

TABLE OF CONTENTS

	Page
9.0 ENVIRONMENTAL PROTECTION.....	9.0-1
9.1 ENVIRONMENTAL REPORT.....	9.1-1
9.1.1 Date of Application.....	9.1-1
9.1.2 Environmental Considerations.....	9.1-1
9.1.3 Analysis of Effects of Proposed Action and Alternatives	9.1-3
9.1.4 Status of Compliance.....	9.1-3
9.1.5 Adverse Information.....	9.1-4
9.2 ENVIRONMENTAL PROTECTION MEASURES.....	9.2-1
9.2.1 Radiation Safety	9.2-1
9.2.2 Effluent and Environmental Controls and Monitoring	9.2-1
9.2.3 Integrated Safety Analysis	9.2-3
9.3 REFERENCES.....	9.3-1

LIST OF TABLES

None

LIST OF FIGURES

None

9.0 ENVIRONMENTAL PROTECTION

AREVA Enrichment Services (AES) has prepared documents to demonstrate that its proposed environmental protective measures are adequate to protect the environment and the health and safety of the public as well as comply with the regulatory requirements imposed in 10 CFR 20 (CFR, 2008a), 10 CFR 30 (CFR, 2008b), 10 CFR 40 (CFR, 2008c), 10 CFR 51 (CFR, 2008d), and 10 CFR 70 (CFR, 2008e). The scope of information in this section of the Environmental Report (ER) is the same as previously reviewed by the Nuclear Regulatory Commission (NRC) for the National Enrichment Facility (NEF) (LES, 2005) and found acceptable by the NRC in NUREG-1827 (NRC, 2005).

Summarized below are the Safety Analysis Report (SAR) chapter section, general information category, the corresponding 10 CFR regulatory requirement, and the NUREG-1520 (NRC, 2002) section that identifies criteria that is acceptable to the NRC.

SAR Chapter Section	General Information Category	10 CFR Citation	NUREG-1520 Reference Section
9.1	Environmental Report	70.21(h)	9.4.3.1.1
9.1.1	Date of Application	70.21(f)	9.4.3.1.1(1)
9.1.2	Environmental Considerations	51.45(b)	9.4.3.1.1(2)
9.1.3	Analysis of Effects of Proposed Action and Alternatives	51.45(c)	9.4.3.1.1(3)
9.1.4	Status of Compliance	51.45(d)	9.4.3.1.1(4)
9.1.5	Adverse Information	51.45(e)	9.4.3.1.1(5)
9.2	Environmental Protection Measures	70.22(a)(8)	9.4.3.2
9.2.1	Radiation Safety	20.1101(a)	9.4.3.2.1
	ALARA Controls and Reports	20.1101(d)	9.4.3.2.1(1)-(3)
	Waste Minimization	20.1406	9.4.3.2.1(4)
9.2.2	Effluent and Environmental Controls and Monitoring	70.59(a)(1)	9.4.3.2.2
9.2.2.1	Effluent Monitoring	20.1501(a)	9.4.3.2.2(1)
9.2.2.2	Environmental Monitoring	20.1501(a)	9.4.3.2.2(2)
9.2.2.3	ISA Summary	70.65(b)	9.4.3.2.2(3)

This Safety Analysis Report (SAR) Chapter documents the potential environmental impacts associated with construction and operation of the EREF and indicates that adverse impacts are small. These impacts are outweighed by the substantial socioeconomic benefits associated with plant construction and operation. Additionally, the EREF will meet the underlying need for additional reliable and economical uranium enrichment capacity in the United States, thereby serving important energy and national security policy objectives. Accordingly, because the impacts of the proposed EREF are minimal and acceptable, and the benefits are desirable, the no-action alternative may be rejected in favor of the proposed action.

9.1 ENVIRONMENTAL REPORT

AES has prepared an Environmental Report (ER) that meets the requirements contained in 10 CFR Part 51 (CFR, 2008d), Subpart A. In particular, the ER addresses the requirements in 10 CFR 51.45(b)-(e) (CFR, 2008f) and follows the general format of NUREG-1748 (NRC, 2003).

The ER presents the proposed action, purpose of the proposed action, and applicable regulatory requirements (Chapter 1); discusses alternatives (Chapter 2); describes the facility and the affected environment (Chapter 3); and describes potential impacts of the proposed action (Chapter 4). Mitigation measures are described in Chapter 5, environmental measurements and monitoring programs in Chapter 6, a cost-benefit analysis in Chapter 7, and a summary of environmental consequences in Chapter 8. References and preparers are listed in Chapters 9 and 10, respectively.

