AREVA

June 24, 2013

10 CFR 70.34

AES-O-NRC-13-02687

ATTN: Document Control Desk
Director, Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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

Subject: License Amendment Request (LAR) 13-02, Request to Modify Materials License SNM-2015, License Condition #10

Pursuant to 10 CFR 70.34, AREVA Enrichment Services LLC (AES) hereby requests a license amendment to modify the AES License SNM-2015. This amendment proposes to modify License Condition #10 to remove the Environmental Report (ER) from the list of identified License documents. As currently written, License Condition #10 presents a list of documents, including the ER, that must be updated as changes are made to the facility. It is AES' understanding from discussions with the Staff that the ER is included in this list because certain information in the Environmental Report was used to support conclusions reached in the Eagle Rock Enrichment Facility (EREF) Safety Evaluation Report (SER), NUREG-1951. To remove the ER from the list of License documents, AES is proposing to incorporate the relevant text from ER Sections 6.1.1 and 6.1.2, which was relied on in the SER, into the proposed revision to Section 9.2 of the Safety Analysis Report (SAR). Upon approval of this LAR, future revisions and/or supplements to the Environmental Report will only be necessary for significant environmental changes consistent with the requirements of 10 CFR 51.60.

Enclosure 1 provides the details of the proposed change and includes a technical and regulatory evaluation of the change. Enclosure 2 provides the proposed change (both marked-up pages with references to the ER source material as well as the revised pages themselves are provided) associated with the proposed Safety Analysis Report (SAR) revision. Enclosure 3 provides a mark-up of License Condition #10. Enclosure 4 provides the SUNSI marked-up page associated with the SAR (Figure 9.2-1) and AES requests this information be withheld from public disclosure in accordance with 10 CFR 2.390.

Approval of the proposed amendment is requested by November 1, 2013.

NMSS01

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If there are any questions or if additional information is needed, please contact Mr. James A. Kay, Licensing Manager, at 508-573-6554.

Respectfully,

George A. Harper
Vice President, Engineering and Licensing

Enclosures:

1. Description and Evaluation of the Proposed Change
2. Proposed Revised Pages of Safety Analysis Report
3. Proposed Markup of License Condition #10
4. SUNSI Marked-up Page of SAR

cc: Deborah Seymour, Branch Chief, Construction Projects Branch 1, NRC Region II
James Smith, NRC Senior Project Manager, NMSS

ENCLOSURE 1

Description and Evaluation of the Proposed Change

Subject: LAR 13-02, Modification of Materials License SNM-2015, License Condition #10

DESCRIPTION OF CHANGE

AES proposes to modify License Condition #10 of Materials License SNM-2015, by removing the Environmental Report from the list of identified License documents.

BACKGROUND

The EREF Environmental Report (ER) was prepared as required by 10 CFR 70.21(h) to support the License Application for the Eagle Rock Enrichment Facility.

> *70.21 (h) A license application for a uranium enrichment facility must be accompanied by an Environmental Report required under subpart A of part 51 of this chapter.*

The ER addresses the applicable NRC guidance provided in NUREG-1748 and provides the AES assessment of the environmental impacts of the EREF proposed action (and reasonable alternatives) for the purpose of the NRC's National Environmental Policy Act (NEPA) process and preparation of an Environmental Impact Statement (EIS) [see NUREG-1945] and the Finding of No Significant Impact. Following a hearing held in 2011, the Atomic Safety and Licensing Board (ASLB) concluded that:

> *"having reviewed the basis for the staff's NEPA/environmental-related conclusions, the Board determines that (1) the application and record of the proceeding contain sufficient information to support license issuance; (2) the staff's review of the application has been adequate to support findings to be made by the NMSS Director with respect to whether (a) the application satisfies the standards set forth in the Commission's hearing notice and the applicable standards in 10 C.F.R. Parts 30, 40, and 70, and (b) the requirements of NEPA and the agency's implementing regulations in Part 51 have been met; and (3) the review conducted by the staff pursuant to 10 C.F.R. Part 51 has been adequate. Further, after considering the final balance among conflicting factors in the record of this proceeding, the Board concludes that (1) the requirements of NEPA section 102(2)(A), (C), and (E) and 10 C.F.R. Part 51, Subpart A, have been complied with in the proceeding; and (2) after independently weighing the environmental, economic, technical, and other benefits against the environmental and other costs, and considering reasonable alternatives, the license requested under the AES application at issue in this proceeding should be issued."*

This completed the NEPA process.

Future revisions and updating of the ER are under the specific provisions of 10 CFR 51.60. Specifically, 10 CFR 51.60(b) (1) and (2) require an update and/or supplement for either of the following conditions:

a) Renewal of a license.
b) Issuance of an amendment that would authorize or result in a significant expansion of a site, a significant change in the types of effluents, a significant increase in the amounts of effluents, a significant increase in individual or cumulative occupational radiation exposure, or a significant increase in the potential for or consequences from radiological accidents.

As currently written, including the ER in the list of License documents in License Condition #10, the Materials License requires the ER to be updated as changes are made to the facility. License Condition #10 of SNM-2015 states the following:

> *The licensee shall conduct authorized activities at the EREF in accordance with the statements, representations, and conditions as described in the documents listed below (or licensee revisions to those documents in accordance with Section 19 of the Quality Assurance Program Description; Title 10 of the Code of Federal Regulation (10 CFR) 40.35(f), 10 CFR 51.22, 10 CFR 70.32, 10 CFR 70.72, or 10 CFR 95.19; or License Conditions 13 or 24):*
>
> *a) Application for Material License, transmittal letter dated December 30, 2008 and supplemental transmittal letters dated April 23, 2009, April 30, 2010, and May 16, 2011.*
>
> *i. Eagle Rock Enrichment Facility Safety Analysis Report*
> *ii. Eagle Rock Enrichment Facility Environmental Report*
> *iii. Eagle Rock Enrichment Facility Physical Security Plan*
> *iv. Eagle Rock Enrichment Facility Fundamental Nuclear Material Control Plan*
> *v. Eagle Rock Enrichment Facility Quality Assurance Program Description*
> *vi. Eagle Rock Enrichment Facility Emergency Plan*
> *vii. Eagle Rock Enrichment Facility Standard Practice Procedure Plan*
>
> *b) Supplemental letter concerning liability insurance coverage for construction, dated January 31, 2011.*

Based on discussions with the Staff, it is AES' understanding that the ER is included in this list of License documents because information provided in the ER relating to the AES Environmental Measurements and Monitoring Programs was used for conclusions reached in the EREF Safety Evaluation Report (SER) [NUREG-1951]. As such, AES is proposing to incorporate the relevant text from ER Sections 6.1.1 and 6.1.2, which is relied on in the SER, into the proposed revision to Section 9.2 of the EREF Safety Analysis Report (SAR). In this

manner, future revisions and/or supplements to the ER will only be necessary for significant environmental changes consistent with the requirements of 10 CFR 51.60 as described above.

EVALUATION/APPROACH

The EREF SER was reviewed to identify references to information from the ER. Table 1 below provides a listing of those sections of the ER referenced in the SER. Each of these items was then evaluated to determine information that is only in the ER and relied on for the Staff's conclusions presented in the SER. Based on this, AES determined that this information is mostly related to descriptions of the EREF's radiological compliance programs during operations.

As such, in support of this LAR, relevant information from the ER related to the topics below needs to be inserted into Section 9.2 of the SAR:

- Radiological effluent monitoring program
- Radiological environmental monitoring program
- Features for waste minimization

CONCLUSIONS

The provisions for updating and supplementing the ER are included in 10 CFR Part 51. 10 CFR 51.60 provides specific conditions as to when an update and/or supplement are required.

Since AES is proposing to insert information relied upon by the NRC in reaching their conclusions described in the SER, it is AES' conclusion that no further revisions of the ER would be necessary after NRC approval of this LAR, other than if the specific Part 51 conditions requiring an update and/or supplement are met.

