

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)	)	ASLBP No. 10-899-02-ML-BD01
	)	

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NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS  
OF LAW CONCERNING MANDATORY HEARING ON ENVIRONMENTAL MATTERS

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August 12, 2011

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I. INTRODUCTION

1.1. This final partial initial decision provides the findings and conclusions of the Atomic Safety and Licensing Board ("ASLB" or "Board") regarding uncontested environmental matters with respect to the application submitted by AREVA Enrichment Services LLC ("AES" or "Applicant") to the U.S. Nuclear Regulatory Commission ("NRC") on December 30, 2008 for a license under Title 10 of the *Code of Federal Regulations* ("10 C.F.R.") Parts 30, 40, and 70 to possess and use source, byproduct, and special nuclear material and to enrich natural uranium to a maximum of 5 percent uranium-235 ("U-235") by a gas centrifuge process.

1.2 These findings address the environmental matters associated with this proceeding that arise under Sections 102(2)(A), (C), and (E) of the National Environmental Policy Act of 1969 ("NEPA"), 42 U.S.C. §§ 4321-4370, and subpart A of 10 C.F.R. Part 51. A first partial initial decision addressing safety matters was issued on April 8, 2011. See AREVA Enrichment Services LLC, "First Partial Initial Decision (Uncontested/Mandatory Hearing on Safety Matters)," LBP-11-11 (April 8, 2011).

II. PROCEDURAL BACKGROUND

2.1 On December 30, 2008, AES submitted an application to the NRC for a license to possess and use source, byproduct, and special nuclear material and to enrich natural

uranium to a maximum of 5 percent U-235 in a gas centrifuge uranium enrichment facility known as the Eagle Rock Enrichment Facility (“EREF”), to be located in Bonneville County, Idaho. See AES – EREF Application for a Uranium Enrichment Facility License Under 10 C.F.R. 70, “Domestic Licensing of Special Nuclear Material” (December 30, 2008) (NRC Agencywide Document Access and Management System (“ADAMS”) Accession No. ML090300658). On April 23, 2009, AES submitted a revised application. AES – EREF Revision 1 to License Application for the Eagle Rock Enrichment Facility (April 23, 2009) (ML091210558). Notice of the NRC’s receipt and consideration of the initial and revised AES EREF license application was published in the *Federal Register* on July 30, 2009. “Notice of Receipt of Application for License; Notice of Consideration of Issuance of License; Notice of Hearing and Commission Order; and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information and Safeguards Information for Contention Preparation,” CLI-09-15, 70 NRC 1, 74 Fed. Reg. 38,052 (July 30, 2009) (“Notice of Hearing and Order”). Subsequently, on April 30, 2010, the Applicant submitted Revision 2 to the Application. AES – EREF License Application Revision 2 (April 30, 2010) (ML101610549).

2.2 As set forth in the Notice of Hearing and Order, the Commission directed this Board to conduct a hearing in accordance with 10 C.F.R. Part 2 and to make certain findings, discussed further below. 74 Fed. Reg. at 38,054. The Commission also provided specific guidance on certain issues related to environmental issues, financial qualifications, foreign ownership, creditor requirements, and other matters. *Id.* at 38,057-59.

2.3 On March 26, 2010, this Board was established to preside over the mandatory hearing. Establishment of Atomic Safety and Licensing Board (March 26, 2010). On August 24, 2010, the Board was reconstituted by appointing Administrative Judge G. Paul Bollwerk, III, to serve as Board Chair in place of Administrative Judge Alex S. Karlin. Notice of Atomic Safety and Licensing Board Reconstitution (Aug. 24, 2010).

2.4 In February 2011, the NRC staff (“staff”) published the final Environmental Impact Statement for the Proposed Eagle Rock Enrichment Facility in Bonneville County, Idaho (NUREG-1945) (“FEIS”) (NRC000134 and NRC000135). The FEIS represents the staff’s conclusions based on its review of the Applicant’s Environmental Report (“ER”).

2.5 In preparation for the mandatory hearing on environmental matters, this Board reviewed the Applicant’s ER and the staff’s FEIS (NRC000134 and NRC000135). Based on this review, the Board asked the staff and AES to address certain issues in written responses to the Board. The Board memorialized its initial publicly-available questions in “Memorandum and Order (Initial Board Questions Regarding Environmental-Related Matters and Associated Administrative Directives),” dated April 15, 2011 (“Initial Questions”).

2.6 On May 2, 2011, the staff and AES filed answers to these questions. See NRC Staff Response to the Licensing Board’s Initial Questions Regarding Environmental Matters (May 2, 2011) (NRC000136); AES Response to Initial Environmental Questions (May 2, 2011) (AES000064).

2.7 This Board posed supplemental questions in “Memorandum and Order (Second Set of Board Questions Regarding Environmental-Related Matters),” April 22, 2011 (“Second Set of Questions”). On May 9, 2011, the staff and AES responded to the Board’s supplemental questions. See NRC Staff Response to the Licensing Board’s Second Set of Questions Regarding Environmental Matters (May 9, 2011) (NRC000170); AES Response to Second Set of Environmental Questions (May 9, 2011) (AES000079).

2.8 On May 12, 2011, this Board posed a third set of questions in “Memorandum and Order (Third Set of Board Questions Regarding Environmental-Related Matters)” (“Third Set of Questions”). The staff and AES responded to the Board’s third set of supplemental questions on May 27, 2011. See NRC Staff Response to the Licensing Board’s Third Set of Questions Regarding Environmental Matters (May 27, 2011) (NRC000176); AES Response to Third Set of Environmental Questions (May 27, 2011) (AES000095).

2.9 On June 2, 2011, this Board gave notice that it would convene an evidentiary session to receive testimony and exhibits in the mandatory hearing portion of this proceeding starting on July 12, 2011, in Idaho Falls, Idaho. Notice of Hearing (Notice of Evidentiary Hearing and Opportunity to Provide Oral and Written Limited Appearance Statements) (June 2, 2011) (“Notice of Hearing”). The Notice of Hearing also invited members of the public to provide oral or written limited appearance statements in connection with the proceeding on July 10 and 11, 2011. *Id.*

2.10 Also on June 2, 2011, the Board posed two additional questions. See Memorandum and Order (Providing Presentation Topics, Additional Questions, and Administrative Directives Associated with Mandatory Hearing on Environmental Matters) at 6 (June 2, 2011). The staff and AES responded to the Board’s additional questions on June 17, 2011. See NRC Staff Response to Licensing Board’s Fourth Set of Questions on Environmental Matters (June 17, 2011) (NRCR00184) and AES Response to Fourth Set of Environmental Questions (June 17, 2011) (AES000099).

2.11 In its June 2, 2011 Notice of Hearing, the Board specified the following topics for evidentiary presentations by the staff and AES:

- Presentation 1: Purpose and Need for the Proposed Action
- Presentation 2: “Preconstruction” Activities
- Presentation 3: Greenhouse Gas Impacts of Facility’s Production Power Consumption
- Presentation 4: Construction Air Quality Impacts
- Presentation 5: Radiological Effluent Monitoring Program (REMP)
- Presentation 6: Historic/Cultural Resources Memorandum of Agreement and Associated Mitigation Measures

2.12 On July 1, 2011, the staff and AES filed evidentiary presentations addressing the topics outlined by the Board in its June 2, 2011 Order. See AES Presentation on

Topic 1: Purpose and Need for Proposed Action (AES000102); ERI Presentation on Topic 1: Purpose and Need for Proposed Action (AES000103); AES Presentation on Topic 2: Preconstruction (AES000105); NRC Staff Presentation Topic 3: Greenhouse Gas Impacts of Facility's Production Power Consumption (NRC000190); NRC Staff Presentation Topic 4: Construction Air Quality Impacts (NRC000197); NRC Staff Presentation Topic 5: Radiological Effluent Monitoring Program (NRC000207); and NRC Staff Presentation Topic 6: Historical/Cultural Resources Memorandum of Agreement and Associated Mitigation Measures (NRC000214).

2.13 On July 11, 2011, the Board heard Oral Limited Appearance Statements and accepted written statements from members of the public in Idaho Falls, Idaho.<sup>1</sup>

2.14 On July 11, 2011, members of this Board, the parties to this proceeding, and two members of the Snake River Alliance visited the site of the proposed EREF. See Memorandum and Order (Regarding Request to Attend Site Visit) (July 8, 2011).

