AREVA

10 CFR 70.5

November 16, 2009

AES-O-NRC-09-00198-0

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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

Subject: Supplemental Response AREVA Enrichment Services LLC Environmental Report for the Eagle Rock Enrichment Facility - ER RAI #2 Revised Response.

On April 23, 2009, AREVA Enrichment Services LLC (AES) submitted a revised License Application to the U.S. Nuclear Regulatory Commission (NRC) to construct and operate the Eagle Rock Enrichment Facility (EREF) in Bonneville County, Idaho (Ref. 1).

On August 10, 2009, the NRC transmitted to AES Requests for Additional Information (RAI) regarding the EREF Environmental Report (ER) (Ref. 2). On September 9, 2009, AES submitted the responses to the NRC ER RAIs (Ref. 3). Subsequently, the NRC requested additional information regarding methylene chloride use presented in the AES response to ER RAI #2. Enclosure 2 provides the AES revised response to ER RAI #2 regarding methylene chloride use, emissions, and mitigation measures.

Enclosure 3 provides markup pages for the AES response that are public information. Enclosure 4 provides markup pages for the AES response that is security-related sensitive unclassified non-safeguards information (SUNSI) that should be withheld in accordance with 10 CFR 2.390. Enclosures 3 and 4 include markup pages of the EREF Environmental Report, Safety Analysis Report, and Emergency Plan.

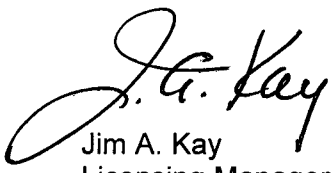
Some AES responses contain SUNSI information that AES is requesting be withheld from public disclosure in accordance with 10 CFR 2.390. Enclosure 1 provides an affidavit supporting our request to withhold the information identified in Enclosure 4 in accordance with 10 CFR 2.390(b).

The EREF License Application will be revised to include the changes identified in the markups of the Environmental Report, Safety Analysis Report, and Emergency Plan provided in Enclosures 3 and 4 in Revision 2 of the EREF License Application.

NMSS01
NMSS

If you have any questions regarding this submittal, please contact me at (508) 573-6554.

Respectfully,



Jim A. Kay
Licensing Manager

References:

1) S. Shakir (AES) Letter to the U.S. Nuclear Regulatory Commission, Revision 1 to License Application for the Eagle Rock Enrichment Facility, dated April 23, 2009.
2) B. Reilly (U.S. Nuclear Regulatory Commission) Letter to Jim Kay, Licensing Manager, Eagle Rock Enrichment Facility, AREVA Enrichment Services LLC, Request for Additional Information - AREVA Enrichment Services LLC Environmental Report for the Eagle Rock Enrichment Facility, dated August 10, 2009.
3) J. Kay (AES) Letter to the U.S. Nuclear Regulatory Commission, Response to Requests for Additional Information – AREVA Enrichment Services LLC Environmental Report for the Eagle Rock Enrichment Facility, dated September 9, 2009.

Enclosures:

1) Affidavit of Jim Kay
2) ER RAI 2 Revised Response
3) Public Information - Markup Pages of the Environmental Report and Safety Analysis Report
4) SUNSI - Markup Pages of the Environmental Report, Safety Analysis Report and Emergency Plan

Commitment:

The EREF License Application will be revised to include the changes identified in the markups of the Environmental Report, Safety Analysis Report, and Emergency Plan provided in Enclosures 3 and 4 in Revision 2 of the EREF License Application

cc: Breeda Reilly, U.S. NRC Senior Project Manager
Steve Lemont, U.S. NRC Senior Project Manager

a) I am the Licensing Manager for the AREVA Enrichment Services LLC (AES), and as such have the responsibility of reviewing the proprietary and confidential information sought to be withheld from public disclosure in connection with our application to construct and operate a uranium enrichment facility. I am authorized to apply for the withholding of such proprietary and confidential information from public disclosure on behalf of AES.

b) I am making this affidavit in conformance with the provisions of 10 CFR 2.390 of the regulations of the Nuclear Regulatory Commission (NRC), and in conjunction with AES's request for withholding, which is accompanied by this affidavit.

c) I have knowledge of the criteria used by AES in designating information as proprietary or confidential.

d) By this submittal, AES seeks to protect from disclosure the following certain Security-Related Information contained in Enclosure 4:

   Markups to the EREF Environmental Report, EREF Safety Analysis Report, and EREF Emergency Plan.

   This affidavit discusses the bases for withholding certain portions of this submittal, as indicated therein, from public disclosure.

e) Pursuant to the provisions of 10 CFR 2.390(b)(4), the following is furnished for consideration by the NRC in determining whether the proprietary information sought to be protected should be withheld from public disclosure.

   1. This information is deemed Security-Related (SUNSI) Information by the NRC.

   2. The information sought to be withheld is being provided to the NRC in confidence, and, under the provisions of 10 CFR 2.390, it is to be received in confidence by the NRC.