Note: The change proposed by AES to the AES Materials License is consistent with a recently issued Materials License for another uranium enrichment facility [Reference 9].

SUMMARY OF PROPOSED CHANGES

1. It is proposed that AES License Condition #10 be modified to remove the ER, Item (a) (ii), from the list of documents. See Enclosure 3 for the markup of License Condition #10.
2. It is further proposed that SAR Section 9.2 be revised to include information from the ER used to support conclusions reached in the SER. See Enclosures 2 and 4 for revisions to the SAR.

SAFETY SIGNIFICANCE DETERMINATION

The modification to License Condition #10 of the Materials License SNM-2015 to remove the Environmental Report from the list of License documents is considered acceptable for the following reasons:

1. The ER will still be subject to updating and/or supplementing as specified in 10 CFR 51.60.
2. The text, tables and figures being inserted into the SAR are based on information currently contained in the ER. Relevant text in the ER is simply being incorporated into SAR Section 9.2.
3. The information being added to the SAR does not alter the facility design and does not impact facility integrated safety analysis assumptions or conclusions.
4. No 10 CFR 70.61 performance requirement is impacted.

Conclusion: There is no safety significance as the change does not violate any regulatory requirement or a 10 CFR 70.61 performance requirement.

ENVIRONMENTAL CONSIDERATION

There are no significant environmental changes associated with amending the License as requested. The proposed change does not meet the criteria specified in 10 CFR 51.60 (b) (2) since it does not involve a significant expansion of the site, a significant change in the types of effluents, a significant increase in the amounts of effluents, a significant increase in individual or cumulative occupational radiation exposure, or a significant increase in the potential for or consequences from radiological accidents.

REFERENCES

1. 10 CFR 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions
2. 10 CFR 70, Domestic Licensing of Special Nuclear Material
3. Eagle Rock Enrichment Facility Environmental Report, Rev. 4
4. Eagle Rock Enrichment Facility Safety Analysis Report, Rev. 4
5. Safety Evaluation Report for the Eagle Rock Enrichment Facility in Bonneville County, Idaho (NUREG-1951)
6. Final Environmental Impact Statement for the Proposed Eagle Rock Enrichment Facility in Bonneville County, Idaho (NUREG-1945)
7. Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (NUREG-1748)
8. SNM-2015, AREVA Enrichment Services LLC Materials License
9. SNM-2019, General Electric-Hitachi Global Laser Enrichment LLC Materials License

Table 1 - ER Information Referenced in the SER

SER Section	SER Page	Text Referencing ER
1.3.3.1.1	1-21	AES provided a summary describing the site geography, including its location relative to prominent natural and manmade features (such as rivers, airports, population centers, schools, and commercial and manufacturing facilities). The summary also described the site boundary and controlled area boundary. The applicant's descriptions are consistent with the more detailed information in the ISA Summary (AES, 2010b), the ER (AES, 2010c), and the EP (AES, 2010f).
1.3.3.2	1-21 & 1-22	The applicant provided a summary of demographic information based on the most recent census data that showed the population distribution as a function of distance from the proposed facility. The applicant's descriptions are consistent with the more detailed information in the ISA Summary (AES, 2010b), the ER (AES, 2010c), and the EP (AES, 2010f).
1.3.3.3.4	1-24	The applicant indicated that local precipitation-induced roof-ponding would be limited through roof design. Consequently, roof-ponding hazard resulting from local intense precipitation is highly unlikely (AES, 2010c).
1.3.3.3.4	1-24	Regarding the floodwater intrusion potential because of extreme local precipitation, the applicant indicated that the site of the proposed facility is located at a localized topographical high ground (AES, 2010c).
1.3.3.3.4	1-24	Additionally, the applicant's intent to make the finished grade slope away from buildings will further prevent precipitation accumulations against the structures (AES, 2010c) and, therefore, reduce floodwater intrusion potential.
1.3.3.3.6	1-25	As discussed in Sections 1.3.3.3.1 through 1.3.3.3.6 of this SER, the applicant provided appropriate meteorological data, including a summary of design-basis values for accident analysis of maximum snow loads and probable maximum precipitation, as presented in the ISA Summary (AES, 2010b). The applicant also provided appropriate design-basis information for lightning, high winds, tornadoes, hurricanes, extreme precipitation, and temperature extremes. The applicant's descriptions are consistent with the more detailed information in the ISA Summary (AES, 2010b), the ER (AES, 2010c), and the EP (AES, 2010f).
1.3.3.4.1	1-26	The applicant provided information on seismic hazards in Section 3.3.7 of the ER (AES, 2010c), Section 1.3.5 of the SAR (AES, 2010a), and Section 3.2.6 of the ISA Summary (AES, 2010b).

SER Section	SER Page	Text Referencing ER
1.3.4	1-35	The staff has verified that the site description is consistent with the information used as a basis for the ER (USEC, 2003a).
9.3.1.1	9-3	As noted in Table 4.12-22 of the applicant's ER, the CEDE to the maximally exposed hypothetical member of the public (teen) located at the north-northeast side of the controlled area boundary, resulting from the release to the atmosphere of 19.5 MBq (528 μCi) of uranium from gaseous release points, would be less than 0.9 microsieverts (μSv) (0.09 [mrem]) (AES, 2009b) or 0.09 percent of the 1 mSv (100 mrem) limit on dose to the public in Part 20. This estimated maximum public dose is also well below the 0.1 mSv (10 mrem) ALARA constraint on air emissions described in 10 CFR 20.1101.
9.3.1.1	9-3	The applicant estimated the maximum releases of uranium material from liquid effluents during normal operations at the proposed facility. The applicant estimated that the maximum annual quantity of radiological material in liquid effluent would be 900 becquerels (0.024 μCi) of uranium. This effluent would be dispersed as an atmospheric release of distillate from the evaporator in the Liquid Effluent Collection and Treatment System (AES, 2009b).
9.3.1.1	9-3	As noted in Section 8.7 of the applicant's ER, radioactive material may be released from the EREF as the result of gaseous and liquid effluent discharges, including controlled releases from the uranium enrichment process lines during decontamination and maintenance of equipment.
9.3.1.1	9-3	The CEDE to the maximally exposed member of the public (teen) located at the north side of the controlled area boundary, resulting from the combined annual release to the atmosphere of 19.5 MBq (528 μCi) of uranium from the EREF, would be less than 0.9 μSv (0.09 mrem) (AES, 2009b).

SER Section	SER Page	Text Referencing ER
9.3.1.2	9-4	In Section 4.12.2.1.5 of the applicant's ER (AES, 2009b), the applicant identified plant design features developed to assure that radiological impacts to the environment and public are well below regulatory limits. These include: • Process systems that handle uranium hexafluoride (UF_6) operate at sub-atmospheric pressure to minimize outward leakage of UF_6; • UF_6 cylinders are moved only when cool and when UF_6 is in solid form to minimize the risk of inadvertent release due to mishandling; • Process off-gas from UF_6 purification and other operations passes through desublimers to solidify and reclaim as much UF_6 as possible. Remaining gases pass through high efficiency filters and chemical absorbers to remove hydrogen fluoride (HF) and uranium compounds; • Gaseous effluent passes through pre-filters, high-efficiency particulate air (HEPA) filters, and activated carbon filters, all of which greatly reduce the radioactive material in the final discharged effluent to very low concentrations; • Liquid waste is routed to collection tanks and treated through a combination of precipitation, filtration, and evaporation to remove radioactive material prior to release of the distillate vapors to the atmosphere; and • Effluent paths are monitored and sampled to ensure compliance with regulatory discharge limits.
9.3.1.5	9-6	In Section 4.13.5 of the ER (AES 2009b), the applicant described facility features and systems that will minimize the generation of radioactive waste. These features and systems are based on principles of control, conservation, reprocessing, and recovery. Specific examples include: (a) a decontamination workshop designed to remove radioactive contamination from equipment and allow some equipment to be reused rather than treated as waste, (b) closed-loop cooling systems have been incorporated in the design to reduce water usage, (c) outer packaging associated with consumables will be removed prior to use in a contaminated area, (d) collected waste will be volume reduced at a centralized waste processing facility, and (e) use of glove boxes to minimize the spread of contamination.
9.3.1.6	9-7	In Section 3.12.2 of the applicant's ER (AES 2009b), the applicant has described a solid waste management program at the proposed facility for industrial (non-hazardous), radioactive mixed, and hazardous wastes.