9.1.1 Date of Application

The effective date of the ER is December 30, 2008. As required by 10 CFR 70.21(f) (CFR, 2008g), this date is at least nine months before facility construction is scheduled to begin in February, 2011.

9.1.2 Environmental Considerations

Applicant's ER adequately addresses the requirements of 10 CFR 51.45(b) (CFR, 2008f) as follows.

9.1.2.1 Description of Proposed Action

The proposed action, described in ER Section 1.2, Proposed Action, is the issuance of an NRC specific license under 10 CFR 30 (CFR, 2008b), 10 CFR 40 (CFR, 2008c) and 10 CFR 70 (CFR, 2008e) to possess and use byproduct material, source material and special nuclear material (SNM) and to construct and operate a uranium enrichment facility in Bonneville County, Idaho. The enriched uranium is intended for use primarily in domestic commercial nuclear power plants.

Significant characteristics of the facility are described in ER Chapter 1, Introduction of the Environmental Report and Chapter 3, Description of Affected Environment. Major site features, along with plant design and operating parameters are included. A discussion of how the special nuclear material (SNM), in this case uranium hexafluoride (UF₆), will be processed to produce enriched uranium-235 (²³⁵U) is described in ER Section 1.2, Proposed Action, which also includes the proposed project schedule.

9.1.2.2 Purpose of Proposed Action

ER Section 1.1, Purpose and Need for the Proposed Action, demonstrates the need for the facility. The demonstration provides the:

- Quantities of SNM used for domestic benefit
- A projection of domestic and foreign requirements for services
- Alternative sources of supply for AES' proposed services.

ER Section 1.1, Purpose and Need for the Proposed Action, also discusses if delay of the facility occurs, the effects to the nation's energy program or AES's business such as loss of contracts.

9.1.2.3 Description of the Affected Environment

Chapter 3 of the ER contains detailed descriptions of the affected environment. The chapter provides a baseline characterization of the site and its environs prior to any disturbances associated with construction or operation of the facility. The following topics and corresponding ER chapter section include:

- Site location (including longitude and latitude) and facility layout (1.2)
- Regional demography (3.10) and land use (3.1)
- Socioeconomic information (3.10), including low-income and minority populations within 130 km² (50 mi²) as directed by NUREG-1748 (4.11)
- Regional historic (3.8), archeological (3.8.), architectural (3.9), scenic (3.9), cultural (3.8), and natural landmarks (3.9)
- Local meteorology and air quality (3.6)
- Local surface water and ground water hydrology (3.4)
- Regional geology and seismology (3.3)
- Local terrestrial and aquatic ecology (3.5).

The baseline descriptions presented are from the most current information available. It was gathered from federal, state, and county sources along with on-site data. Therefore, the information represents both seasonal and long-term environmental trends.

9.1.2.4 Discussion of Considerations

Three ER chapters discuss the potential environmental impacts relating to the proposed action. Chapter 4 details environmental and socioeconomic effects due to site preparation and facility construction and operation. Chapter 2 describes alternatives to the proposed action, including siting and designs. Chapter 7 provides a discussion of the costs and benefits for each alternative as well as the relationship between short-term use and long-term productivity of the environment, and resources committed. In addition, Chapter 8 provides a summary of environmental consequences from all actions. The associated regulatory criteria and corresponding ER section are as follows:

A. Impact of the Proposed Action on the Environment

- Effects of site preparation and construction on land and water use (4.1 and 4.4)
- Effects of facility operation on human population (including consideration of occupation and public radiation exposure) and important biota (4.10, 4.11, and 4.12)
- Any irreversible commitments of resources because of site preparation and facility construction and operation, such as destruction of wildlife habitat, removal of land from agriculture, and diversion of electrical power (4.1, 7.0, and 8.2)
- Plans and policies regarding decommissioning and dismantling at the end of the facility's life (8.9)

- Environmental effects of the transportation of radioactive materials to and from the site (4.2)
- Environmental effects of accidents (4.12)
- Impacts on air and water quality (4.6 and 4.4)
- Impacts on cultural and historic resources (4.8).

B. Adverse Environmental Effects

Three chapters in the ER discuss adverse environmental effects. Refer to Section 9.1.5 below for additional detail on the associated ER chapters and topics.

C. Alternatives to the Proposed Action

ER Chapter 2 provides a complete description of alternatives to the proposed action. Included are the no action alternative scenarios as well as the siting criteria and technical design requirements in sufficient detail to allow a fair and reasonable comparison between the alternatives.