   3. The information sought to be withheld is not available in public sources, to the best of AES's knowledge and belief.

For all of the reasons discussed above, AES requests that the identified proprietary information be withheld from public disclosure.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on November 16, 2009.

J. A. Kay

Mr. Jim A. Kay
Licensing Manager of AES LLC
400 Donald Lynch Boulevard
Marlborough, MA 01752

Maureen L. Lyons

Notary Public

ER RAI 2; REVISED RESPONSE

NRC Question:

Provide air impact analyses that show compliance with applicable Idaho state standards.

a. Provide an assessment of the impact that the estimated annual amount of fluorides released to the environment will have on livestock feed crops and forage that may be grown on contiguous parcels. Provide a qualitative analysis or perform appropriate dispersion modeling, as necessary, to estimate the resulting maximum potential accumulation of fluoride on crops and forage vegetation for comparison against the published safe levels in effect in Idaho (see Idaho Administrative Procedures Act [IDAPA] 58.01.01 Part 577) and to determine conformance with fluoride emission limits and ambient air quality standards in effect in Idaho (see IDAPA 58.01.01 Part 585).

b. Releases of ethanol and methylene chloride are anticipated from the EREF during operations (Section 4.6.2.1, AES 2009a). Provide air analyses that illustrate the impacts of releases of ethanol and methylene chloride that result from normal operation. Compare the resulting estimated impacts to the relevant standards in Idaho rules IDAPA 58.01.01 Parts 585 and 586.

The State of Idaho published specific rules regarding the emissions of various chemical species for the protection of the environment. The environmental report should contain an analysis of the expected emissions and compare the result with the appropriate state guidelines for the species anticipated to be emitted during operation of the EREF.

AES Response:

a. The following assessment demonstrates that emissions of fluorides from EREF will be in compliance with Idaho air quality regulations:

Potential for Fluoride Emissions to Impact Forage Vegetation (IDAPA 58.01.01 Part 577)

The Idaho ambient air quality standards for fluorides are found in IDAPA 58.01.01 Part 577.06 and are expressed in terms of the ***total fluoride content in vegetation used for feed and forage***. In accordance with IDAPA Part 577.06, the air quality standards for fluorides are those concentrations in air which result in total fluoride content in vegetation used for feed and forage of no more than 40 parts per million (ppm) dry basis (annual arithmetic mean), 60 ppm dry basis, (monthly concentration for two consecutive months), and 80 ppm dry basis (monthly concentration never to be exceeded).

To assess the potential for fluoride emissions from EREF to impact forage crops, a literature value for an accumulation coefficient for natural vegetation exposed to fluorides from industrial emissions was used to estimate a potential concentration of fluoride in vegetation at EREF. The estimated concentration of fluoride in vegetation was calculated from the literature-based accumulation coefficient and the estimated concentration of fluoride in air. The concentration of HF in air at various distances from the release point was calculated by multiplying the annual average emission rate by a site-specific air dispersion factor.

The average annual emission of fluoride was calculated as follows:

As stated in the ER Section 4.6.2.1, hydrogen fluoride (HF) releases are estimated to be less than 2.0 kg/yr (4.4 lb/yr), based on European operational experience. An annual average release rate for HF was calculated: at 2.0 kg/yr, or 2 $x10^6$ mg/yr, the average release rate (in units of mg/sec) is:

2 $x10^6$ mg/yr / [365 day/yr x 24 hr/day x 60 min/hr x 60 sec/min] = 0.0634 mg/sec

Site-specific air dispersion factors (χ/Q values) having units of sec/m^3 were calculated using meteorological data from the INL. As shown in Table 4.6-8 of the EREF ER, these χ/Q values were calculated for several potential receptor points including the site boundary, the nearest resident, the nearest recreation area, and the nearest business. Using the most conservative χ/Q value, (the value at the site boundary for the most critical sector), 4.259 $x10^{-6}$ sec/m^3, the estimated HF concentration in air at the site boundary (C_{SB}) is calculated as follows:

C_{SB} = 0.0634 mg/sec x 4.259 $x10^{-6}$ sec/m^3 = 2.701$x10^{-7}$ mg/ m^3

A maximum fluoride accumulation coefficient of 5.1 m^3/g dry wt day was cited in literature. Using the 5.1 m^3/g dry wt day value, an estimated concentration of fluoride in vegetation, (C_{veg}), from emissions at EREF for one year can be calculated as follows:

C_{veg} = 2.701$x10^{-7}$ mg/ m^3 x (5.1 m^3/g dry wt day) x 365 days x 1000 ug/mg = 0.5 ug/g (ppm) dry weight. This value is less than the annual average concentration standard of 40 ppm in IDAPA Part 577.06. Based on the very low anticipated HF emission rates, no exceedance of the bimonthly or maximum forage vegetation standards would be expected.