SER Section	SER Page	Text Referencing ER
9.3.1.6	9-8	As noted in Section 3.12.2.1.2.9 of the applicant's ER (AES, 2009b), the operation of the facility would yield an annual production of 1,222 cylinders of depleted UF_6 per year, or approximately 15,270 metric tonnes (16,832 tons). The Full Tails Cylinder (FTC) Storage Pad would have a capacity of 33,638 cylinders.
9.3.2.1	9-8	The staff reviewed the applicant's assumptions and conclusions used in its calculations in Sections 4.12 and 8.7 of the ER (AES, 2009b) and determined that they are reasonable as emissions were estimated from emissions from similarly designed plants.
9.3.2.1	9-9	As noted in the applicant's ER (AES, 2009b), the applicant will develop a program of corrective actions to be taken when established action levels of radiation are exceeded for any of the measured parameters.
9.3.2.1	9-9	As described in Section 1.3 of the applicant's ER (AES, 2009b), in addition to meeting NRC requirements, the applicant will also obtain required Federal and State permits for hazardous air pollutants.
9.3.2.1	9-9	As described in Section 6.1.2 of the applicant's ER (AES, 2009b), the applicant's reporting procedures comply with the requirements of 10 CFR 70.59 and the specific guidance in Regulatory Guide 4.16 (NRC, 1985).
9.3.2.2	9-11	The staff reviewed the applicant's assumptions and conclusions used in its calculations (ER Sections 4.12 and 8.7 [AES 2009b]) and determined that they are reasonable as the emission estimates are based on similarly designed facilities.
9.3.2.2	9-11	As described in Section 1.3 of the applicant's ER (AES, 2009b), in addition to meeting the NRC's regulatory requirements, the applicant will obtain required Federal and State permits relating to liquid discharges (primarily related to groundwater protection).
9.3.2.2	9-11	As described in Section 6.1.2 of the applicant's ER (AES, 2009b), the applicant's reporting procedures comply with the requirements of 10 CFR 70.59 and the specific guidance in Regulatory Guide 4.16 (NRC, 1985).

SER Section	SER Page	Text Referencing ER
9.3.2.3	9-12	For the physiochemical monitoring program (described in the applicant's ER, Section 6.2.8), the applicant has a quality assurance program that will use a set of formalized and controlled procedures for sample collection, laboratory analysis, chain of custody, reporting of results, and corrective actions. Samples sent to laboratories will include blanks and duplicates at specified frequencies to provide data for identifying routine reporting or analytical errors as part of quality assurance checks on the data. Analyses will only be performed at laboratories with appropriate EPA and State of Idaho certifications. The laboratory analyses will be conducted using the best available standard techniques at State or EPA-certified laboratories.
9.3.2.3	9-12	The staff finds that these procedures are adequate to validate the analytical results produced by the REMP, which is described in the applicant's ER Section 6.1.2 (AES, 2009b).
9.3.2.4	9-12	The applicant has established its REMP for the facility. The REMP is a major part of the applicant's effluent compliance program. The effectiveness of the applicant's effluent controls will be confirmed through implementation of the REMP. The purpose of the REMP is to verify confinement integrity at the facility and to support the primary means of demonstrating compliance with applicable radiation protection standards for the environment and the public. Compliance is demonstrated primarily through effluent monitoring (see applicant's ER Section 6.1.2 [AES, 2009b]).
9.3.2.4	9-12 & 9-13	As noted in the applicant's ER (Section 6.1.2 [AES, 2009b]), the REMP sampling locations are based on NRC guidance found in NUREG-1302, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors," (NRC, 1991).

ENCLOSURE 2

Proposed Revised Pages of Safety Analysis Report

The sections of the SAR affected by the proposed change are identified below. Both marked-up pages with references to the ER source material, as well as the re-typed SAR page revisions are provided in this Enclosure.

1. Section 9.2.2.1 – revised, new sections 9.2.2.1.1, 9.2.2.1.2, and 9.2.2.1.3 added
2. Section 9.2.2.2 – revised
3. Section 9.2.2.3 – new section, Waste Minimization
4. Section 9.2.2.4 – new section, Data Analysis
5. Section 9.2.2.5 – new section, Laboratory Quality Control
6. Section 9.2.2.6 – new section, Action Levels
7. Section 9.2.2.7 – new section, Federal and State Standards for Discharges
8. Section 9.2.2.8 – new section, Reporting
9. Section 9.3 – revised with appropriate references
10. Tables 9.2-1 through 9.2-4 – new tables copied from ER Tables 6.1-1, 6.1-2, 6.1-3 and 6.1-4, respectively; and select information from ER Table 6.2-1.
11. Figures 9.2-1(SUNSI) and 9.2-2 – new figures copied from ER Figures 6.1-1(SUNSI) and 6.1-2, respectively

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:

INSERT A

- 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.

9.2.2.1.2 CALCULATION OF TOTAL EFFECTIVE DOSE EQUIVALENT

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. INSERT B 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.

INSERT C

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.

INSERT D

INSERT A

As a matter of compliance with regulatory requirements, all potentially radioactive effluent from the facility is discharged only through monitored pathways. See ER Section 4.12.2.1.1, Routine Gaseous Effluent, for a discussion of pathway assessment. The effluent sampling program for the EREF is designed to determine the quantities and concentrations of radionuclides discharged to the environment. The uranium isotopes ^{238}U, ^{236}U, ^{235}U, and ^{234}U are expected to be the prominent radionuclides in the gaseous effluent. The annual uranium source term for routine gaseous effluent releases from the 6.6 million SWU EREF plant has been conservatively assumed to be 19.5 MBq (528 µCi) per year, which is proportional to the 4.4 MBq (120 µCi) per year source term applied to the 1.5 million SWU plant described in NUREG-1484 (NRC, 1994).

This is a very conservative annual release estimate used for bounding analyses. Additional details regarding source term are provided in ER Section 4.12, Public and Occupational Health Impacts. Representative samples are collected from each release point of the facility. Because uranium in gaseous effluent may exist in a variety of compounds (e.g., depleted hexavalent uranium, triuranium octoxide, and uranyl fluoride), effluent data will be maintained, reviewed, and assessed by the facility's Radiation Protection/Chemistry Manager to assure that gaseous effluent discharges comply with regulatory release criteria for uranium. Table 9.2-1, Effluent Monitoring Program, presents an overview of the effluent sampling program.

Gaseous effluent from the EREF, which has the potential for airborne radioactivity, will be discharged through the four Separations Building Gaseous Effluent Ventilation Systems (GEVS), the Technical Support Building (TSB) GEVS, the Centrifuge Test and Post Mortem Facilities GEVS, the Centrifuge Test and Post Mortem Facilities Exhaust Filtration System, the Ventilated Room Heating, Ventilating, and Air Conditioning (HVAC) System, and the TSB Contaminated Area HVAC System.

FROM ER §6.1.1.1 P. 6.1-3

Liquid effluent discharges will include domestic sanitary wastes from the Domestic Sanitary Sewage Treatment Plant (SSTP) and stormwater runoff. Domestic SSTP effluent is discharged to the Domestic SSTP Basin. General site stormwater runoff is routed to the Site Stormwater Detention Basins and stormwater runoff from the Cylinder Storage Pads (i.e., Full Product Cylinder Storage Pad and Northern Cylinder Storage Pads) is collected in the Cylinder Storage Pads Stormwater Retention Basins. There will be no liquid effluent discharges from plant operations.

