EIE”) this 25th day of February 2011, which to the best of my knowledge resulted in transmittal of the foregoing to those on the EIE Service List for the captioned proceeding.

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