Comparison to Screening Emission Levels (EL) and Acceptable Ambient Concentrations (AAC) (IDAPA 58.01.01 Parts 585 and 586)

According to Section 4.6.2.1 of the EREF ER, hydrogen fluoride (HF) releases are estimated to be 2.0 kg (4.4 lbs) each year. As a very conservative measure for the purpose of this calculation, it was assumed that all 2.0 kg (4.4 lbs) were emitted in one month period.

To compare to the EL: 4.4 lbs/month ÷ 30 day/month ÷ 24 hrs/day = 6 x 10^{-3} lbs/hr.

This conservative estimate is less than the screening emission limit of 0.167 lbs/hr for fluorides, and, as a result, complies with IDAPA 58.01.01 Sections 210 and 585.

To further assess potential fluoride emissions and to compare to the AAC:
(6 x 10^{-3} lbs/hr) x (453.59 g/lb) = 2.72 g/hr = 0.76 mg/sec

Table 4.6-8 of the EREF ER contains the χ/Q value at the EREF site boundary for the most critical sector (i.e., yields the most conservative value). This value is 4.259 x 10^{-6} sec/m^3.

(0.76 mg/sec) x (4.259 x 10^{-6} sec/m^3) = 3.23 x 10^{-6} mg/m^3

3.23 x 10^{-6} mg/m^3 is much lower than the AAC of 0.125 mg/m^3.

As a result, the emissions of fluorides meet the requirements of IDAPA 58.01.01 Sections 210 and 585.

b. The following assessment reveals that emissions of ethanol and methylene chloride from EREF operation will be in compliance with Idaho air quality regulations:

Per Section 4.6.2.1 of the EREF ER, approximately 173 kg (382 lbs) of ethanol is estimated to be released to the atmosphere each year. Based on recent European operational experience data received subsequent to submittal of the EREF ER, approximately 1,055 kg (2,325 lbs) of methylene chloride is estimated to be released to the atmosphere each year.

To demonstrate compliance with Idaho air quality regulations, the release rates for these two volatile organic compounds were first compared to the Screening Emission Level (EL) contained in IDAPA 58.01.01, Section 585 (for ethanol, a non-carcinogen), and Section 586 (for methylene chloride, a carcinogen). If the potential emission rate exceeded the EL, then the estimated ambient air concentration was calculated and compared to the Ambient Air Concentration (AAC) or Ambient Air Concentration for Carcinogen (AACC).

As shown below, the estimated emission rate for ethanol is less than the EL contained in IDAPA 58.01.01, Section 585. Because the ethanol annual release rate is less than the EL, compliance is demonstrated per IDAPA 58.01.01, Section 210.05. The estimated emission rate for methylene chloride, conversely, is greater than the EL contained in IDAPA 58.01.01, Section 586. As a result, the estimated ambient air concentration for methylene chloride was calculated. The estimated ambient air concentration (as shown below) is less than the AACC, thus demonstrating compliance per IDAPA 58.01.01, Section 210.06.

For ethanol

Calculation of the ethanol release rate followed the guidance of IDAPA 58.01.01, Section 210.02, Quantification of Emission Rates.

Ethanol is used as a degreaser as part of EREF's maintenance procedures. As such, ethanol is released to the atmosphere intermittently, which is assumed to be uncontrolled and occur for 20 hours per week, or 1,040 hrs per year per IDAPA 58.01.01, Section 210.02.b. The estimated emission rate, therefore, is

382 lbs/yr ÷ 1040 hrs/yr = 0.367 lbs/hr

0.367 lbs/hr < 125 lbs/hr (EL)

As a result, the annual average uncontrolled emissions of ethanol demonstrate compliance per IDAPA 58.01.01, Section 210.05.b.

For methylene chloride

Calculation of the methylene chloride release rate followed the guidance of IDAPA 58.01.01, Section 210.02, Quantification of Emission Rates.

Methylene chloride is used as a degreaser as part of EREF's maintenance procedures. As such, methylene chloride is released to the atmosphere intermittently, which is assumed to be uncontrolled and occur for 20 hours per week, or 1,040 hrs per year per IDAPA 58.01.01, Section 210.02.b. The estimated emission rate, therefore, is

2325 lbs/yr ÷ 1040 hrs/yr = 2.236 lbs/hr (annual average)

2.236 lbs/hr > 1.6×10^{-3} lbs/hr (EL)

Because the emission rate is not less than or equal to the EL, a comparison to the AACC was performed per the guidance of IDAPA 58.01.01, Section 210.03, Quantification of Ambient Concentrations. Specifically, the above hourly emission rate was converted to SI units, then multiplied by the site-specific air dispersion factor (χ/Q) to obtain the hourly ambient concentration, then multiplied by a persistence factor of 0.125 (per IDAPA 58.01.01, Section 210.03.a.i) to convert to an annual average concentration, which in turn was compared to the AACC in IDAPA 58.01.01, Section 586. As discussed in the part "a." response, the χ/Q value at the EREF site boundary for the most critical sector (i.e., yields the most conservative value) is 4.259×10^{-6} sec/m^3.