BASED ON ER §6.1.1.2 P. 6.1-5

9.2.2.1.1 Expected Concentrations

Pursuant to 10 CFR 20 (CFR, 2008a), surveys necessary to demonstrate compliance with these regulations and to demonstrate that the amount of radioactive material present in effluent from the facility has been kept as low as reasonably achievable (ALARA), are required. In addition, the NRC has issued Regulatory Guide 4.15 "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment" (NRC, 1979) and Regulatory Guide 4.16 "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants" (NRC, 1985) that reiterate that concentrations of hazardous materials in effluent must be controlled and that licensees must adhere to the ALARA principal such that there is no undue risk to the public health and safety at or beyond the site boundary.

BASED ON ER §6.1.1.1 P. 6.1-1

As noted in ER Section 6.1.1, Effluent Monitoring Program, discharge of gaseous effluent has the highest possibility of the potential pathways, of introducing facility-related uranium into the environment. However, the radioactive materials in gaseous effluents from the EREF are expected to be very low concentrations of uranium because of process and effluent controls. Under routine operating conditions, radioactive material in effluents discharged from the facility will comply with regulatory release criteria.

FROM ER §6.1.1 p. 6.1-1
FROM ER §6.1.2 p. 6.1-6
FROM ER §6.1.1 p. 6.1-2

INSERT B

Compliance is demonstrated through effluent and environmental sampling data. Compliance with 10 CFR 20.1301 (CFR, 2008a) will be demonstrated using a calculation of the total effective dose equivalent (TEDE) to the individual who is likely to receive the highest dose in accordance with 10 CFR 20.1302(b)(1) (CFR, 2008a). Pursuant to 10 CFR 70 (CFR, 2008e), semiannual reports will be submitted, specifying the quantities of the principal radionuclides released to unrestricted areas and other information needed to estimate the annual radiation dose to the public from effluent discharges.

FROM ER §6.1.1 p. 6.1-2
FROM ER §6.1.1 p. 6.1-1 & p. 6.1-2

INSERT C

9.2.2.1.3 Effluent Discharge Locations and Sampling

Figure 9.2-1, Effluent Release Points and Meteorological Tower, indicates the locations of air and liquid effluent release points from the facility complex to the environment. Effluents will be sampled as indicated in Table 9.2-1, Effluent Monitoring Program. This table presents an overview of the effluent sampling program. For gaseous effluents, liquid condensate samples from the evaporator exhaust vent and continuous air sampler filters are analyzed for gross alpha and gross beta each week. The filters, or liquid condensate samples, are composited quarterly and an isotopic analysis is performed if a specified gross alpha or gross beta action level is exceeded (as specified in Table 9.2-1). Table 9.2-2, Required Lower Limit of Detection for Effluent Sample Analysis, summarizes detection requirements for gaseous effluent sample analyses. Sampling of liquid effluent discharges to the detention and retention basins are described below in Section 9.2.2.2, Environmental Monitoring.

FROM ER §6.1-1 p. 6.1-1
BASED ON ER §6.1.1.1 p. 6.1-4
NEW TEXT

The guidance in "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors (NRC, 1991) and Regulatory Guide 4.16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants" (NRC, 1985) was followed for determining sample locations, analyses, frequencies, durations, and lower limits of detection.

FROM ER §6.1.1 p. 6.1-1

INSERT D

[The Radiological Environmental Monitoring Program (REMP) at the EREF is a major part of the effluent compliance program. It provides a supplementary check of containment and effluent controls, establishes a process for collecting data for assessing radiological impacts on the environs and estimating the potential impacts on the public, and supports the demonstration of compliance with applicable radiation protection standards and guidelines.] [The REMP includes the collection of data during pre-operational years in order to establish baseline radiological information that will be used in determining and evaluating impacts from operations at the plant on the local environment. The REMP will be initiated at least two years prior to plant operations in order to develop a sufficient database. The early initiation of the REMP provides assurance that a sufficient environmental baseline has been established for the plant before the arrival of the first uranium hexafluoride shipment.]

– FROM ER § 6.1.2 p. 6.1-5

– FROM ER § 6.1.2 p. 6.1-6

[Environmental media identified for radiological sampling consist of ambient air, groundwater, soil/sediment, and vegetation.] [Figure 9.2-2, Modified Site Features with Proposed Sampling Stations and Monitoring Locations, indicates the REMP sampling locations.] [The types and frequency of radiological environmental sampling and analyses are summarized in Table 9.2-3, Radiological Environmental Monitoring Program.] [Although the site Domestic Sanitary Sewage Treatment Plant will receive only domestic sanitary wastes, samples will be collected semiannually from the sanitary sewage treatment system and will be analyzed for isotopic uranium.]

– FROM ER § 6.1.2 p. 6.1-5

– BASED ON ER § 6.1.2 p. 6.1-8

– BASED ON ER § 6.1.2 p. 6.1-5

– FROM ER § 6.1.2 p. 6.1-7

[Because the offsite dose equivalent rate from stored uranium cylinders is expected to be very low and difficult to distinguish from the variance in normal background radiation beyond the site boundary, demonstration of compliance will rely on a system that combines direct dose equivalent measurements and computer modeling to extrapolate the measurements. Environmental thermoluminescent dosimeters (TLDs) placed at the Owner Controlled Area fence line or other location(s) close to the stored uranium cylinders, along with a minimum of two off-site TLD control sampling locations to provide information on regional changes in background radiation levels, will provide quarterly direct dose equivalent information. Where TLD results indicate radiation levels at the fence line in excess of background, the direct dose equivalent at offsite locations will be estimated through extrapolation of the quarterly TLD data using the Monte Carlo N-Particle (MCNP) computer program (ORNL, 2005) or a similar computer program.]

FROM ER § 6.1.2 p. 6.1-7

[A control location will be established beyond 8 km (5 mi) in an upwind sector (the sector with a non-prevalent wind direction) that is not in the vicinity of any other facility with a significant radiological source term.]

FROM ER § 6.1.2 p. 6.1-6 & p. 6.1-7

[A minimum detectable concentration (MDC) of at least 1.8×10^{-9} Bq/ml (5.0×10^{-14} µCi/ml) is a program requirement (NRC, 2002) for all analyses performed on gaseous effluent samples. That MDC value represents 5% of the limit for any applicable uranium isotope (Class W). Liquid condensate samples from the evaporator discharge are analyzed to an MDC equivalent to 5% or less of the appropriate 10 CFR 20 Appendix B, Table 2, Col. 1 (Air) value (CFR, 2008a).] [The MDCs for gross alpha (assumed to be uranium) in various environmental media are shown in Table 9.2-4, Required MDC for Environmental Sample Analysis.]

– BASED ON ER § 6.1.1.1 p. 6.1-4

– FROM ER § 6.1.2 p. 6.1-5

9.2.2.3 Waste Minimization

The EREF will also have in place a Decontamination Workshop designed to remove radioactive contamination from equipment and allow some equipment to be reused rather than treated as waste.

In addition, the EREF process systems that handle UF_6, other than the Product Liquid Sampling System, will operate entirely at sub-atmospheric pressure to prevent outward leakage of UF_6. Cylinders, initially containing liquid UF_6, will be transported only after being cooled, so that the UF_6 is in solid form, to minimize the potential risk of accidental releases due to mishandling.

ALARA controls will be maintained during facility operation to minimize the generation of radioactive waste as directed in 10 CFR 20 (CFR, 2008a). The outer packaging associated with consumables will be removed prior to use in a contaminated area. The use of glove boxes will minimize the spread of contamination and waste generation.

FROM ER §4.13.5 p. 4.13-8

9.2.2.4 Data Analysis

Written procedures will be in place to ensure the collection of representative samples, use of appropriate sampling methods and equipment, proper locations for sampling points, and proper handling, storage, transport, and analyses of effluent samples. In addition, the plant's written procedures also ensure that sampling and measuring equipment, including ancillary equipment such as airflow meters, are properly maintained and calibrated at regular intervals. Sampling equipment (pumps, pressure gages, and air flow calibrators) will be calibrated by qualified individuals. Sampling equipment and lines will be inspected for defects, obstructions, and cleanliness. Calibration intervals will be developed based on applicable industry standards.