D. Relationship between Short- and Long-term Productivity

ER Chapter 7, the cost-benefit analysis, included the consideration of the short-term uses and productivity of the site during the active life of the facility. No adverse impacts on the long-term productivity of the environment after decommissioning of the facility have been identified. The European experience at the Almelo enrichment plant demonstrates that a centrifuge technology site can be returned to a greenfield site for use without restriction.

E. Irreversible and Irrecoverable Commitments of Resources

Irreversible environmental commitments and irretrievable material resources also are included in the cost-benefit analysis in ER Chapter 7. They are part of the capital costs associated with the land and facility and operating and maintenance costs. No significant commitments are involved with the proposed action. The site should be available for unrestricted use following decommissioning. Some components may be reused or sold as scrap during the plant life or following decommissioning.

9.1.3 Analysis of Effects of Proposed Action and Alternatives

ER Chapter 2 discusses the analysis of effects of the proposed action and alternatives in accordance with 10 CFR 51.45(c) (CFR, 2008f). The analysis considers and balances the environmental effects of the proposed action and alternatives available to reduce or avoid both environmental and socioeconomic effects and other benefits of the proposed action.

9.1.4 Status of Compliance

ER Section 1.3 summarizes, as required in 10 CFR 51.45(d) (CFR, 2008f), the applicability of environmental regulatory requirements, permits, licenses, or approvals as well as the current status of each on the effective date of the ER.

Many federal laws and regulations apply to the facility during site assessment, construction, and operation. Some of these laws require permits from, consultations with, or approvals by, other governing or regulatory agencies. Some apply only during certain phases of facility development, rather than the entire life of the facility. Federal statutes and regulations (non-nuclear) have been reviewed to determine their applicability to the facility site assessment, construction, and operation.

9.1.5 Adverse Information

In accordance with 10 CFR 51.45(e) (CFR, 2008f), various sections throughout the ER discuss adverse environmental effects. In particular, Chapter 4 details environmental and socioeconomic effects due to site preparation and facility construction and operation. Chapter 2 compares potential impacts from alternatives. Lastly, Chapter 8 provides a summary of environmental consequences from all actions.

9.2 ENVIRONMENTAL PROTECTION MEASURES

AES is committed to protecting the public, plant workers, and the environment from the harmful effects of ionizing radiation due to plant operation. Accordingly, AES is firmly committed to the "As Low As Reasonably Achievable," (ALARA) philosophy for all operations involving source, byproduct, and special nuclear material. This commitment is reflected in written procedures and instructions for operations involving potential exposures of personnel to radiation (both internal and external hazards) and the facility design. Written procedures for effluent monitoring address the need for periodic (monthly) dose assessment projections to members of the public to ensure that potential radiation exposures are kept ALARA (i.e., not in excess of 0.1 mSv/yr (10 mrem/yr)) in accordance with 10 CFR 20.1101(d).

Parts of AES's environmental protective measures are described in the ER. In particular, Chapter 4 discusses the anticipated results of the radiation protection program with regard to ALARA goals and waste minimization. Chapter 6 discusses the environmental controls and monitoring program.

A detailed description of AES' radiation protection program is included separately in this License Application as Safety Analysis Report (SAR) Chapter 4. Similarly, AES's provisions for a qualified and trained staff, which also is part of the environmental protection measures required, are established by the personnel qualifications of the management and supervisory staff as well as formal training for facility employees, as described in SAR Chapter 2, Organization and Administration.

9.2.1 Radiation Safety

The four acceptance criteria that describe the facility radiation safety program are divided between two License Application documents. SAR Chapter 4 describes:

- Radiological (ALARA) goals for effluent control
- ALARA reviews and reports to management.

ER Chapter 4, Environmental Impacts, addresses:

- Effluent controls to maintain public doses ALARA, and
- Waste minimization.

In particular, ER Section 4.12 describes public and occupational health effects from both non-radiological and radiological sources. This section specifically addresses calculated total effective dose equivalent to an average member of critical groups or calculated average annual concentration of radioactive material in gaseous and liquid effluent to maintain compliance with 10 CFR 20 (CFR, 2008a).

ER Section 4.13 contains a discussion on facility waste minimization that identifies process features and systems to reduce or eliminate waste. It also describes methods to minimize the volume of waste.

9.2.2 Effluent and Environmental Controls and Monitoring

AES has designed an environmental monitoring program to provide comprehensive data to monitor the facility's impact on the environment. The preoperational program will focus on collecting data to establish baseline information useful in evaluating potential changes in

environmental conditions caused by facility operation. The preoperational program will be initiated at least two years prior to facility operation.