2.15 On July 12-13, 2011, this Board held the mandatory evidentiary hearing on environmental matters, including the topics covered in the staff and AES pre-filed presentations, in Idaho Falls, Idaho. Witnesses for the staff and AES presented the pre-filed presentations and answered Board questions during the evidentiary hearing.

2.16 On July 29, 2011, the staff filed a motion to correct an error in its presentation regarding the greenhouse gas ("GHG") footprint from coal-fired plants (NRC000190) and supplement the information provided to the Board regarding the Northwest Power Pool. See NRC Staff Unopposed Motion to Amend and Supplement the Record (July 29, 2011).

2.17 On August 2, 2011, the Board closed the evidentiary record. Memorandum and Order (Adopting Transcript Corrections; Admitting Additional NRC Staff Exhibits; Closing the Evidentiary Record of Mandatory Proceeding) (August 2, 2011). In accordance with the Board's

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<sup>1</sup> The Limited Appearance Statement Session scheduled for July 10, 2011, was cancelled due to an absence of public attendance.

schedule for the environmental-related portion of the mandatory hearing, the staff and AES submitted their proposed findings of fact and conclusions of law on August 12, 2011.

2.18 The proposed findings of fact and conclusions of law presented herein are the Board's findings of fact with respect to the evidence presented at the July 12-13, 2011 mandatory hearing regarding environmental matters, and the Board's conclusions of law with respect thereto.

### III. LEGAL STANDARDS AND REGULATORY GUIDANCE

#### A. Regulatory Requirements

3.1 Section 193 of the Atomic Energy Act of 1954, as amended ("AEA"), requires the NRC to conduct a hearing with regard to the licensing of the construction and operation of a uranium enrichment facility. 42 U.S.C. § 2243(b); *see also* 10 C.F.R. §§ 70.23a and 70.31(e) (requiring a hearing for uranium enrichment facility licenses). This type of hearing is known as an "uncontested" or "mandatory" hearing, in contrast to a "contested" hearing, which takes place if (1) there is a controversy between the NRC staff and the applicant for a license concerning the issuance of the license or any of the terms or conditions thereof, or (2) a petition for leave to intervene in opposition to an application for a license has been granted or is pending before the Commission. 10 C.F.R. § 2.4. If a license application for a type of facility subject to the mandatory hearing requirement is contested, the hearing will be bifurcated into contested and uncontested portions on an issue-by-issue basis. *Exelon Generation Company, LLC* (Early Site Permit for Clinton ESP Site), CLI-05-17, 62 NRC 5, 34 (2005).

3.2 On July 28, 2005, the Commission issued a Memorandum and Order responding to six questions certified by the ASLB Panel concerning the NRC's statutory duty to conduct a mandatory (or uncontested) hearing for certain license applications. *Clinton ESP*, CLI-05-17, 62 NRC at 5. Among the questions raised was whether in uncontested hearings the Board should conduct a *de novo* review of the license application or whether the Board should instead

determine only whether the staff's review of the application was sufficient. The Commission determined that a *de novo* review is not necessary for mandatory hearings. Rather,

when considering safety and environmental matters not subject to the adversarial process – so-called 'uncontested' issues – the boards should decide simply whether the safety and environmental record is 'sufficient' to support license issuance. In other words, the boards should inquire whether the NRC staff performed an adequate review and made findings with reasonable support in logic and fact.

*Id.* at 34.

3.3 In its Notice of Hearing and Order for this proceeding, the Commission directed that, in the case of an uncontested proceeding, as here, the Board will determine the following without conducting a *de novo* evaluation of the 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.

In Paragraph C, the Commission further directed that:

[t]he 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 the NRC's implementing regulations in 10 CFR part 51 have been met.

Notice of Hearing and Order at 38,054.

3.4 In accordance with the Commission's Notice of Hearing and Order, the Board must:

determine whether the requirements of section 102(2)(A), (C), and (E) of NEPA and subpart A of 10 CFR part 51 have been complied with in the proceeding; independently consider the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be

taken; and determine, after weighing the environmental, economic, technical, and other benefits against the environmental and other costs, and considering reasonable alternatives, whether a license should be issued, denied, or appropriately conditioned to protect environmental values.

*Id.*

B. NRC Guidance

3.5 The staff has developed generic guidance for reviewing the health, safety, and environmental protection aspects of applications for licenses for fuel cycle facilities, including enrichment and fuel fabrication facilities, in NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," (NRC000031). The primary guidance document applicable to the staff's environmental review is NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC000189).

IV. FINDINGS OF FACT

A. Introduction

4.1 The staff published its FEIS (NRC000134 and NRC000135) in February 2011. The FEIS was prepared in order to comply with NEPA and the NRC's implementing regulations, 10 C.F.R. Part 51, which require the NRC to assess the potential environmental impacts of its proposed actions. The FEIS represents the NRC's independent assessment of the environmental impacts of the proposed action based on the staff's evaluation of the Applicant's ER and other resources.

4.2 Section 102(2)(A) of NEPA requires federal agencies to "utilize a systematic and interdisciplinary approach, which will insure the use of natural and social sciences and environmental design arts in planning and decision making which may have an impact on man's environment." 42 U.S.C. § 4332(2)(A). Section 102(2)(C) of NEPA requires federal agencies to include in an FEIS discussions of the following: (1) the environmental impact of the proposed action; (2) any adverse environmental effects which cannot be avoided; (3) alternatives to the proposed action; (4) the relationship between local short-term uses of man's environment and

the maintenance and enhancement of long-term productivity; and (5) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. 42 U.S.C. §§ 4332(2)(C)(i) – (v).

4.3 The FEIS addresses each of these required discussions. Impacts of the proposed action are addressed in Chapter 4 (Environmental Impacts). Adverse environmental effects which cannot be avoided are included in Section 8.1 (Unavoidable Adverse Environmental Impacts). Alternatives to the proposed action are discussed in Chapter 2 (Alternatives). Section 8.2 includes a discussion of the relationship between short-term uses and long-term productivity of the human environment. Section 8.3 includes a discussion of the irreversible and irretrievable commitments of resources. NRC000134.

4.4 The FEIS satisfies the staff's obligation under Section 102(2)(C) and demonstrates the staff's "hard look" at the environmental impacts of the proposed action.

B. FEIS, Chapter 1, "Introduction"

4.5 In Sections 1.2 and 1.3 of the FEIS, the staff examined both the proposed action and the purpose and need for the proposed action, as explained by the Applicant in the ER. NRC000134 at 1-1 to 1-7; AES000070 at 1.1-3 to 1.2-7. The proposed action considered in the FEIS is for AES to construct, operate, and decommission a gas centrifuge uranium enrichment facility near Idaho Falls, in Bonneville County, Idaho. NRC000134 at xxvi, 1-1. The facility would provide an additional reliable and economical domestic source of enriched uranium to satisfy two needs: (1) the need for enriched uranium to fulfill U.S. electricity generation requirements; and (2) the need for domestic supplies of enriched uranium for national energy security. *Id.* at xxix, 1-3 to 1-7. *See also* NRC000136 at 1-2; Transcript ("Tr.") at 389-461. The staff found that the proposed EREF would fulfill each of these needs. NRC000134 at 1-4 to 1-7.

4.6 In response to specific questions from the Board, the staff affirmed that its purpose and need analysis, which is based, in part, on the number of new reactor combined

license applications (“COLAs”) that the NRC received, remains unchanged in the aftermath of the March 2011 events at the Fukushima Daiichi facility in Japan. NRC000136 at 2-3; Tr. at 458-459. The staff explained that, to date, no combined license applicant has withdrawn its application or sought suspension of the staff’s review thereof in response to the Fukushima events. NRC000136 at 2-3; Tr. at 458. Thus, as the staff indicated during the mandatory hearing, there is no new and significant information that would warrant supplementation of the FEIS. Tr. at 458-59. *See generally* 10 C.F.R. § 51.92(a).