FROM ER §6.1.2 p. 6.1-8

FROM ER §6.1.1 p. 6.1-3

9.2.2.5 Laboratory Quality Control

All environmental samples will be analyzed onsite. However, samples may also be shipped to a qualified independent laboratory for analyses. The EREF will require that all radiological and non-radiological laboratory vendors are certified by the National Environmental Laboratory Accreditation Program (NELAP) or an equivalent state laboratory accreditation agency for the analytes being tested.

BASED ON ER §6.1.2 p. 6.1-5 & p. 6.1-6

The Quality Control (QC) procedures used by the laboratories performing the plant's Radiological Environmental Monitoring Program will be adequate to validate the analytical results and will conform with the guidance in Regulatory Guide 4.15 (NRC, 1979). These QC procedures include the use of established standards such as those provided by the National Institute of Standards and Technology (NIST), as well as

FROM ER §6.1.2 p. 6.1-5

standard analytical procedures such as those established by the National Environmental Laboratory Accreditation Conference (NELAC).

The EREF will ensure that the onsite laboratory and any contractor laboratory used to analyze EREF samples participates in third-party laboratory inter-comparison programs appropriate to the media and analytes being measured. FROM ER §6.1.2 p. 6.1-5

9.2.2.6 Action Levels

Administrative action levels are established for effluent samples and monitoring instrumentation as an additional step in the effluent control process. All action levels are sufficiently low so as to permit implementation of corrective actions before regulatory limits are exceeded. FROM ER §6.1.1 p. 6.1-2

As noted in ER Section 6.2.8, Quality Assurance, corrective actions will be instituted when an administrative action level is exceeded for any of the measured parameters. Action levels will be divided into three priorities: (1) if the sample parameter is three times the normal background level; (2) if the sample parameter exceeds any existing administrative limits, or; (3) if the sample parameter exceeds any regulatory limit. Corrective actions will be implemented to ensure that the cause for the action level exceedance can be identified and immediately corrected, applicable regulatory agencies are notified, if required, communications to address lessons learned are dispersed to appropriate personnel, and applicable procedures are revised accordingly if needed. FROM ER §6.2.8 p. 6.2-4

9.2.2.7 Federal and State Standards for Discharges

ER Section 1.3, Applicable Regulatory Requirements, Permits and Required Consultations, describes all applicable federal and Idaho state standards for discharges, as well as required permits issued by local, Idaho, and Federal governments. FROM ER §1.3 p. 1.3-1

9.2.2.8 Reporting

Radiological reporting procedures will comply with the requirements of 10 CFR 70.59 (CFR, 2008e) and the guidance specified in Regulatory Guide 4.16 (NRC, 1985). Reports of the concentrations of principal radionuclides released to unrestricted areas in effluents will be provided and will include the Minimum Detectable Concentration (MDC) for the analysis and the error for each data point. FROM ER §6.1.2 p. 6.1-6

Each year, the EREF will submit a summary report of the environmental sampling program to the NRC, including all associated data as required by 10 CFR 70 (CFR, 2008e). The report will include the types, numbers, and frequencies of environmental measurements and the identities and activity concentrations of facility-related radionuclides found in environmental samples, in addition to the MDC for the analyses and the error associated with each data point. FROM ER §6.1.2 p. 6.1-8

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.

NRC, 1979. QUALITY ASSURANCE FOR RADIOLOGICAL MONITORING PROGRAMS (NORMAL OPERATIONS) - EFFLUENT STREAMS AND THE ENVIRONMENT, REGULATORY GUIDE 4.15, U.S. NUCLEAR REGULATORY COMMISSION, FEBRUARY 1979.

NRC, 1985. MONITORING AND REPORTING RADIOACTIVITY IN RELEASES OF RADIOACTIVE MATERIALS IN LIQUID AND GASEOUS EFFLUENT FROM NUCLEAR FUEL PROCESSING AND FABRICATION PLANTS AND URANIUM HEXAFLUORIDE PRODUCTION PLANTS, REGULATORY GUIDE 4.16, U.S. NUCLEAR REGULATORY COMMISSION, DECEMBER 1985.

NRC, 1994. FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE CONSTRUCTION AND OPERATION OF CLAIBORNE ENRICHMENT CENTER, HOMER, LOUISIANA, NUREG-1484, VOLUME 1, U.S. NUCLEAR REGULATORY COMMISSION, AUGUST 1994.

ORNL, 2005. MCNP5 MONTE CARLO N-PARTICLE TRANSPORT CODE SYSTEM, CCC-730, OAK RIDGE NATIONAL LABORATORY, RSICC COMPUTER CODE COLLECTION, 2005.

9.2-1

Table ~~6.1-1~~ Effluent Monitoring Program
(Page 1 of 1)

Sample Location	Sample Type	Analysis / Frequency
Separations Building GEVS exhaust vents TSB GEVS exhaust vent TSB Contaminated Area HVAC System exhaust vent Centrifuge Test and Post Mortem Facilities GEVS exhaust vent[a] Centrifuge Test and Post Mortem Facilities Exhaust Filtration System exhaust vent[a] Ventilated Room HVAC System exhaust vent	Continuous air particulate filter	Gross alpha/beta-Weekly Isotopic analysis[d]-Quarterly composite
Evaporator	Continuous liquid condensate sample from exhaust vent	Gross alpha/beta – Weekly Isotopic analysis[d] – Quarterly composite
Process Areas[b]	Local area continuous air particulate filter[c]	Gross alpha/beta-Weekly Isotopic analysis[d]-Quarterly composite
Non-Process Areas[b]	Local area continuous air particulate filter[c]	Gross alpha/beta-Quarterly composite

Notes:

[a] The continuous sampling system is operated only when the Centrifuge Test Facility or Post Mortem Facility is in operation.

[b] A "Process Area" is any area of the facility where UF_6 process flow between feed, product, or tails cylinders occurs, including areas where cylinders containing UF_6 are opened for testing, inspection, or sampling. A "Non-Process Area" is any other area where uranic material is present in an open form.

[c] These will generally be collected with mobile continuous air monitors, as required to complement the effluent monitoring program.

[d] Isotopic analysis for Uranium if gross alpha and gross beta activities indicate that an individual radionuclude could be present in a concentration greater than 10 percent of the concentrations specified in Table 2 of Appendix B to 10 CFR Part 20 (CFR, 2008~~x~~a).

Table ~~6.1-2~~ 9.2-2 Required Lower Limit of Detection for Effluent Sample Analysis
(Page 1 of 1)

Effluent Type	Nuclide	MDC[a] in Bq/ml (µCi/ml)
Gaseous[b]	Isotopic U	1.8×10^{-9} (5.0×10^{-14})
Gaseous[b]	Gross Alpha	1.8×10^{-9} (5.0×10^{-14})

Notes:

[a] These MDCs are 5% of the limits in 10 CFR 20 Appendix B, Table 2 Effluent Concentrations (retention Class W) (CFR, 2008~~x~~a).

[b] Liquid condensate samples from the Evaporator exhaust vent will be analyzed to an MDC equivalent to 5% or less of the 10 CFR 20 Appendix B, Table 2, Col. 1 (Air) value for retention Class W (CFR, 2008~~x~~a).