The estimated annual average methylene chloride concentration in air at the site boundary is as follows:

(1) SI Conversion

(2.236 lbs/hr) x (453.59 g/lb) = 1,015 g/hr

(1,015 g/hr) x (1×10^{6} µg/g) = 1.015×10^{9} µg/hr

(2) Annual Average Concentration

(1.015×10^{9} µg/hr) x (4.259×10^{-6} sec/m^3) ÷ 3600 sec/hr x 0.125 = 0.15 µg/m^3

(3) AACC Comparison

0.15 µg/m^3 < 0.24 µg/m^3 (AACC annual average)

As a result, the annual average uncontrolled emissions of methylene chloride demonstrate compliance per IDAPA 58.01.01, Section 210.06.b.

Although for the purpose of calculation both ethanol and methylene chloride were assumed to be released uncontrolled to the atmosphere, AES will in fact have administrative controls, practices, and procedures in place to control their release, as noted in EREF ER Section 5.2.12.1. In addition, AES will investigate alternative solvents for methylene chloride solvent use. Potential solvent alternatives, such as citrus-based, aqueous-based, petroleum hydrocarbons, and glycol ethers, would be evaluated based on their performance as a replacement solvent for methylene chloride, their toxicity and safety characteristics, and costs.

AES will also consider implementing potential source reduction strategies and best management practices (BMPs) for methylene chloride. These activities could include the use of pre-moistened industrial solvent wipers, management of used solvent wipers (storage in leak-

free accumulation containers, keeping the container closed when not adding waste to the container), training of maintenance personnel, and establishing a solvent inventory and use tracking system.

Associated EREF License Application Revisions:

The following changes as shown in Enclosures 3 and 4 will be made to the EREF License Application:

ER Sections 1.3, 3.12.2, 4.6.2.1, 4.12.1.1, and 5.2.12.1
ER Tables 2.1-4, 3.12-2 and 3.12-3
SAR Tables 1.1-1, 1.1-4, and 6.1-4
EP Tables 1.1-4 and 1.1-5

Commitment:

The EREF License Application will be revised to include the ER, SAR, and EP markups provided in Enclosures 3 and 4 in Revision 2 of the EREF License Application.

Reference:

Abstract of "Accumulation of Airborne Fluorides in Forest Trees and Vegetation" R. Hogskolevein, published in the European Journal of Forest Pathology, accessed on the website of the International Society of Fluoride Research at http://www.fluoride-journal.com/97-30-3/303-188b.htm. Date accessed: August 25, 2009

Markup Pages of the EREF Environmental Report:
- ER Section 1.3 (pages 1.3-7, 1.3-8, and insert page)
- ER Section 3.12.2 (page 3.12-9)
- ER Tables 3.12-2 and 3.12-3
- ER Section 4.6.2.1, 4.12.1.1, 5.2.12.1 and insert page

Markup Pages of the EREF Safety Analysis Report:
- SAR Tables 1.1-1 and 1.1-4

subject to permit review. The threshold emission rate for nitrogen dioxide shall be based on total oxides of nitrogen.

Operating Permits (under Title V) are required for major sources that have a potential to emit more than 4.5 kg (10 lbs) per hour or 91 MT (100 tons) per year for criteria pollutants, or for landfills greater than 2.5 million m^3 (88 million ft^3). In addition, major sources also include facilities that have the potential to emit greater than 9.1 MT (10 tons) per year of a single Hazardous Air Pollutant, or 22.7 MT (25 tons) per year of any combination of Hazardous Air Pollutants. Air emissions for the proposed EREF during operations will be less than the limits identified by the standards; therefore, a permit is not required. Similarly, the proposed EREF would not require a National Emissions Standards for Hazardous Air Pollutants (NESHAPS) permit since it would not be a major source of criteria air pollutants and would not be a source of hazardous air pollutants.

For this facility, the potential applicable state permit is the permit to construct (PTC) which is issued by the IDEQ. Specifically, an air quality PTC is required prior to construction or modification of stationary sources, such as buildings, structures, and other installations that emit, or may emit, pollutants into the air. A PTC is also required for certain portable equipment such as generators. The State of Idaho uses a self-exemption process for air quality permits (IDAPA, 2008i). The Rules for Control of Air Pollution in Idaho provide for exemptions to the PTC. These conditions are as follows:

1. Idaho Administrative Code (IDAPA) 58.01.01.220 (IDAPA, 2008i) states the general exemption criteria to be used by owners or operators to exempt certain sources from the requirement to obtain a permit to construct. No permit to construct is required for a source that satisfies the following criteria in subparts (01.a and 01.b):
   a. (01.a) Maximum capacity of a source to emit an air pollutant under its physical and operational design without consideration of limitations on emissions such as air pollutant control equipment, restriction on hours of operation and restrictions on the type and amount of material combusted, stored or processed would not (i.) equal or exceed one hundred (100) tons per year of any regulated air pollutant and (ii.) cause an increase in the emissions of a major facility that equals or exceeds the significant emission rates set out in the definition of significant at Section 006.
   b. (01.b) The source is not part of a proposed new major facility or part of a proposed major modification.
2. IDAPA 58.01.01.222.01(d) (IDAPA, 2008i) states that a source is exempt if it satisfies the criteria set forth in section 220 and if stationary internal combustion engines are used exclusively for emergency purposes, which are operated less than or equal to aggregate of five hundred (500) hours total per year and are fueled by natural gas, propane gas, liquefied petroleum gas, distillate fuel oils, residual fuel oils, and diesel fuel.

   Insert A

   An ~~The~~ other exemption in IDAPA 58.01.01.222.02(c) (IDAPA, 2008i) is for fuel burning equipment used for indirect heating and for reheating furnaces using natural gas, propane gas, liquefied petroleum gas, or biogas (gas produced by the anaerobic decomposition of organic material through a controlled process) with hydrogen sulfide concentrations less than two hundred (200) parts per million by volume (ppmv) exclusively with a capacity of less than (50) million (British thermal units) BTUs per hour input.
3. Record Retention (IDAPA 58.01.01.220.02) (IDAPA, 2008i) states that the owner or operator shall maintain documentation on-site which shall identify the exemption determined to apply to the source and verify that the source qualifies for the identified exemption. The records and documentation shall be kept for a period of time not less than five (5) years

from the date of when the exemption determination has been made or for the life of the source for which the exemption has been determined to apply, which ever is greater, or until such time as a permit to construct or an operating permit is issued which covers the operation of the source. The owner or operator shall submit the documentation to the Department upon request.

Insert B

The proposed facility qualifies for these exemptions and, therefore, a permit is not required for the following reasons:

1. The six diesel generators (standby (4), security, and fire pump), will be used exclusively for emergency purposes and for the purpose of testing these generators, the generators will be meet the hours of operation for testing specified in the IDAPA 58.01.01.222.01(d) (IDAPA, 2008i). Records will be maintained to document the hours of operation for each diesel generator.

Insert C

2. The six (6) diesel generators have the potential to emit less than 25 tons per year of critical air pollutants (oxides of nitrogen (NOx), carbon monoxide (CO), oxides of sulfur dioxide (SO_2), particulate matter (PM_{10}), and volatile organic compounds (VOC)).

Idaho Water Quality Division

To implement the Safe Drinking Water Act (SDWA) requirements on a state level, the Idaho Environmental Protection and Health Act (Idaho Code Chapter 1, Title 39) (IDAHO Code, 2008c) gives the Idaho Department of Environmental Quality (IDEQ) the authority to promulgate rules governing quality and safety of drinking water (IDAPA, 2008b). The Water Quality Division (WQD) is delegated responsibility to implement the SDWA. The state 1) ensures that water systems are tested for contaminants, 2) reviews plans for water system improvements, 3) conducts on-site inspections and sanitary surveys, 4) provides training and technical assistance, and 5) takes action against water systems not meeting standards (EPA, 2004). In addition, a state has primary enforcement responsibility for drinking water systems in the state (CFR, 2008q).

Therefore, drinking water provided at the proposed facility will be governed by the SDWA as a public drinking water system. Rules governing quality and safety of drinking water in Idaho have been promulgated in IDAPA 58.01.08 (IDAPA, 2008b). No person may construct a drinking water system until it is demonstrated to the WQD that the water system will have adequate technical, financial, and managerial capacity (IDAPA, 2008b). Although there is not a permit required for a drinking water system, AES must have a drinking water facility plan that includes sufficient detail to demonstrate that the proposed project meets applicable criteria. The facility plan generally addresses the overall system-wide plan. The facility plan shall identify and evaluate problems related to the drinking water system, assemble basic information, present criteria and assumptions, examine alternative solutions with preliminary layouts and cost estimates, describe financing methods, set forth anticipated charges for users, and review organizational and staffing requirements.

The WQD requires facility owners of drinking water systems to place the direct supervision and operation of their systems under a properly licensed operator. All drinking water systems are also required to have a licensed backup or substitute operator. Operators are licensed by the Idaho State Board of Drinking Water and Wastewater Professionals.

Water systems serving fewer than 10,000 persons are considered to be small systems. IDAPA 58.01.08.005(02)(b) (IDAPA, 2008b) and 40 CFR 142 (CFR, 2008r) provide authorization for obtaining variances from the requirement to comply with Maximum Contaminant Level (MCL) or treatment techniques to systems serving fewer than 10,000 persons. Although a permit is not required for a drinking system serving fewer than 10,000 persons, the IDEQ requires a

RAI #1 and #2

Insert A

IDAPA 58.01.01.223.02.a. (IDAPA, 2008i) states that no permit to construct for toxic air pollutants is required for a source where the uncontrolled emission rate for all toxic air pollutants shall be less than or equal to all applicable screening emission levels listed in Sections 585 and 586.