C. FEIS, Chapter 2, “Alternatives”

4.7 Based on the above-stated purpose and need, the staff considered alternatives to the construction and operation of the proposed EREF. The staff considered a reasonable range of alternatives to the proposed action, including alternative sites for an AES uranium enrichment facility, alternative sources of low-enriched uranium, alternative technologies for uranium enrichment, and the no-action alternative. NRC000134 at xxix-xxx, 2-1 to 2-69. The staff considered the following alternatives to fulfill domestic enriched uranium needs:

(1) construct and operate the facility at a site other than the proposed Bonneville County site; (2) re-activate the Portsmouth Gaseous Diffusion Facility in Piketon, Ohio; (3) downblend highly enriched uranium from either United States or Russian nuclear warheads; and (4) purchase low-enriched uranium from foreign sources. *Id.* at 2-27 to 2-39. The staff also considered the following alternative technologies for uranium enrichment: electromagnetic isotope separation process, liquid thermal diffusion, gaseous diffusion, atomic vapor laser isotope separation, molecular laser isotope separation, and the separation of isotopes by laser excitation. *Id.* at 2-39 to 2-42. These alternatives were eliminated from further consideration in the FEIS based on economic, environmental, national security, or technological maturity factors. *Id.* at 2-27.

D. FEIS, Chapter 3, “Affected Environment”

4.8 The FEIS contains a description of the regional and local environmental conditions at the proposed EREF site before any preconstruction activities are performed and

prior to the proposed action. NRC000134 at 3-1 to 3-113. This includes detailed descriptions of the site location, land use, historic and cultural resources, visual and scenic resources, climatology, meteorology, air quality, geology, minerals, soils, water resources, ecological resources, noise, transportation, public and occupational health, socioeconomics, and environmental justice considerations. *Id.*

E. FEIS, Chapter 4, “Environmental Impacts”

4.9 The FEIS also discusses the potential environmental impacts associated with preconstruction, construction, operation, and decommissioning of the proposed EREF, defining the impacts as small, moderate, or large. NRC000134 at 4-1 to 4-127.

4.10 The staff found that the potential impact of the proposed EREF project would be small in the following resources areas: land use, geology and soils, water resources, noise, public and occupational health, waste management, socioeconomics, and environmental justice. *Id.* at xxxi-xxxix, 4-3 to 4-127. Small to moderate impacts are possible in the areas of historic and cultural resources, visual and scenic resources, ecological resources, transportation, and accidents. *Id.* at xxxii-xi, 4-4 to 4-120. Small to large impacts are possible with respect to air quality during preconstruction and construction. *Id.* at xxxiii-xxxiv, 4-11 to 4-31.

4.11 The proposed EREF site currently consists primarily of agricultural and undeveloped rangeland. *Id.* at 4-3. The staff determined that the impact on land use would be small because preconstruction and construction would occur on approximately 592 acres of a 4200-acre private parcel of land and there are large land areas in the county that will continue to be used for grazing and crop production, including U.S. Bureau of Land Management (“BLM”) lands surrounding the proposed EREF property. *Id.* at xxxi, 4-4. Operation of the proposed EREF is not expected to alter land use on adjacent properties and, as such, the impacts on land use during operations would be small. *Id.* at xxxii, 4-3 to 4-4. Because decontamination and

decommissioning would not be expected to result in a change in land use from operation, the impacts would be small. *Id.* at xxxii, 4-122.

4.12 With respect to historic and cultural resources at the site, the staff determined that the impacts would be small to moderate. *Id.* at xxxii, 4-7. The proposed EREF site includes 13 cultural resource sites (3 prehistoric, 6 historic, and 4 multi-component), one of which, the John Leopard Homestead (MW004), was determined to be eligible for listing on the National Register of Historic Places. *Id.* at xxxii, 4-5 to 4-6. Professional excavation and data recovery of the MW004 site were completed during preconstruction activities authorized by the NRC pursuant to an exemption. *Id.* at 4-6 to 4-7; NRC000082. Therefore, the impact to site MW004 was mitigated to moderate. NRC000134 at xxxii, 4-6 to 4-7. Because the greatest potential for impacts on historic and cultural resources would occur during preconstruction (e.g., ground disturbing activities), the impact of construction, operation, and decommissioning on these resources would be small. *Id.* at xxxii, 4-5 to 4-8, 4-122.

4.13 The NRC, the Idaho State Historic Preservation Office (“SHPO”), and AES are expected to enter into a Memorandum of Agreement (“MOA”) to address the completed mitigation of site MW004, the completed X-ray fluorescence analysis of obsidian artifacts found at the proposed EREF site, and the survey by AES for historic and cultural resources of any previously un-surveyed areas that may be identified following final design. *Id.* at 4-6 to 4-7. The MOA also references AES’s unanticipated discoveries and monitoring plan. *Id.* at 4-6. The Shoshone-Bannock Tribes have accepted the NRC’s invitation to be a concurring party on the MOA. *Id.*

4.14 During the mandatory hearing on environmental matters, the staff presented information regarding the status of the MOA and an overview of AES’s unanticipated discoveries and monitoring plan. NRC000214; Tr. at 625-641.

4.15 Neither the NRC’s regulations nor the Advisory Council on Historic Preservation’s regulations prevent the NRC from issuing the record of decision, as discussed in 10 C.F.R.

§§ 51.102 and 51.103, prior to execution of the MOA. NRC000176 at 1-2. In order to ensure compliance with Section 106 of the National Historic Preservation Act (“NHPA”), however, the staff will not issue the license to AES prior to execution of the MOA. NRC000176 at 1-2; Tr. at 628-629. As of the date of the NRC’s last filing to the Board, August 12, 2011, the parties had not finalized the draft MOA. Tr. at 627. See *also* NRC000136 at 3-4.

4.16 The staff determined that the impact of the proposed action on visual and scenic resources would be small to moderate. NRC000134 at xxxii-xxxiii, 4-10 to 4-11, 4-122. Even though increased activity and fugitive dust would occur at the proposed site during preconstruction, it would be relatively short in duration, making these impacts on visual and scenic resources small. *Id.* at xxxii, 4-8 to 4-10. Construction of the proposed EREF would introduce visual intrusions, particularly taller buildings and increased activity, which are out of character with the surrounding area. NRC000134 at xxxiii, 4-10. As such, the staff determined that construction of the proposed EREF would have a small to moderate impact on visual and scenic resources. *Id.* Because the proposed facility would be visually inconsistent with the current setting, and its operation is expected to alter the visual rating of the surrounding public lands, the staff determined that construction and operation of the proposed facility would have a moderate visual impact. *Id.* at xxxiii, 4-10 to 4-11. Because many buildings and the perimeter lighting would remain in place as part of decommissioning, the impacts on visual and scenic resources during decommissioning would be small to moderate. *Id.* at xxxiii, 4-122.

4.17 The staff determined that air quality impacts of the proposed action would range from small to large. NRC000134 at xxxiii, 4-12. Preconstruction and construction would have a small impact on ambient air quality for all hazardous air pollutants (“HAPs”) and for all criteria pollutants except particulates, but would have a moderate to large impact on near-field air quality from particulates during fugitive dust-producing activities (e.g., site clearing, grading, travel on unpaved onsite roads, transfer and stockpiling of materials). *Id.* at xxxiii, 4-11 to 4-22.

4.18 During the mandatory hearing on environmental matters, the staff presented an overview of the AERMOD air dispersion model, which the staff used to evaluate the impacts to ambient air quality from the proposed EREF preconstruction and construction. NRC000197; Tr. at 523-556. See *also* NRC000135 at Appendix C. The staff determined that ambient air modeling predicts that impacts on ambient air quality from the routine operation of the proposed EREF would be small with respect to all criteria pollutants and all HAPs. NRC000134 at xxxiv, 4-12, 4-22 to 4-28. During decommissioning, air quality impacts resulting from fugitive dust and criteria pollutants from the operation of transportation equipment would be small. *Id.* at xxxiv, 4-122 to 4-123.

4.19 The staff also evaluated the impact of preconstruction, construction, operation, and decommissioning activities on the geologic resources and soils at the proposed site. NRC000134 at xxxiv, 4-31 to 4-34. Impacts would occur primarily during preconstruction, as a result of soil-disturbing activities that loosen soil and increase the potential for erosion. *Id.* Because these impacts are short-term and can be mitigated, impacts on geology and soils would be small. *Id.* at xxxiv, 4-123.