9.2-3
Table ~~6.1-3~~ Radiological Environmental Monitoring Program
(Page 1 of 1)

Sample Type/Location	Minimum Number of Sample Locations	Sampling and Collection Frequency	Type of Analysis
Continuous Airborne Particulate	5	Continuous operation of air sampler with sample collection as required by dust loading but at least biweekly. Quarterly composite samples by location.	Gross beta/gross alpha analysis each filter change. Quarterly isotopic analysis on composite sample.
Vegetation INSERT 1	9	1 to 2-kg (2.2 to 4.4-lb) samples collected semiannually	Isotopic analysis [a]
Groundwater	10	4-L (1.06-gal) samples collected semiannually	Isotopic analysis [a]
Basins INSERT 2	1 from each of 5 basins [b]	4-L (1.06-gal) water sample/1 to 2-kg (2.2 to 4.4-lb) sediment sample collected quarterly	Isotopic analysis [a]
Soil INSERT 3	9	1 to 2-kg (2.2 to 4.4-lb) samples collected semiannually	Isotopic analysis [a]
Domestic Sanitary Sewage Treatment Plant	1	4-L (1.06-gal) water fraction/1 to 2-kg (2.2 to 4.4-lb) solid fraction; samples collected semiannually[c]	Isotopic analysis [a]
TLD	18	Quarterly	Gamma and neutron dose equivalent

Notes:

[a] Isotopic analysis for Uranium.

[b] Site Stormwater Detention Basins and Cylinder Storage Pads Stormwater Retention Basins.

[c] Both treated residual solids and clarified liquids are collected from the Domestic Sanitary Sewage Treatment Plant.

~~Note: Physiochemical monitoring parameters are addressed separately in ER Section 6.2, Physiochemical Monitoring.~~

EREF
SAR Table 9.2-3 Inserts

Sample Type/Location	Minimum Number of Sample Locations	Sampling and Collection Frequency	Type of Analysis

INSERT 1 (Vegetation)

	6	Quarterly if present (i.e., during growing seasons); one sample at each location	Fluoride uptake

INSERT 2 (Basins)

	discharge points to the basins [b]	Quarterly for one sediment sample at each location	Fluoride uptake

INSERT 3 (Soil)

	3 plus 1 at each of the three detention basin outfalls	Quarterly, near vegetation sample locations; one sample at each location	Fluoride uptake

FROM ER TABLE 6.2-1

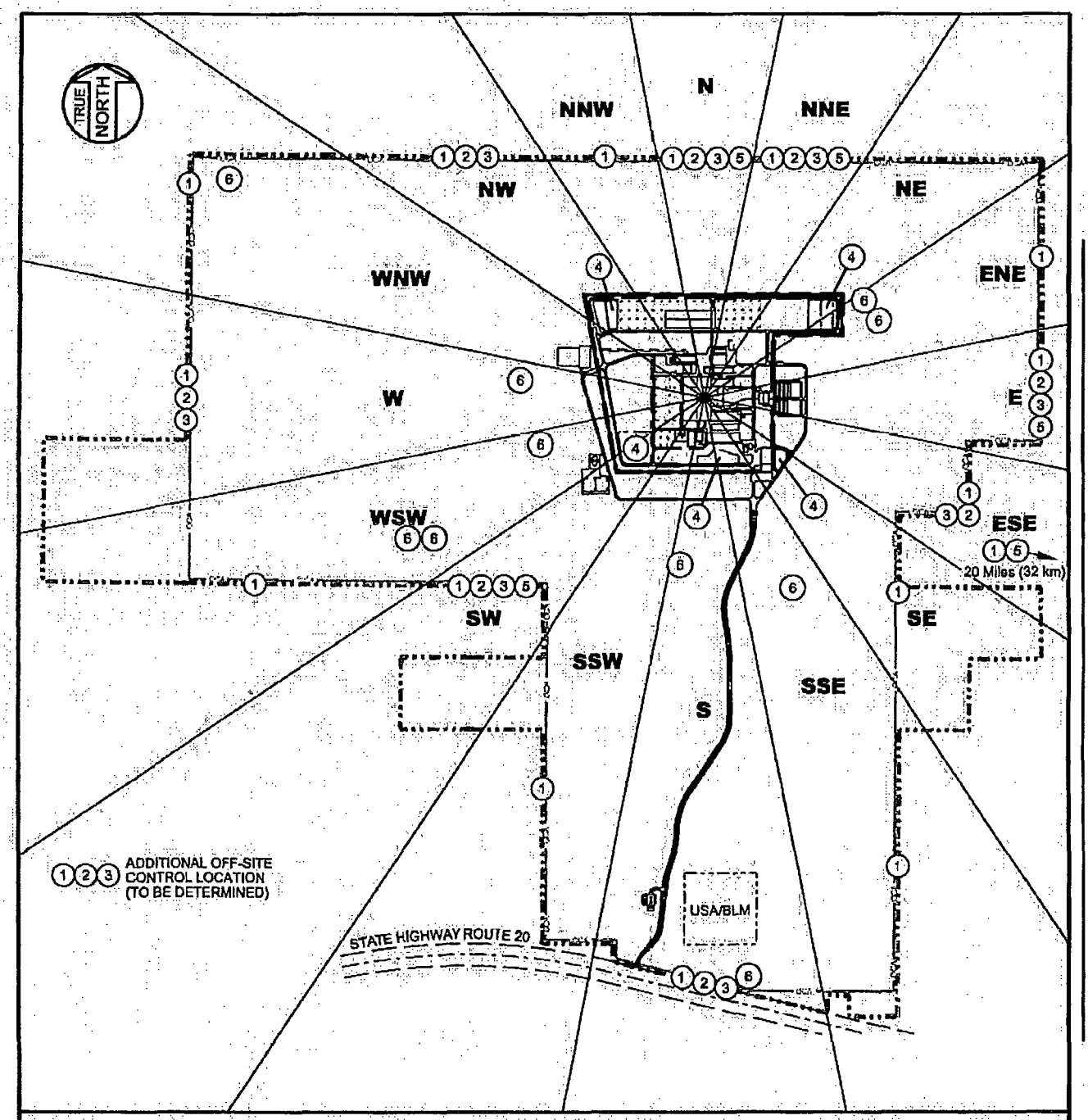
Table ~~6.1-4~~ 9.2-4 Required MDC for Environmental Sample Analysis
(Page 1 of 1)

Medium	Analysis	MDC Bq/ml or g (µCi/ml or g)
Ambient Air[a]	Gross Alpha	7.4×10^{-10} (2.0×10^{-14})
Vegetation	Isotopic U	1.9×10^{-4} (5.0×10^{-9})
Soil/Sediment	Isotopic U	1.1×10^{-2} (3.0×10^{-7})
Groundwater[a]	Isotopic U	1.1×10^{-4} (3.0×10^{-9})

[a] MDCs are 2% or less of the limits in 10 CFR 20 Appendix B, Table 2 Effluent Concentrations (retention Class W for ambient air) (CFR, 2008~~x~~a).

9.2-1

Figure ~~6.1-1~~, Effluent Release Points and Meteorological Tower, contains Security-Related Information Withheld from Disclosure under 10 CFR 2.390



LEGEND:

- PROPERTY LINE
- OCA — OWNER CONTROLLED AREA FENCE (10 Feet (3 Meters) INSIDE OF PROPERTY LINE)
- (1) THERMOLUMINESCENT DOSIMETER
- (2) SOIL SAMPLE
- (3) VEGETATION SAMPLE
- (4) WATER SAMPLE / SEDIMENT SAMPLE
- (5) CONTINUOUS AIRBORNE PARTICULATE SAMPLE
- (6) GROUNDWATER WELL SAMPLE

0 1500 3000 6000
SCALE: FEET

0 500 1000 2000
SCALE: METERS

9.2-2

FIGURE ~~6.1-2~~ **Rev. 4**

Modified Site Features with Proposed Sampling Stations and Monitoring Locations

EAGLE ROCK ENRICHMENT FACILITY
~~ENVIRONMENTAL~~ REPORT
SAFETY ANALYSIS

Re-typed SAR page revisions:

- 9.2, Environmental Protection Measures (pages 9.2-1 – 9.2.7), and
- 9.3, References (page 9.3-1)

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 nonradiological 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 pre-operation (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.