IDAPA 58.01.01.223.02.b. (IDAPA, 2008i) states that no permit to construct for toxic air pollutants is required for a source where the uncontrolled ambient concentration for all toxic air pollutants at the point of compliance shall be less than or equal to all applicable acceptable ambient concentrations listed in Sections 585 and 586.

Insert B

IDAPA 58.01.01.223.05 (IDAPA, 2008i) states that an annual certified report for the toxic pollutant exemption will be submitted to the Idaho DEQ.

Insert C

3. The estimated emission rates of hydrogen fluoride and ethanol from operations are less than the applicable screening levels for toxic air pollutants and the estimated ambient air concentration of methylene chloride from operations and toxic air pollutants (specifically benzene) from the on-site fueling facility are less than the acceptable ambient concentrations for a carcinogen (AACC).

The sanitary sewage treatment system is capable of handling approximately 18,700 m^3/yr (4,927,500 gal/yr) based on the design number of employees of approximately 550. Figure 3.12-1, Domestic Sanitary Sewage Treatment Plant, shows the planned location of the Domestic Sanitary Sewage Treatment Plant. Treated domestic sanitary effluent is discharged to the lined Cylinder Storage Pads Stormwater Retention Basin and allowed to evaporate.

3.12.2 Solid Waste Management

Solid waste generated at the EREF will be grouped into industrial (nonhazardous), radioactive and mixed, and hazardous waste categories. In addition, solid radioactive and mixed waste will be further segregated according to the quantity of liquid that is not readily separable from the solid material. The solid waste management systems will be a set of facilities, administrative procedures, and practices that provide for the collection, temporary storage, (no solid waste processing is planned), and disposal of categorized solid waste in accordance with regulatory requirements. All solid radioactive wastes generated will be Class A low-level wastes as defined in 10 CFR 61 (CFR, 2008ee).

Industrial waste, including miscellaneous trash, vehicle air filters, empty cutting oil cans, miscellaneous scrap metal, and paper will be shipped offsite for minimization and then sent to a licensed waste landfill. The EREF is expected to produce approximately 70,307 kg (155,000 lbs) of this industrial waste annually. Table 3.12-2, Estimated Annual Non-Radiological Wastes, identifies normal waste streams and quantities.

Radioactive waste will be collected in labeled containers in each Restricted Area and transferred to the Solid Waste Collection Room for inspection. As appropriate, waste will be volume-reduced and all radioactive waste disposed of at a licensed low-level waste disposal facility. The EREF is expected to produce approximately 146,500 kg (323,000 lbs) of radioactive waste annually.

Hazardous wastes (e.g., spent blasting sand, empty spray paint cans, empty propane gas cylinders, solvents such as acetone and toluene, degreaser solvents, hydrocarbon sludge, and chemicals, such as methylene chloride and petroleum ether) and some mixed wastes will be generated at the facility. These wastes will be collected at the point of generation, transferred to the Solid Waste Collection Room, inspected, and classified. Any mixed waste that may be processed to meet land disposal requirements may be treated in its original collection container and shipped offsite as low-level waste for disposal. Table 3.12-2, Estimated Annual Non-Radiological Wastes, lists anticipated hazardous wastes and quantities. The EREF is expected to produce approximately ~~5,062 kg (11,160 lbs)~~ 3,378 kg (7,448 lbs) of hazardous wastes annually.

3.12.2.1 Radioactive and Mixed Wastes

Solid radioactive wastes are produced in a number of plant activities and require a variety of methods for offsite treatment and disposal. These wastes are categorized into wet solid waste and dry solid waste due to differences in storage and disposal requirements found in 40 CFR 264 (CFR, 2008gg) and 10 CFR 61 (CFR, 2008ee), respectively. Dry wastes are defined in 10 CFR 61, Subpart 61.56(a)(3) (CFR, 2008ff), as containing "as little free standing and non-corrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume." Wet wastes for the EREF are defined as those that have as little free liquid as reasonably achievable but with no limit with respect to percent of volume.

All solid radioactive wastes generated are Class A low-level wastes as defined in 10 CFR 61 (CFR, 2008ee). Wastes are transported offsite for disposal by contract carriers. Transportation is in compliance with 49 CFR 107 and 49 CFR 173 (CFR, 2008i) (CFR, 2008k).