4.20 The staff evaluated potential impacts on water resources from preconstruction, construction, and operation of the proposed EREF. NRC000134 at xxxiv, 4-34 to 4-45. The staff determined that the impacts to water quality would be small because stormwater runoff would be diverted to a stormwater detention basin, making the potential low for contaminated stormwater discharging to water bodies on adjacent property. *Id.* at xxxiv, 4-37, 4-39 to 4-43. Additionally, no surface water sources would be used, there are no natural surface water bodies within or near the proposed EREF site, and groundwater occurs at depths of 202 meters (661 feet) to 220 meters (722 feet). *Id.* at xxxiv, 3-57, 4-35, 4-37, 4-39. Finally, no direct discharge of liquid effluents to surface or groundwater would occur during operations. *Id.* at 4-39 to 4-41.

4.21 The staff determined that impacts on water usage during preconstruction, construction, and operation would be small because the annual water use requirements would be less than one percent of the total groundwater withdrawals from the Eastern Snake River Plain (“ESRP”) aquifer, and would remain well within the water right appropriation. NRC000134 at 4-35, 4-38. During decommissioning, impacts to water resources are expected to be similar to those during construction. *Id.* at xxxv, 4-123 to 4-124.

4.22 The staff assessed the impacts of preconstruction, construction, and operation of the proposed EREF on ecological resources, and determined that these impacts would be small to moderate during preconstruction and construction and small during operation. NRC000134 at xxxv, 4-45 to 4-57. Because preconstruction activities such as land clearing could result in direct impacts at the proposed EREF site, such as habitat loss and wildlife mortality, as well as indirect impacts to ecological resources in surrounding areas, primarily from fugitive dust and wildlife disturbances, the staff determined that the impact of preconstruction on plant communities and wildlife would be moderate. *Id.* No rare or unique plant communities, or threatened or endangered species, have been found or are known to occur on the proposed EREF site. *Id.* Construction, operation, and decommissioning could result in impacts on wildlife and plant communities as a result of noise, lighting, traffic, and human presence, but the staff determined that these impacts would be small. *Id.* at 4-45 to 4-57, 4-124.

4.23 Impacts from noise during preconstruction, construction, and operation were determined to be small. NRC000134 at xxxv-xxxvi, 4-57 to 4-64. Most of the noise-producing activities (e.g., site clearing and grading, excavations, utility burials, construction of onsite roads, and construction of the ancillary buildings and structures) would occur during preconstruction. *Id.* at xxxv-xxxvi, 4-58 to 4-62. The noise impacts from initial preconstruction activities may exceed established standards at some locations along the proposed EREF property boundary for relatively short periods of time. *Id.* at 4-62. However, because of the distances involved, expected levels of attenuation, application of mitigation measures, and the expected limited

presence of human receptors at these locations, the impacts of noise during preconstruction would be small for human receptors. *Id.*

4.24 Noise impacts during construction and the overlap period when partial operations begin while building construction continues may exceed established standards at some offsite locations for relatively short periods of time. *Id.* at 4-62 to 4-63. While the noise impacts from construction and operation during the overlap period are expected to be additive, they would still be substantially reduced from noise levels during initial construction. *Id.* at xxxvi, 4-62 to 4-63.

4.25 Noise impacts from operation of the proposed EREF would be due primarily to the operation of six diesel-fueled emergency generators, commuter traffic, the movement of delivery vehicles, and operation of various pumps, compressors, and cooling fans. *Id.* The staff concluded that distances from noise sources to sensitive receptors would result in adequate attenuation of noise related to operation of the proposed EREF; therefore, noise impacts from operation would be small. *Id.* Noise impacts during decommissioning would be similar to those during construction and were determined to be small. *Id.* at xxxvi, 4-124.

4.26 Transportation impacts during preconstruction, construction, and operation would be small to moderate on adjacent local roads (due to the potentially significant increase in average daily traffic), but regional impacts would be small. NRC000134 at xxxvi, 4-65. During preconstruction and construction, the construction of highway entrances, the daily commute of workers, daily construction deliveries, and waste shipments would cause an impact on the local transportation network. *Id.* at xxxvi, 4-65 to 4-67. Because traffic volume is expected to remain below the design capacity of Interstate 15 (“I-15”) and traffic slowdowns or delays would only be expected to occur at the entrance to the proposed EREF during shift changes, the impacts on overall traffic patterns and volumes during construction would be small to moderate on U.S. Route 20 (“US 20”) and small on I-15. *Id.* at xxxvi, 4-66.

4.27 Transportation impacts during operation would occur from the transport of personnel, nonradiological materials, and radioactive materials to and from the proposed EREF

site, especially during the period when construction and operation overlap. *Id.* at xxxvi-xxxvii, 4-67 to 4-74. Overall, increased traffic during facility operation would have a small to moderate impact on the traffic on US 20 (small for any off-peak shift change). *Id.* at 4-68. Additionally, the annual impacts of routine transportation activities and accident risks (radiological and chemical) would be small. *Id.* at xxxvii, 4-68 to 4-74. See also NRC000136 at 5-7, NRC000170 at 1-2. Traffic during the initial portion of decommissioning would be similar to the period when construction and operations overlap, and would be less than construction and operation after facility operations cease entirely, making the impacts on local traffic on US 20 small to moderate. NRC000134 at xxxvii, 4-124 to 4-125.

4.28 The staff determined that nonradiological impacts to occupational health from preconstruction and construction would be small, based on the staff's estimates of injuries and illnesses obtained using annual injury and illness data for heavy construction compiled by the U.S. Department of Labor, Bureau of Labor Statistics ("BLS"). NRC000134 at xxxvii, 4-76, 4-77. The staff also concluded that there would be no radiological impacts to occupational health during preconstruction and construction, because radionuclide concentrations at the proposed EREF site would be at or below natural background levels. *Id.* at xxxvii, 4-77.

4.29 The staff determined that nonradiological impacts to public and occupational health during operations, including occupational illnesses and injuries as well as potential chemical exposures to workers and members of the public, would be small. *Id.* at xxxvii, 4-78, 4-80. The staff's conclusion with regard to occupational illnesses and injuries is based on the staff's estimates of injuries and illnesses using data compiled by the BLS, and comparisons to data from an existing uranium enrichment facility and the chemical manufacturing industry. *Id.* at 4-78, 4-79. The staff's conclusion with regard to potential chemical exposures is based on design features of the proposed EREF that minimize the possibility of chemical exposures, and estimated concentrations of hydrogen fluoride (or hydrofluoric acid, "HF") and uranium

compounds at workplace and public receptor locations that fall well below occupational exposure limits. *Id.* at xxxvii, 4-79.

4.30 The staff determined that radiological impacts to workers and the public during operations, including impacts to construction workers during initial operations, would be small. NRC000134 at xxxvii, 4-82 to 4-86. Because annual doses to workers at operating uranium enrichment facilities are typically low, and because the radiological impacts to workers at the proposed EREF are expected to be similar to those at other enrichment facilities, the staff concluded that radiological impacts would be small. *Id.* at 4-82. For workers, the staff determined that the most significant impact would be to construction workers completing the cylinder storage pads during the period of time when initial operation and construction would be occurring simultaneously. *Id.* at 4-81. For members of the public, the staff determined doses attributable to operation of the proposed EREF and concluded that the impact would be small based on the low doses involved, especially when compared to normal background radiation levels. *Id.* at xxxvii, 4-82 to 4-86.

4.31 The staff concluded that nonradiological impacts to workers during decommissioning would be small, because the nature and duration of these activities are similar to those of construction activities. *Id.* at 4-125. The radiological impacts to workers during decommissioning would also be small because standard amounts of uranium hexafluoride (“UF<sub>6</sub>”) would be handled during purging of the centrifuges. *Id.* Radiological impacts to the public during decommissioning would be small because an active environmental monitoring and dosimetry program would be conducted to ensure that doses to the public would be maintained within regulatory limits. *Id.*

4.32 The staff determined that impacts from management of nonhazardous, hazardous, and radioactive solid wastes at the proposed EREF during preconstruction and construction, operation, and decommissioning would be small. NRC000134 at xxxviii, 4-91 to 4-95, 4-126. This conclusion is based on the low volumes of waste expected to be generated in

comparison with current and future capacity at local and regional waste disposal facilities. *Id.* The staff also concluded that impacts from management of liquid wastes would be small because there will be no discharge of liquid effluents to surface water or groundwater. *Id.* at 4-95 to 4-96. Finally, the staff concluded that impacts from temporary onsite storage of depleted UF<sub>6</sub> and subsequent transportation, conversion, and disposal of depleted UF<sub>6</sub> at an offsite location would be small based on previous U.S. Department of Energy (“DOE”) evaluations of such impacts at DOE facilities and the Applicant’s commitment to implement a cylinder management program at the proposed EREF. *Id.* at 4-96 to 4-98.