As a matter of compliance with regulatory requirements, all potentially radioactive effluent from the facility is discharged only through monitored pathways. See ER Section 4.12.2.1.1, Routine Gaseous Effluent, for a discussion of pathway assessment. The effluent sampling program for the EREF is designed to determine the quantities and concentrations of radionuclides discharged to the environment. The uranium isotopes ^{238}U, ^{236}U, ^{235}U, and ^{234}U are expected to be the prominent radionuclides in the gaseous effluent. The annual uranium source term for routine gaseous effluent releases from the 6.6 million SWU EREF plant has been conservatively assumed to be 19.5 MBq (528 μCi) per year, which is proportional to the 4.4 MBq (120 μCi) per year source term applied to the 1.5 million SWU plant described in NUREG-1484 (NRC, 1994).

This is a very conservative annual release estimate used for bounding analyses. Additional details regarding source term are provided in ER Section 4.12, Public and Occupational Health Impacts. Representative samples are collected from each release point of the facility. Because uranium in gaseous effluent may exist in a variety of compounds (e.g., depleted hexavalent uranium, triuranium octoxide, and uranyl fluoride), effluent data will be maintained, reviewed, and assessed by the facility's Radiation Protection/Chemistry Manager to assure that gaseous effluent discharges comply with regulatory release criteria for uranium. Table 9.2-1, Effluent Monitoring Program, presents an overview of the effluent sampling program.

Gaseous effluent from the EREF, which has the potential for airborne radioactivity, will be discharged through the four Separations Building Gaseous Effluent Ventilation Systems (GEVS), the

Technical Support Building (TSB) GEVS, the Centrifuge Test and Post Mortem Facilities GEVS, the Centrifuge Test and Post Mortem Facilities Exhaust Filtration System, the Ventilated Room Heating, Ventilating, and Air Conditioning (HVAC) System, and the TSB Contaminated Area HVAC System.

Liquid effluent discharges will include domestic sanitary wastes from the Domestic Sanitary Sewage Treatment Plant (SSTP) and stormwater runoff. Domestic SSTP effluent is discharged to the Domestic SSTP Basin. General site stormwater runoff is routed to the Site Stormwater Detention Basins and stormwater runoff from the Cylinder Storage Pads (i.e., Full Product Cylinder Storage Pad and Northern Cylinder Storage Pads) is collected in the Cylinder Storage Pads Stormwater Retention Basins. There will be no liquid effluent discharges from plant operations.

9.2.2.1.1 Expected Concentrations

Pursuant to 10 CFR 20 (CFR, 2008a), surveys necessary to demonstrate compliance with these regulations and to demonstrate that the amount of radioactive material present in effluent from the facility has been kept as low as reasonably achievable (ALARA), are required. In addition, the NRC has issued Regulatory Guide 4.15 "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment" (NRC, 1979) and Regulatory Guide 4.16 "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants" (NRC, 1985) that reiterate that concentrations of hazardous materials in effluent must be controlled and that licensees must adhere to the ALARA principal such that there is no undue risk to the public health and safety at or beyond the site boundary.

As noted in ER Section 6.1.1, Effluent Monitoring Program, discharge of gaseous effluent has the highest possibility of the potential pathways, of introducing facility-related uranium into the environment. However, the radioactive materials in gaseous effluents from the EREF are expected to be very low concentrations of uranium because of process and effluent controls. Under routine operating conditions, radioactive material in effluents discharged from the facility will comply with regulatory release criteria.

9.2.2.1.2 Calculation of Total Effective Dose Equivalent

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. Compliance is demonstrated through effluent and environmental sampling data. Compliance with 10 CFR 20.1301 (CFR, 2008a) will be demonstrated using a calculation of the total effective dose equivalent (TEDE) to the individual who is likely to receive the highest dose in accordance with 10 CFR 20.1302(b)(1) (CFR, 2008a). Pursuant to 10 CFR 70 (CFR, 2008e), semiannual reports will be submitted, specifying the quantities of the principal radionuclides released to unrestricted areas and other information needed to estimate the annual radiation dose to the public from effluent discharges. 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.

9.2.2.1.3 Effluent Discharge Locations and Sampling

Figure 9.2-1, Effluent Release Points and Meteorological Tower, indicates the locations of air and liquid effluent release points from the facility complex to the environment. Effluents will be sampled as indicated in Table 9.2-1, Effluent Monitoring Program. This table presents an overview of the effluent sampling program. For gaseous effluents, liquid condensate samples from the evaporator exhaust vent and continuous air sampler filters are analyzed for gross alpha and gross beta each week. The filters, or liquid condensate samples, are composited quarterly and an isotopic analysis is performed if a specified gross alpha or gross beta action level is exceeded (as specified in Table 9.2-1). Table 9.2-2, Required Lower Limit of Detection for Effluent Sample Analysis, summarizes detection requirements for gaseous effluent sample analyses. Sampling of liquid effluent discharges to the detention and retention basins are described below in Section 9.2.2.2, Environmental Monitoring.

The guidance in "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors (NRC, 1991) and Regulatory Guide 4.16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants" (NRC, 1985) was followed for determining sample locations, analyses, frequencies, durations, and lower limits of detection.

Lastly, ER 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.

The Radiological Environmental Monitoring Program (REMP) at the EREF is a major part of the effluent compliance program. It provides a supplementary check of containment and effluent controls, establishes a process for collecting data for assessing radiological impacts on the environs and estimating the potential impacts on the public, and supports the demonstration of compliance with applicable radiation protection standards and guidelines. The REMP includes the collection of data during pre-operational years in order to establish baseline radiological information that will be used in determining and evaluating impacts from operations at the plant on the local environment. The REMP will be initiated at least two years prior to plant operations in order to develop a sufficient database. The early initiation of the REMP provides assurance that a sufficient environmental baseline has been established for the plant before the arrival of the first uranium hexafluoride shipment.

Environmental media identified for radiological sampling consist of ambient air, groundwater, soil/sediment, and vegetation. Figure 9.2-2, Modified Site Features with Proposed Sampling Stations and Monitoring Locations, indicates the REMP sampling locations. The types and frequency of radiological environmental sampling and analyses are summarized in Table 9.2-3, Radiological Environmental Monitoring Program. Although the site Domestic Sanitary Sewage Treatment Plant

will receive only domestic sanitary wastes, samples will be collected semiannually from the sanitary sewage treatment system and will be analyzed for isotopic uranium.

Because the offsite dose equivalent rate from stored uranium cylinders is expected to be very low and difficult to distinguish from the variance in normal background radiation beyond the site boundary, demonstration of compliance will rely on a system that combines direct dose equivalent measurements and computer modeling to extrapolate the measurements. Environmental thermoluminescent dosimeters (TLDs) placed at the Owner Controlled Area fence line or other location(s) close to the stored uranium cylinders, along with a minimum of two off-site TLD control sampling locations to provide information on regional changes in background radiation levels, will provide quarterly direct dose equivalent information. Where TLD results indicate radiation levels at the fence line in excess of background, the direct dose equivalent at offsite locations will be estimated through extrapolation of the quarterly TLD data using the Monte Carlo N-Particle (MCNP) computer program (ORNL, 2005) or a similar computer program.

A control sample location will be established beyond 8 km (5 mi) in an upwind sector (the sector with a non-prevalent wind direction) that is not in the vicinity of any other facility with a significant radiological source term.

A minimum detectable concentration (MDC) of at least 1.8×10^{-9} Bq/ml (5.0×10^{-14} μCi/ml) is a program requirement (NRC, 2002) for all analyses performed on gaseous effluent samples. That MDC value represents 5% of the limit for any applicable uranium isotope (Class W). Liquid condensate samples from the evaporator discharge are analyzed to an MDC equivalent to 5% or less of the appropriate 10 CFR 20 Appendix B, Table 2, Col. 1 (Air) value (CFR, 2008a). The MDCs for gross alpha (assumed to be uranium) in various environmental media are shown in Table 9.2-4, Required MDC for Environmental Sample Analysis.

9.2.2.3 Waste Minimization

The EREF will also have in place a Decontamination Workshop designed to remove radioactive contamination from equipment and allow some equipment to be reused rather than treated as waste.