Table 3.12-2 Estimated Annual Non-Radiological Wastes
(Page 1 of 1)

Waste	Annual Quantity
Spent Blasting Sand	249.5 kg (550 lbs)
Miscellaneous Combustible Waste	13,472 kg (29,700 lbs)
Cutting Machine Oils	90 L (23.8 gal)
Spent Degreasing Water (from clean workshop)	2 m^3 (528 gal)
Spent Demineralizer Water (from clean workshop)	400 L (106 gal)
Empty Spray Paint Cans*	40 each
Empty Cutting Oil Cans	40 each
Empty Propane Gas Cylinders*	10 each
Acetone*	54 L (14.3 gal)
Toluene*	4 L (1.0 gal)
Degreaser Solvent SS25*	4.8 L (1.3 gal)
Petroleum Ether*	20 L (5.3 gal)
Miscellaneous Scrap Metal	4,183 kg (9,221 lbs)
Motor Oils (for I. C. engines)	3,387 L (895 gal)
Oil Filters	250 each
Air Filters (vehicles)	50 each
Air Filters (building ventilation)	45,359 kg (100,000 lbs)
Hydrocarbon Sludge*	20 kg (44 lbs)
Methylene Chloride*	~~3,687 L (974 gal)~~

* Hazardous waste as defined in 40 CFR 261 (in part or whole) (CFR, 2008v)

2,415 L (638 gal)

Table 3.12-3 Estimated Annual Gaseous Effluent
(Page 1 of 1)

Area	Quantity (yr^{-1})	Discharge Rate m^3/yr (SCF/yr) @STP
Gaseous Effluent Vent Systems	NA	2.6×10^8 (9.18×10^9)
HVAC Systems		
Radiological Areas	NA	1.93×10^9 (max) (6.8×10^{10})
Non-Radiological Areas	NA	2.2×10^9 (max) (7.8×10^{10})
Total Gaseous HVAC Discharge	NA	4.13×10^9 (max) (14.6×10^{10})
Constituents:	**Quantity (yr^{-1})**	
Helium	880 m^3 (31,080 ft^3) @STP	NA
Nitrogen	104 m^3 (STP) (3,672 ft^3)	NA
Ethanol	80 L (21.2 gal)	NA
Laboratory Compounds	Traces (HF)	NA
Argon	380 m^3 (13,418 ft^3) @STP	NA
Hydrogen Fluoride	<2.0 kg (<4.4 lb)	NA
Uranium	<20 g (<0.0441 lb)	NA
Methylene Chloride	~~1,220 L (322 gal)~~	NA
Thermal Waste:		
Summer Peak	55.2×10^9 J/hr (52.3×10^6 BTU/hr)	NA
Winter Peak	78×10^9 J/hr (74×10^6 BTU/hr)	NA

800 L (211 gal)

- Emissions from the operation of four emergency generators will be small. These emission units are exempt from permitting requirements.
- Vehicular emissions are predicted to be extremely low in the vicinity of the site.
- Emissions of hazardous air pollutants are predicted to be insignificant and are well below permitting thresholds.

4.6.2.1 Description of Gaseous Effluents

Uranium hexafluoride (UF_6) will be the radioactive effluent for gaseous pathways. Average source term releases to the atmosphere are estimated to be 19.5 MBq (528 µCi) per year for the purposes of bounding routine operational impacts. European experience indicates that uranium discharges from gaseous effluent ventilation systems are less than 20 g (0.71 ounces) per year. Therefore, 19.5 MBq (528 µCi) is a very conservative estimate and is consistent with an NRC estimate (NRC, 1994) for a 6.6 million SWU plant that has been scaled for the 3.3 million SWU EREF.

Nonradioactive gaseous effluents include hydrogen fluoride (HF), ethanol and methylene chloride. HF releases are estimated to be 2.0 kg (4.4 lbs) each year. Approximately 173 kg (382 lbs) and ~~1,684 kg (3,713 lbs)~~ of ethanol and methylene chloride, respectively, are estimated to be released each year. These values are based on European operational experience. 1,055 kg (2,325 lbs)

In addition, on-site diesel engines include four standby diesel generators for use as standby power sources, a security diesel generator, and a fire pump diesel. Their use will be administratively controlled (i.e., only run a limited number of hours per year to limit emissions) and are exempt from air permitting requirements of the state of Idaho (IDAPA, 2008i).

4.6.2.2 Description of Gaseous Effluent Ventilation Systems and Exhaust Filtration Systems

The principal functions of the gaseous effluent ventilation system (GEVS) is to protect both the operator during connection/disconnection of UF_6 process equipment, and the environment, by collecting and cleaning all potentially hazardous gases from the plant prior to release to the atmosphere. Releases to the atmosphere will be in compliance with regulatory limits.

The stream of air and water vapor drawn into the GEVS can have suspended within it UF_6, hydrogen fluoride (HF), oil and uranium particulates (mainly UO_2F_2). Online instrument measurements will provide a continuous indication to the operator of the quantity of radioactive material and HF in the emission stream. This will enable rapid corrective action to be taken in the event of any deviation from the normal operating conditions.