4.33 With regard to socioeconomic impacts, the staff determined that economic impacts (e.g., new jobs and income) as well as impacts on population, housing, and community services from the proposed EREF during preconstruction and construction, operation, and decommissioning would be small. NRC000134 at 4-103 to 4-106, 4-126. Economic impacts would be small because the number of jobs created would constitute less than one percent of total employment in the region. *Id.* at 4-103 to 4-106. Impacts on population, housing, and community services would also be small because in-migration of workers for the proposed EREF would lead to increases of less than 0.1 percent in occupancy rates and staffing requirements for community services. *Id.*

4.34 With regard to environmental justice, the staff concluded that there is a potential that environmental justice populations could be affected as a result of impacts to some resource areas (e.g., historic and cultural resources, visual and scenic resources, ecological resources, transportation, and accidents) during preconstruction, construction, and operation, and due to intermittent moderate to large impacts to air quality during preconstruction from fugitive dust. NRC000134 at xxxix, 4-108 to 4-111. However, the staff determined that these impacts would not be disproportionately high or adverse for environmental justice populations because there are no such populations within four miles of the proposed EREF facility (which is the geographic area recommended for environmental justice assessment, consistent with NUREG-1748,

Appendix C (NRC000189)). *Id.* at xxxix, 4-108, 4-126; NRC000135 at G-1 to G-4. Additionally, because the impacts of decontamination and decommissioning on all resource areas would be small, and because there are no environmental justice populations within 4 miles of the facility, there would be no environmental justice concerns stemming from those activities. NRC000134 at 4-126.

4.35 In order to assess the impacts of accidents on workers and the public, the staff analyzed six representative accident scenarios, varying in severity from intermediate-consequence to high-consequence, which could occur at the proposed EREF. NRC000134 at xl, 4-111, 4-117 to 4-120. The selected accident scenarios encompass a diverse set of events and cover a spectrum of consequences, and are consistent in scope with the accidents selected in the staff's evaluation of the National Enrichment Facility in Lea County, New Mexico. NRC000136 at 7, NRC000055.

4.36 Based on this analysis, the staff determined that the impact of a criticality accident would be high (fatality) for a worker in close proximity to the proposed facility, and moderate for the offsite public. NRC000134 at 4-118. For the other five accident scenarios, all of which involve releases of UF<sub>6</sub>, the impact on workers would range from low to high. *Id.* at xl, 4-118. For the offsite public, radiological consequences would be low for all six scenarios; uranium chemical exposure consequences would be high for one accident and low for the remainder; and HF exposure consequences would be intermediate for three scenarios and low for the remainder. *Id.* The overall consequences to the collective offsite public are less than one lifetime cancer fatality. *Id.* at xl, 4-119. Based on this analysis, the staff determined that these accidents pose an acceptably low risk to workers, the public, and the environment based on a combination of plant design, passive and active engineered controls (i.e., Items Relied on for Safety or "IROFS"), administrative controls, and management measures. *Id.* at 4-119 to 4-120; NRC000136 at 8. Therefore, the staff concluded that impacts of accidents would range from small to moderate. NRC000134 at xl; NRC000136 at 8.

4.37 In Section 4.2.17 of the FEIS, the staff assessed the potential impacts of preconstruction, construction, operation and decommissioning of the proposed EREF on GHG emissions. NRC000134 at 4-127 to 4-142. During preconstruction and construction, the staff estimated that fuel consumption by construction vehicles, commuting workers, and delivery vehicles would produce approximately 54,215 metric tons (“MT”) of carbon dioxide (“CO<sub>2</sub>”) emissions during the 7-year preconstruction and heavy construction period. *Id.* at 4-136.

4.38 With respect to GHG emissions generated during operation of the proposed EREF, the staff’s analysis in the FEIS focused on GHG impacts of transportation and fuel consumption. *Id.* at 4-136 to 4-137. The staff estimated that 26,136 MT of CO<sub>2</sub> would be generated annually from EREF operation. *Id.* at 4-137.

4.39 With respect to GHG emissions generated during decommissioning, the staff based its analysis on fuel consumption and transportation of waste to appropriate disposal or recycling facilities. *Id.* at 4-137. The staff estimated that total CO<sub>2</sub> emissions for waste transport would be 129,469 MT over the 8-year decommissioning period, and that annual CO<sub>2</sub> emissions from workforce commuting would be 3,184 MT during decommissioning. *Id.* at 4-140 to 4-141.

4.40 In its responses to Board questions to the parties and at the hearing, the staff provided further discussion of its GHG analysis. This discussion included information related to the impacts of GHG emissions resulting from the generation of power needed to operate the EREF, along with quantitative estimates of those impacts. NRC000136 at 10-11; NRC000176 at 3-4; NRC000190.

4.41 In its presentation on GHG impacts at the hearing, the staff (R. Kolpa<sup>2</sup>) explained that the annual power demand for operating the EREF is 683,280 megawatt-hours (“MWh”). NRC000190 at 8. The staff noted that this number is bounding because it assumes that the plant would operate at full production 24 hours a day, 7 days a week, 365 days a year. Tr. at 493.

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<sup>2</sup> Statement of Professional Qualifications for Ron Kolpa (filed May 2, 2011) (NRC000154).

4.42 The staff presented data on the relative contributions of electricity-generating technologies at the national level and in Idaho, where the proposed EREF would be located. At a national level, coal is responsible for 45 percent of power generation, natural gas for 23 percent, and hydroelectric for 7 percent. NRC000190 at 3; Tr. at 487-88. In Idaho, coal accounts for a negligible amount of power generation, while natural gas accounts for 12.5 percent and hydroelectric for nearly 80 percent. NRC000190 at 4; NRC000192; Tr. at 487.

4.43 The staff explained that the Northwest Power Pool (“NWPP”), a region designated by the U.S. Environmental Protection Agency (“EPA”) in its GHG emissions database, eGRID, represents the area within which the electric generating facilities that are most likely to supply power to the EREF are located. Tr. at 492; see NRC000190 at 7. The staff also noted that, in most instances, a transmission operator will try to supply power from the closest possible baseload source in order to minimize transmission losses. Tr. at 488-89, 492.

4.44 The staff identified a GHG emission factor of 858.8 lb CO<sub>2</sub>e/MWh for the NWPP. NRC000190 at 8; Tr. at 493. Using this factor and the proportional contributions of technologies of Idaho electricity generators shown in NRC000192, the staff estimated that the annual GHG emissions from the power required to operate the EREF would be 54,145 MT per year. NRC000190 at 10; Tr. at 498-99. This value represents 0.00018 percent of annual global GHG emissions and 0.0025 percent of annual national GHG emissions. NRC000190 at 12; Tr. at 507. When combined with the estimated direct impacts of 26,136 MT (NRC000134 at 4-141), the total annual GHG emissions are 80,281 MT, which represents 0.00027 percent of annual global GHG emissions and 0.0037 percent of annual national GHG emissions. NRC000190 at 13. The staff concluded that this represents a small impact. *Id.*

4.45 As requested by the Board, the staff also estimated the annual power-related GHG emissions for operation of the EREF assuming that all of the power required was generated in coal-fired power plants. Tr. at 504. This estimate, 674,900 MT of GHGs, was obtained by multiplying the annual power demand of the EREF (683,280 MWh) by an emission

factor of 0.9877 MT CO<sub>2</sub>e/MWh. NRC000216 at 1. The staff obtained this emission factor by dividing the estimated annual CO<sub>2</sub>e generated by U.S. coal-fired power plants in 2010 (see NRC000217 at 167) by the total power generated by those plants in 2010 (see NRC000217 at 95). NRC000216 at 2. The estimated GHG emissions assuming power generation using only coal represents a maximum bounding value. Tr. at 504.

4.46 The estimated GHG emissions of 674,900 MT if only coal-fired plants were to supply power for the EREF represents 0.0023 percent of annual global GHG emissions and 0.031 percent of annual national GHG emissions. NRC000216 at 2-3. The staff concluded that these impacts would be small. *Id.* When the direct GHG impacts of 26,136 MT (NRC000134 at 4-141) are added, the resulting total of 701,036 MT represents 0.0024 percent of annual global GHG emissions and 0.033 percent of annual national GHG emissions.