In addition, the EREF process systems that handle UF_6, other than the Product Liquid Sampling System, will operate entirely at sub-atmospheric pressure to prevent outward leakage of UF_6. Cylinders, initially containing liquid UF_6, will be transported only after being cooled, so that the UF_6 is in solid form, to minimize the potential risk of accidental releases due to mishandling.

ALARA controls will be maintained during facility operation to minimize the generation of radioactive waste as directed in 10 CFR 20 (CFR, 2008a). The outer packaging associated with consumables will be removed prior to use in a contaminated area. The use of glove boxes will minimize the spread of contamination and waste generation.

9.2.2.4 Data Analysis

Written procedures will be in place to ensure the collection of representative samples, use of appropriate sampling methods and equipment, proper locations for sampling points, and proper handling, storage, transport, and analyses of effluent samples. In addition, the plant's written procedures also ensure that sampling and measuring equipment, including ancillary equipment such as airflow meters, are properly maintained and calibrated at regular intervals. Sampling equipment

(pumps, pressure gages, and air flow calibrators) will be calibrated by qualified individuals. Sampling equipment and lines will be inspected for defects, obstructions, and cleanliness. Calibration intervals will be developed based on applicable industry standards.

9.2.2.5 Laboratory Quality Control

All environmental samples will be analyzed onsite. However, samples may also be shipped to a qualified independent laboratory for analyses. The EREF will require that all radiological and non-radiological laboratory vendors are certified by the National Environmental Laboratory Accreditation Program (NELAP) or an equivalent state laboratory accreditation agency for the analytes being tested.

The Quality Control (QC) procedures used by the laboratories performing the plant's Radiological Environmental Monitoring Program will be adequate to validate the analytical results and will conform with the guidance in Regulatory Guide 4.15 (NRC, 1979). These QC procedures include the use of established standards such as those provided by the National Institute of Standards and Technology (NIST), as well as standard analytical procedures such as those established by the National Environmental Laboratory Accreditation Conference (NELAC).

The EREF will ensure that the onsite laboratory and any contractor laboratory used to analyze EREF samples participates in third-party laboratory inter-comparison programs appropriate to the media and analytes being measured.

9.2.2.6 Action Levels

Administrative action levels are established for effluent samples and monitoring instrumentation as an additional step in the effluent control process. All action levels are sufficiently low so as to permit implementation of corrective actions before regulatory limits are exceeded.

As noted in ER Section 6.2.8, Quality Assurance, corrective actions will be instituted when an administrative action level is exceeded for any of the measured parameters. Action levels will be divided into three priorities: (1) if the sample parameter is three times the normal background level; (2) if the sample parameter exceeds any existing administrative limits, or; (3) if the sample parameter exceeds any regulatory limit. Corrective actions will be implemented to ensure that the cause for the action level exceedance can be identified and immediately corrected, applicable regulatory agencies are notified, if required, communications to address lessons learned are dispersed to appropriate personnel, and applicable procedures are revised accordingly if needed.

9.2.2.7 Federal and State Standards for Discharges

ER Section 1.3, Applicable Regulatory Requirements, Permits and Required Consultations, describes all applicable federal and Idaho state standards for discharges, as well as required permits issued by local, Idaho, and Federal governments.

9.2.2.8 Reporting

Radiological reporting procedures will comply with the requirements of 10 CFR 70.59 (CFR, 2008e) and the guidance specified in Regulatory Guide 4.16 (NRC, 1985). Reports of the concentrations of principal radionuclides released to unrestricted areas in effluents will be provided and will include the

Minimum Detectable Concentration (MDC) for the analysis and the error for each data point. Each year, the EREF will submit a summary report of the environmental sampling program to the NRC, including all associated data as required by 10 CFR 70 (CFR, 2008e). The report will include the types, numbers, and frequencies of environmental measurements and the identities and activity concentrations of facility-related radionuclides found in environmental samples, in addition to the MDC for the analyses and the error associated with each data point.

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, 1979. Quality Assurance for Radiological Monitoring Programs (Normal Operations) – Effluent Streams and the Environment, Regulatory Guide 4.15, U.S. Nuclear Regulatory Commission, February 1979.

NRC, 1985. Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants, Regulatory Guide 4.16, U.S. Nuclear Regulatory Commission, December, 1985.

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, 1994. Final Environmental Impact Statement for the Construction and Operation of Claiborne Enrichment Center, Homer, Louisiana, NUREG-1484, Volume 1, U.S. Nuclear Regulatory Commission, August 1994.

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

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

ORNL, 2005. MCNP5 Monte Carlo N-Particle Transport Code System, CCC-730, Oak Ridge National Laboratory, RSICC Computer Code Collection, 2005.

ENCLOSURE 3

Proposed Marked-up of License Condition #10

Marked-up page is attached in this Enclosure.

NRC FORM 374A U.S. NUCLEAR REGULATORY COMMISSION	2
MATERIALS LICENSE **SUPPLEMENTARY SHEET**	License Number SNM-2015 Docket or Reference Number 70-7015

10) The licensee shall conduct authorized activities at the EREF in accordance with the statements, representations, and conditions as described in the documents listed below (or licensee revisions to those documents in accordance with Section 19 of the Quality Assurance Program Description; Title 10 of the *Code of Federal Regulation* (10 CFR) 40.35(f), 10 CFR 51.22, 10 CFR 70.32, 10 CFR 70.72, or 10 CFR 95.19; or License Conditions 13 or 24):
    a) Application for Material License, transmittal letter dated December 30, 2008 and supplemental transmittal letters dated April 23, 2009, April 30, 2010, and May 16, 2011.
        i) Eagle Rock Enrichment Facility Safety Analysis Report
        ~~ii) Eagle Rock Enrichment Facility Environmental Report~~
        ii ~~iii)~~ Eagle Rock Enrichment Facility Physical Security Plan
        iii ~~iv)~~ Eagle Rock Enrichment Facility Fundamental Nuclear Material Control Plan
        iv ~~v)~~ Eagle Rock Enrichment Facility Quality Assurance Program Description
        v ~~vi)~~ Eagle Rock Enrichment Facility Emergency Plan
        vi ~~vii)~~ Eagle Rock Enrichment Facility Standard Practice Procedure Plan
    b) Supplemental letter concerning liability insurance coverage for construction, dated January 31, 2011.

11) Introduction of UF_6 into any module (e.g., Separations Building Module (SBM) or any cascade within an SBM) of the EREF shall not occur until the Commission completes an operational readiness and management measures verification review to verify that management measures that ensure compliance with the performance requirements of 10 CFR 70.61 have been implemented and confirms that the facility has been constructed and will be operated safely and in accordance with the requirements of the license. The licensee shall provide the Commission with appropriate advance notice, normally no later than 120 days in advance of the date that it plans to introduce UF_6 into any module of the EREF.

12) The licensee is hereby granted the exemption request from certain provisions of 10 CFR 40.36 and 10 CFR 70.25, in order to provide forward-looking incremental funding for decommissioning, as described in Section 1.2.5 "Special Exemptions and Special Authorizations" of the EREF Safety Analysis Report, Revision 3, dated April 2011.

13) The licensee is granted the special authorization as requested in correspondence dated August 20, 2010. Specifically:

    a) The licensee shall not make changes to the license application that decreases the effectiveness of safety commitments in the license application, without prior U.S. Nuclear Regulatory Commission (NRC) approval. For these changes, the licensee shall submit to the NRC, for review and approval, an application to amend the license. Such changes shall not be implemented until approval is granted.

    b) Upon documented completion of a change request for a facility or process, the licensee may make changes in the facility or process as presented in the license application, or conduct tests or activities not presented in the license application, without prior NRC approval, subject to the following conditions:

        1. There is no degradation in the safety commitments in the license application, and
        2. The change, test, or activity does not conflict with any condition specifically stated in the license.

    Records of such changes shall be maintained, including technical justification and management approval, in dedicated records to enable NRC inspection upon request at the facility. A report containing a description of each such change, and appropriate revised sections to the license application, shall be submitted to the NRC within three months of implementing the change.

14) This license will expire 30 years after the date of license issuance.