The operational program will monitor to ensure facility emissions are maintained ALARA. Sampling focuses on locations within the site perimeter, but may also include distant locations as control sites. Sampling locations have been determined based on NRC guidance found in the document, "Off-site Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors" (NRC, 1991), meteorological information, and current land use. The sampling locations may be subject to change as determined from the results of periodic review of land use.

ER Chapter 6 describes the environmental measurement and monitoring programs as they apply to preoperation (baseline), operation, and decommissioning conditions for both the proposed action and each alternative.

9.2.2.1 Effluent Monitoring

ER Section 6.1, Radiological Monitoring, presents information relating to the facility radiological monitoring program. This section describes the location and characteristics of radiation sources and radioactive effluent. It also describes the various elements of the monitoring program, including:

- Number and location of sample collection points
- Measuring devices used
- Pathway sampled or measured
- Collection frequency and duration
- Method and frequency of analysis, including lower limits of detection.

Based on recorded plant effluent data, dose projections to members of the public will be performed monthly to ensure that the annual dose to members of the public does not exceed the ALARA constraint of 0.1 mSv/yr (10 mrem/yr) from air emissions and radioactive materials. If the monthly dose impact assessment indicates a trend in effluent releases that, if not corrected, could cause the ALARA constraint to be exceeded, appropriate corrective action will be initiated to reduce the discharges to assure that subsequent releases will be in compliance with the annual dose constraint. In addition, an evaluation of the need for increased sampling will be performed. Corrective actions may include, for example, change out of Separation Building or Technical Support Building Gaseous Effluent Vent System filters.

Lastly, Section 6.1 of the ER justifies the choice of sample locations, analyses, frequencies, durations, and lower limits of detection.

9.2.2.2 Environmental Monitoring

ER Section 6.0, Environmental Measurements and Monitoring Programs, also includes information relating to the facility environmental monitoring program. The information presented is the same as that included in the effluent monitoring program, i.e., number and location of sample collection points, etc.

9.2.3 Integrated Safety Analysis

AES has prepared an integrated safety analysis (ISA) in accordance with 10 CFR 70.60 (CFR, 2008h). The ISA:

- Provides a complete list of the accident sequences that if uncontrolled could result in radiological and non-radiological releases to the environment with intermediate or high consequences.
- Provides reasonable estimates for the likelihood and consequences of each accident identified.
- Applies acceptable methods to estimate environmental effects that may result from accidental releases.

The ISA also

- Identifies adequate engineering and/or administrative controls for each accident sequence of environmental significance
- Assures adequate levels are afforded so those items relied on for safety (IROFS) will satisfactorily perform their safety functions.

The ISA demonstrates that the facility and its operations have adequate engineering and/or administrative controls in place to prevent or mitigate high and intermediate consequences from the accident sequences identified and analyzed.

9.3 REFERENCES

CFR, 2008a. Title 10, Code of Federal Regulations, Part 20, Standards for Protection Against Radiation, 2008.

CFR, 2008b. Title 10, Code of Federal Regulations, Part 30, Rules of General Applicability to Domestic Licensing of Byproduct Material, 2008.

CFR, 2008c. Title 10, Code of Federal Regulations, Part 40, Domestic Licensing of Source Material, 2008.

CFR, 2008d. Title 10, Code of Federal Regulations, Part 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions, 2008.

CFR, 2008e. Title 10, Code of Federal Regulations, Part 70, Domestic Licensing of Special Nuclear Material, 2008.

CFR, 2008f. Title 10, Code of Federal Regulations, Section 51.45, Environmental report, 2008.

CFR, 2008g. Title 10, Code of Federal Regulations, Section 70.21, Filing, 2008

CFR, 2008h. Title 10, Code of Federal Regulations, Section 70.60, Applicability, 2008.

LES, 2005. National Enrichment Facility Safety Analysis Report, Revision 7, June 2005.

NRC, 1991. Off-site Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors, NUREG-1302, U.S. Nuclear Regulatory Commission, 1991.

NRC, 2003. Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, Final Report, NUREG-1748, U.S. Nuclear Regulatory Commission, August 2003.

NRC, 2002. Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility, NUREG-1520, U.S. Nuclear Regulatory Commission, March 2002.

NRC, 2005. Safety Evaluation Report for the National Enrichment Facility in Lea County, New Mexico; Docket 70-3103; Louisiana Energy Services, June 2005.