4.47 The staff also noted that if all power were to come from the NWPP, the GHG footprint could be calculated by multiplying the annual EREF power demand of 683,280 MWh by the NWPP emission factor of 858.8 lb CO<sub>2</sub>e/MWh and converting to proper units. NRC000216 at 3. The resulting GHG emissions would be 266,749 MT/year. *Id.* at 3-4. This represents 0.00091 percent of annual global GHG emissions and 0.012 percent of annual national GHG emissions, which the staff determined would result in small impacts in both cases. *Id.* at 4. When the direct GHG impacts of operations (26,136 MT) are added to the indirect power-related impacts, the total is 292,885 MT, which represents 0.0010 percent of annual global GHG emissions and 0.014 percent of annual national GHG emissions.

4.48 In accordance with the Commission's direction and guidance in its Notice of Hearing and Order dated July 30, 2009, the staff considered the potential environmental impacts of a hypothetical terrorist attack on the proposed EREF. NRC000134 at 4-142. The staff considered threats associated with releases of radioactive and hazardous materials occurring at the proposed EREF and during transportation to or from the proposed EREF. *Id.* Because the releases expected from a terrorist attack would be similar to those that would result

from an explosion or other accident of the same magnitude and involving the same amount of material, the staff concluded that potential impacts from terrorist acts would be similar to the impacts of transportation accidents or facility accidents. *Id.* at 4-142, 4-143, 4-145. For terrorist acts involving the transport of radioactive or hazardous material (e.g., UF<sub>6</sub>) to or from the proposed EREF, the staff concluded that the greatest potential impacts would be similar to those expected from severe transportation accidents. *Id.* at 4-143. For a hypothetical terrorist attack on the facility itself, the staff concluded that the consequences of potential facility accidents are also applicable to potential terrorist attacks. *Id.* at 4-145.

4.49 In Section 4.3 of the FEIS, the staff addressed the cumulative impacts of the proposed EREF and other identified past, present, and reasonably foreseeable projects, facilities, and activities within defined regions of interest (“ROIs”). NRC000134 at 4-147 to 4-160. For the proposed EREF, the chosen ROI radius was 16 kilometers (10 miles) for all resources except socioeconomics, for which the radius was 80 kilometers (50 miles). *Id.* Within these ROIs, the staff reviewed existing activities, known past impacts, and foreseeable new projects, and considered both direct and indirect impacts. *Id.* at 4-147 to 4-148.

4.50 Because preconstruction activities at the proposed EREF are not part of the proposed action, the staff considered the impacts of those activities as cumulative impacts. *Id.* at 4-148. Preconstruction activities were considered past activities for this purpose. Preconstruction impacts were discussed in the various resource area discussions in Sections 4.2.1 through 4.2.13 of the FEIS so that they could be presented alongside construction impacts of the proposed facility, which are part of the proposed action. In Section 4.2.14 of the FEIS, the staff compared preconstruction and construction impacts and estimated the fractions of the impacts in each resource area attributable to preconstruction and construction. *Id.* at 4-112 to 4-116.

4.51 The staff’s cumulative impacts analysis also includes the construction and operation of a proposed electrical transmission line and substation, and modifications to an

existing substation, in order to provide power for the proposed EREF. *Id.* at 4-148. The staff did not identify any additional past, current, or future developments within the 16-mile ROI, but did identify several projects within the 50-mile ROI that could contribute to regional socioeconomic impacts. *Id.*

4.52 The staff concluded that cumulative land use impacts would be small, because there are no reasonably foreseeable future activities that would result in a cumulative alteration of land use designations, and current land use within the proposed transmission line corridor (agricultural and open rangeland) is not expected to be restricted as a result of the new installation. NRC000134 at 4-149.

4.53 The staff concluded that cumulative impacts to historic and cultural resources would be small because site MW004 (the significant historic site identified on the proposed EREF site) represents a site type that is found throughout the region and that is unlikely to be removed from the region. NRC000134 at 4-149.

4.54 The staff concluded that cumulative impacts on visual and scenic resources would be small, because no additional development is reasonably foreseeable for the area, and because the proposed transmission line will largely follow the right-of-way of an existing transmission line and only a small portion of it will be visible from the trailhead at Hell's Half Acre Wilderness Study Area ("WSA"). NRC000134 at 4-150.

4.55 The staff concluded that cumulative impacts on air quality would be small. This conclusion is based on consideration of air quality impacts of possible expansions of local businesses and possible increases in energy sources to support operation of the proposed EREF. NRC000134 at 4-150. The staff determined that impacts from the former would be negligible, and impacts from the latter could not be quantified because there are no known specific plans to expand energy sources. *Id.* The staff also determined that cumulative impacts on air quality from construction and operation of the proposed transmission line would be small

because construction and operational (e.g., maintenance) activities would be relatively modest and of short duration, with limited contributions to air quality impacts. *Id.* at 4-151 to 4-152.

4.56 The staff concluded that cumulative impacts to geology and soils from construction and operation of the proposed EREF would be small because soil contamination would be minimized through use of best management practices (“BMPs”), mitigation measures to minimize erosion and control fugitive dust, and containment of potentially contaminated runoff and process effluents. NRC000134 at 4-152. The cumulative impacts to geology and soils from construction and operation of the proposed transmission line would also be small because soil-disturbing activities would occur primarily during a short construction period and impacts would be minimized using BMPs and mitigation measures. *Id.*

4.57 The staff concluded that cumulative impacts to water resources from construction and operation of the proposed EREF would be small. NRC000134 at 4-152 to 4-154. The proposed facility would have a small impact on the regional groundwater supply because water use at the facility would amount to less than one percent of the water reserves in the ESRP aquifer. *Id.* at 4-153. Potential contamination of surface and groundwater would be avoided or minimized through use of BMPs and mitigation measures, and containment of potentially contaminated runoff in lined stormwater retention basins. *Id.* The cumulative impacts of the proposed transmission line would also be small because soil-disturbing activities would occur primarily during a short construction period and impacts would be minimized through implementation of BMPs and mitigation measures. *Id.* at 4-153 to 4-154.

4.58 The staff considered the potential cumulative impacts of construction and operation of the proposed EREF and the associated transmission line on ecological resources. NRC000134 at 4-154 to 4-157. Agriculture, fragmentation, and grazing occurring in the vicinity of the proposed EREF have led to habitat loss and a decrease in habitat quality and are expected to continue in the future. *Id.* at 4-154. Losses could also occur due to further development in the area. *Id.* Construction and operation of the proposed EREF would result in

a minor contribution to losses and fragmentation of habitat in the area and ecoregion and would represent a small incremental addition to the cumulative impacts on habitat within the ROI and the ecoregion. *Id.* at 4-154 to 4-155. With regard to the proposed transmission line, most of the wildlife habitat within the transmission line corridor was previously fragmented by the existing transmission line and access roads, and the substation expansion would primarily affect cropland, not wildlife habitat. *Id.* at 4-155. Also, design measures would be employed to reduce potential impacts of the new transmission line on wildlife mortality. *Id.* at 4-156. Therefore, the staff concluded that cumulative impacts on ecological resources from construction and operation of the proposed EREF and the proposed transmission line would be small.

4.59 The staff concluded that the cumulative impacts from noise due to construction and operation of the proposed EREF and transmission line would be small because no other major industrial facilities are expected to be constructed in the vicinity, noise impacts from construction would be sporadic, and noise impacts to the proposed EREF from continuing activities at the Idaho National Laboratory (“INL”) would be small. NRC000134 at 4-157.

4.60 The staff concluded that cumulative transportation impacts associated with construction and operation of the proposed EREF would be small because the population density is low, there are no planned or proposed future actions that would contribute to cumulative transportation impacts, and current activities that affect cumulative impacts (e.g., transport of materials to INL) comprise less than two percent of current traffic flow on US 20. NRC000134 at 4-157. The staff also concluded that cumulative transportation impacts from construction and operation (e.g., maintenance) of the proposed transmission line would be small because the construction would use two existing access points on US 20, the number of construction vehicles would be small, additional daily vehicle trips would be less than two percent of the anticipated peak increase in daily traffic, and the duration of construction would be of short. *Id.*

4.61 The staff concluded that cumulative impacts on public and occupational health resulting from construction and operation of the proposed transmission line would be small because the level of effort required to construct and maintain the transmission line would be less than one percent of the level of effort needed to construct the proposed EREF and maintenance of the transmission line would have a minimal additional contribution to injury rates. NRC000134 at 4-158. Cumulative impacts to public health from chemical emissions during operation of the proposed EREF would be small because there are no other known or anticipated sources of HF emissions, and exposure from industrial chemical emissions in the region is currently very low. *Id.* Cumulative impacts from radiological sources at the proposed EREF would also be small because the annual collective population doses during operation of the proposed EREF and from operations at INL are so low that they cannot be monitored, and exposure at the EREF property boundary is expected to be low. *Id.*

4.62 The staff concluded that cumulative impacts from waste management would be small based on the expected small impact on waste management from construction and operation of the proposed EREF and the fact that no additional large developments that would significantly increase municipal waste disposal volume are expected in the Idaho Falls area. NRC000134 at 4-158. The cumulative impacts of the construction and operation of the proposed transmission line and substation would also be small because the anticipated number and volume of waste shipments for those activities would amount to less than one percent of those from preconstruction and construction of the proposed EREF. *Id.*

4.63 With regard to cumulative socioeconomic impacts, the staff identified several other proposed development projects within the 50-mile ROI that was considered for socioeconomic impacts, including the proposed transmission line and substation for the EREF and several residential and commercial developments. NRC000134 at 4-159. Although future projects would increase economic activity in the region and could lead to wage inflation, the workforce in the area is likely large enough to prevent this from being a major issue. *Id.* Also,

the magnitude of other impacts, such as price increases of construction materials, would likely be small. Based on these considerations, the staff concluded that cumulative socioeconomic impacts would be small. *Id.*

4.64 The staff concluded that cumulative environmental justice impacts would be small because construction and operation of the proposed EREF would not disproportionately affect minority and low-income populations living within the vicinity of the proposed EREF. NRC000134 at 4-159 to 4-160.

4.65 The staff considered the impacts of the no-action alternative, which would be not to construct, operate, and decommission the proposed EREF in Bonneville County, Idaho. NRC000134 at 4-160 to 4-164. In its assessment of these impacts, the staff did not consider the impacts of preconstruction activities, some or all of which are expected to have already occurred in advance of the licensing decision. *Id.* at 4-160 to 4-161.

4.66 The staff concluded that if the nation's need for enriched uranium were to continue to increase, requiring construction and operation of another domestic enrichment facility at a different location, impacts in each resource area could range from small to large. NRC000134 at 4-161. These impacts could be similar to those of the proposed action, depending on facility- and site-specific factors. *Id.* at 4-161.

4.67 The staff considered the site-specific impacts of the no-action alternative and concluded that these impacts would range from small to moderate. NRC000134 at 4-161 to 4-164.

4.68 Specifically, under the no-action alternative, impacts to local land use would be small because the designated zoning of the property would remain in place and current uses of grazing and farming could resume. NRC000134 at 4-162.

4.69 Under the no-action alternative, impacts to historic and cultural resources would be small to moderate. NRC000134 at xl, 4-162. The removal of site MW004, which would have already occurred, resulted in a large impact, but that impact was mitigated to moderate because

professional excavation and data recovery were used and because other homestead sites of this type can be found in the region. *Id.*

4.70 Under the no-action alternative, impacts to visual and scenic resources would be small. NRC000134 at xli, 4-162. No visual intrusions to the existing landscape would occur, as no large industrial structures would be constructed and the existing natural character of the area would remain intact. *Id.*

4.71 Impacts to air quality would be small under the no-action alternative because the expected impacts from agricultural use (e.g., release of pollutants from vehicles and equipment, release of fugitive dust during tilling) would be substantially less than those of preconstruction and the proposed action. NRC000134 at 4-162.

4.72 Under the no-action alternative, impacts to geology and soils would be small, because no additional land disturbance from construction would occur and the land could revert back to crop and grazing activities. NRC000134 at 4-162.

4.73 Impacts to water resources would also be small under the no-action alternative, because no changes from current rates of water usage, and no changes in groundwater or surface water quality, would be expected if agricultural activities were to resume at the site. NRC000134 at 4-163.

4.74 Under the no-action alternative, impacts on ecological resources would be small. NRC000134 at 4-163. Although impacts would occur during preconstruction activities that are slated to take place regardless of NRC's licensing decision, there would be no additional land disturbance on the property due to construction and operation, and revegetation of the site, with renewal of some wildlife habitat, could occur. *Id.*

4.75 Under the no-action alternative, noise impacts would be small because construction, operation, and decommissioning would not occur, and noise impacts would be limited to those of previous land uses, such as grazing and farming. NRC000134 at 4-163.

4.76 Under the no-action alternative, transportation impacts would be small because traffic volumes and patterns would remain the same and the current volume of radioactive material and chemical shipments to or from other facilities would not increase. NRC000134 at 4-163.

4.77 Under the no-action alternative, there would be no impacts to workers from construction, operation, and decommissioning and no impacts to workers or the public from chemical and radioactive hazards. NRC000134 at 4-163. If land uses such as grazing and agriculture resumed, impacts would be small. *Id.*

4.78 Under the no-action alternative, impacts from waste management would be small, because there would be no new wastes generated from construction, operation, or decommissioning of the proposed EREF. NRC000134 at 4-163.

4.79 Socioeconomic impacts would be small under the no-action alternative because socioeconomic conditions in the region would remain unchanged. NRC000134 at 4-164.

4.80 Under the no-action alternative, environmental justice impacts would be small because no high or adverse impacts would be expected. NRC000134 at 4-164.

4.81 Under the no-action alternative, accident impacts would be small because there would be no facility accidents during operation if the proposed EREF is not constructed. NRC000134 at 4-164.

F. FEIS, Chapter 5, "Mitigation"

4.82 In Chapter 5 of the FEIS, the staff summarized the potential mitigation measures identified by the Applicant, and proposed additional potential mitigation measures for impacts of the proposed EREF project. NRC000134 at 5-1 to 5-24. The additional potential mitigation measures identified by the staff are suggestions the staff developed following its evaluation of the potential environmental impacts for the proposed EREF. NRC000136 at 3. See *also* NRC000176 at 5-9. These potential mitigation measures are non-binding on the Applicant

and would not become part of the license as conditions. NRC000136 at 3. See also NRC000176 at 5-9.

G. FEIS, Chapter 6, “Environmental Measurement and Monitoring Programs”

4.83 In Chapter 6 of the FEIS, the staff describes the Applicant’s proposed Effluent Monitoring Program (“EMP”) and Radiological Environmental Monitoring Program (“REMP”). NRC000134 at 6-1 to 6-9. In its presentation on the REMP at the environmental hearing, the staff (K. Fischer<sup>3</sup>) clarified that the EMP and the REMP are two complementary, but different, components of the overall radiological monitoring program at the proposed EREF. Tr. at 578. The staff’s presentation contained a comprehensive overview of the features of each of these programs. Tr. at 583-615. Chapter 6 also describes the planned nonradiological monitoring programs at the proposed EREF, including physiochemical monitoring, liquid effluents, stormwater, environmental media, meteorology, and biota. NRC000134 at 6-11 to 6-24.

4.84 The EMP addresses the monitoring, recording, and reporting of data for radiological contaminants emitted from specific points. NRC000134 at 6-1, 6-2 to 6-5, 6-7 to 6-8; NRC000207 at 7; Tr. at 583, 586. In its presentation at the hearing, the staff confirmed that all gaseous and liquid effluent discharge points at the proposed EREF would be continuously monitored. NRC000207 at 9; Tr. at 588.

4.85 The REMP will address monitoring of general environmental media, including ambient air, groundwater, stormwater and basin sediment, soil and vegetation, and direct radiation within and outside the proposed EREF property boundary. NRC000134 at 6-1; NRC000207 at 7; Tr. at 583. In the FEIS, as well as in its presentation at the hearing, the staff described the number of samples, sampling frequency, and sampling locations for each aspect of the REMP. NRC000134 at 6-6 to 6-7, 6-9 to 6-11; NRC000207 at 15-22; Tr. at 596-605.

4.86 The staff also noted that the Applicant followed the recommendations of NUREG-1302, “Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent

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<sup>3</sup> Statement of Professional Qualifications for Karl Fischer (filed May 2, 2011) (NRC000152).

Controls for Boiling Water Reactors,” (April, 1991) (NRC000210) in determining the number and placement of sampling locations for both the EMP and the REMP. NRC000207 at 9, 14; Tr. at 607.

4.87 In its presentation at the hearing, the staff discussed the Applicant’s plans for monitoring of cylinders in the storage pad area. NRC000207 at 13; Tr. at 593-95. Although monitoring procedures are not explicitly included in the EMP or the REMP, the staff noted that AES intends to implement monitoring procedures for the cylinders in the storage pad area. Tr. at 593-94. The staff explained that stormwater runoff from the cylinder pads would be discharged to two lined cylinder pad retention basins, and that discharge from those basins would occur only through evaporation. Tr. at 594. The staff noted that the Applicant’s cylinder management program is intended to mitigate or prevent releases through inspection and maintenance, and described basic features of that program, including annual inspections, replacement and disposal of defective cylinders, and root cause determinations. Tr. at 594-95.

4.88 In its presentation at the hearing, the staff (K. Fischer and B. Biwer<sup>4</sup>) discussed the likelihood that uranium tetrafluoride plugs would form to seal small leaks of UF<sub>6</sub> or its reaction products. NRC000207 at 26; Tr. at 610-13. The staff (B. Biwer) indicated that even in the low humidity environment of the proposed EREF, such leaks would seal fairly quickly. Tr. at 613.

4.89 The staff (K. Fischer) noted that the sufficiency and adequacy of the effluent and environmental monitoring programs with respect to 10 CFR Parts 20 and 70 requirements were addressed during the staff’s safety review, and not as part of the environmental review and preparation of the FEIS. NRC000207 at 3; Tr. at 578-79.

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<sup>4</sup> Statement of Professional Qualifications for Bruce M. Biwer (filed May 2, 2011) (NRC000151).

4.90 At the hearing, the staff (D. Seymour<sup>5</sup>) explained that the NRC inspection program will ensure that all radiological monitoring is properly implemented, adequately tested, and fully capable prior to the receipt of special nuclear material, during operations, and to completion of decommissioning. NRC000207 at 27-34; Tr. at 615-621.

H. FEIS, Chapter 7, "Benefit-Cost Analysis"

4.91 In Chapter 7 of the FEIS, the staff conducted a benefit-cost analysis of the proposed action. NRC000134 at xliii-xliv, 7-1 to 7-12. A benefit-cost analysis can provide a rationale for deciding whether a project is likely to have a net positive economic impact, by aggregating each of the costs and benefits resulting from the project. *Id.* at 7-1. While there are national energy security and fiscal benefits associated with the proposed EREF, and local socioeconomic benefits in the 11-county ROI in which the proposed EREF would be located, there are also direct costs associated with the preconstruction, construction, and operation phases of the proposed project, as well as impacts on various resource areas. *Id.* at xliii, 7-1 to 7-12. However, the staff determined that these impacts are small in magnitude and small in comparison to the local and national benefits of the proposed action. *Id.* at xliii, 7-10.

4.92 Although the no-action alternative, as defined in the FEIS, would include the continuation of enriched uranium production using gaseous diffusion technology and imported enriched uranium supplies, in order to satisfy domestic demand, the staff concluded that the proposed action better satisfied DOE's policy and technical objectives. NRC000134 at 7-8 to 7-11. These objectives require meeting future demand for enriched uranium and improved national energy security with the desired technology upgrades. *Id.* at 7-9 to 7-11. Additionally, the staff determined that, under the proposed action, there would be fewer emissions of criteria pollutants and carbon. *Id.* at 7-10 to 7-11. The staff concluded that, in comparison to the no-action alternative, the proposed action has significant net positive benefits. *Id.* at xliii, 7-10 to 7-11.

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<sup>5</sup> Statement of Professional Qualifications for Deborah Seymour (filed January 14, 2011) (NRC000121).

I. FEIS, Chapter 8, “Summary of Environmental Consequences”

4.93 As required by Section 102(2)(C)(ii) of NEPA, Section 8.1 of the FEIS discusses adverse environmental effects that cannot be avoided if the proposed action is implemented. The staff found that unavoidable impacts would be greater than small in five areas: historic and cultural resources, visual and scenic resources, ecological resources, transportation, and air quality. NRC000134 at 8-3.

4.94 The removal of site MW004 resulted in an unavoidable impact on historic and cultural resources. NRC000134 at 8-3 to 8-4. However, because AES implemented mitigation measures prior to removal, this impact was moderate. *Id.* at 8-4. Unavoidable small to moderate impacts to visual and scenic resources would occur because of the marked contrast between the proposed EREF and the surrounding visual environment. *Id.* As discussed in Section 8.1 of the FEIS, unavoidable moderate impacts to ecological resources would occur during preconstruction and construction due to the removal of sagebrush steppe and pasture vegetation, generation of fugitive dust, erosion, and some wildlife mortality and relocation. *Id.* Unavoidable transportation impacts due to increased traffic density (primarily from commuting workers) would be small to moderate. *Id.* And finally, temporary but unavoidable moderate to large air quality impacts would occur during preconstruction and construction, due to ground-disturbing activities that result in increased fugitive dust emissions. *Id.*

4.95 Section 8.2 of the FEIS discusses the relationship between local short-term uses of the environment and maintenance and enhancement of long-term productivity. NRC000134 at 8-4 to 8-5. The staff found that short-term commitments of resources during preconstruction, construction, and operation would include the use of construction materials and transportation resources, and land, energy and water resources. *Id.* at 8-4 to 8-5. These short-term uses would result in long-term socioeconomic benefits, such as improving the local economy and infrastructure and maintaining a skilled worker base. *Id.* at 8-5. Because the proposed EREF site would be decommissioned for unrestricted use, the buildings and site would be available for

other industrial uses in the long term, resulting in continued employment and economic benefits. *Id.*

4.96 Section 8.3 of the FEIS discusses irreversible and irretrievable commitment of resources associated with the proposed EREF project. NRC000134 at 8-5 to 8-6. Irreversible commitments of resources include the use of the 240-hectare (592-acre) parcel of land for industrial purposes, consumptive use of groundwater from the ESRP aquifer during preconstruction, construction, and operation of the proposed EREF, dedication of land to upgrade the electrical transmission line, and the use of building materials. *Id.* at 8-6. During operation, production of natural UF<sub>6</sub> feed material would result in the irretrievable use of uranium minerals and resources associated with mining, processing, and conversion. *Id.* at 8-6. Finally, during operation and decommissioning, irreversible and irretrievable commitments of resources would be associated with the disposal of a small amount of nonrecyclable wastes, as well as wastes generated during conversion of depleted UF<sub>6</sub>. *Id.*

4.97 Based on our review of the FEIS, we conclude that the staff has a reasonable basis for its conclusions, and that the record is sufficient to satisfy the staff's obligations under NEPA and the Commission's implementing regulations in 10 C.F.R. Part 51.

## V. CONCLUSIONS OF LAW

5.1 Based on our review of the entire record of this proceeding and the foregoing findings of fact, the Board makes the following determinations on the ultimate issues concerning the mandatory hearing on environmental matters.

5.2 As an initial matter, the Board finds that the Application and record of the proceeding contain sufficient information to support license issuance.

5.3 With respect to environmental issues, the Board finds that the staff's review of the Application pursuant to NEPA has been adequate, in accordance with 10 C.F.R. § 2.104(b)(2)(ii). In addition, the Board finds that the requirements of Section 102(2)(A), (C) and (E) of NEPA and the applicable regulations in 10 C.F.R. Part 51, Subpart A have been met.

5.4 Based on an independent review of the final balance of environmental considerations and the reasonable alternatives to the proposed EREF, the Board finds the protection of the environment does not require denial or conditioning of the license.

Respectfully submitted,

**/signed (electronically) by/**

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Dated at Rockville, Maryland  
this 12th day of August, 2011.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
AREVA ENRICHMENT SERVICES LLC	)	Docket No. 70-7015-ML
	)	
(Eagle Rock Enrichment Facility)	)	ASLBP No. 10-899-02-ML-BD01

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing “NRC STAFF’S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW CONCERNING MANDATORY HEARING ON ENVIRONMENTAL MATTERS” in the above-captioned proceeding have been served via the Electronic Information Exchange (“EIE”) this 12th day of August, 2011, which to the best of my knowledge resulted in transmittal of copies to those on the EIE Service List for the above-captioned proceeding.

**/signed (electronically) by/**  
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