There are ten Gaseous Effluent Ventilation Systems for the plant: (1) the Separations Building Modules (SBM) Safe-by-Design GEVS (one in each of the four modules), (2) the Separations Building Modules Local Extraction GEVS (one in each of the four modules), (3) the Technical Support Building (TSB) GEVS and (4) the Centrifuge Test and Post Mortem Facilities GEVS within the Centrifuge Assembly Building (CAB). In addition, the TSB, the Blending, Sampling & Preparation Building (BSPB), and the Centrifuge Test and Post Mortem Facilities have HVAC systems that function to maintain negative pressure and exhaust filtration for rooms served by these systems.

The SBM Safe-by-Design GEVS transports potentially contaminated gases to a set of redundant filters (pre-filter, high efficiency particulate air filter, potassium carbonate impregnated activated carbon filter, a final high efficiency particulate air filter) and fans. The cleaned gases

southwest. At 8 km (5 mi), the concentration is calculated to be $1.3x10^{-5}$ $\mu g/m^3$. The nearest resident to the site, or other sensitive receptor (e.g., schools and hospitals) is located beyond 8 km (5 mi) from the proposed EREF footprint.

These comparisons demonstrate that the Eagle Rock Enrichment Facility gaseous HF emissions (even at rooftop without dispersion considered) will be well below any existing standard and, as a result, will have a negligible environmental and public health impact.

Methylene chloride is used in small bench-top quantities to clean certain components. All chemicals at EREF will be used in accordance with the manufacturers recommendations, health and safety regulations and under formal procedures. AES will investigate the use of alternate solvents and/or apply control technologies as required. The remaining effluents listed in Table 3.12-4, Estimated Annual Liquid Effluent, will have no significant impact on the public because they will be used in deminimus levels or are nonhazardous by nature. All regulated gaseous effluents will be below regulatory limits as specified by the Idaho DEQ Air Quality Division.

Worker exposure to in-plant gaseous effluents listed in Table 3.12-3, Estimated Annual Gaseous Effluent, will be minimal. No exposures exceeding 29 CFR 1910, Subpart Z are anticipated (CFR, 2008n). Leaks in UF_6 components and piping would cause air to leak into the system and would not release effluent. All maintenance activities utilize mitigative features including local flexible exhaust hoses connected to the Gaseous Effluent Vent System, thereby minimizing any potential for occupational exposure. Laboratory and maintenance operations activities involving hazardous gaseous or respirable effluents will be conducted with ventilation control (i.e., fume hoods, local exhaust or similar) and/or with the use of respiratory protection as required.

Mitigation measures to control methylene chloride release are described in Section 5.2.12.1.

4.12.1.2 Routine Liquid Effluent

Routine liquid effluents are listed in Table 3.12-4, Estimated Annual Liquid Effluent. The facility does not discharge any industrial effluents to natural surface waters or grounds on site, and there is no facility tie-in to a Publicly Owned Treatment Works (POTW). Liquid process effluents will be contained on the EREF site via collection tanks, sampled and analyzed to determine if treatment is required before release to the atmosphere by evaporation. See Section 2.1.2.3.3 for further discussion of the Liquid Effluent Collection and Treatment System.

There is no water intake from surface water systems in the region. Water supplies will be from on-site groundwater wells. Treated domestic sanitary effluents will flow to lined retention basins to prevent infiltration, as will storm water from the Cylinder Storage Pads. No public acute or chronic (cumulative) impact is expected from routine liquid effluents.

Worker exposure to liquid in-plant effluents shown in Tables 3.12-2, Estimated Annual Non-Radiological Wastes and 3.12-4, Estimated Annual Liquid Effluent will be minimal. No exposures exceeding 29 CFR 1910, Subpart Z are anticipated (CFR, 2008n). Additionally, handling of all chemicals and wastes will be conducted in accordance with the site Environment, Health, and Safety Program which will conform to 29 CFR 1910 and specify the use of appropriate engineered controls, including personnel protective equipment, to minimize potential chemical exposures. As a result, no worker acute or chronic (cumulative) impact is expected from routine liquid effluents.

4.12.2 Radiological Impacts

Sources of radiation exposure incurred by the public generally fall into one of two major groupings, naturally-occurring radioactivity and man-made radioactivity. Naturally-occurring

Insert D

- AES will investigate alternative solvents or will apply control technologies for methylene chloride solvent use.

Administrative controls, practices, and procedures are used to assure compliance with the EREF's Health, Safety, and Environmental Program. This program is designed to ensure safe storage, use, and handling of chemicals to minimize the potential for worker exposure.

5.2.12.2 Radiological – Normal Operations

Mitigation measures to minimize the impact of radiological gaseous effluents are the same as those listed in ER Section 5.2.12.1, Nonradiological - Normal Operations. Additional measures to minimize radiological exposure and release are listed below.

Radiological practices and procedures are in place to ensure compliance with the EREF's Radiation Protection Program. This program is designed to achieve and maintain radiological exposure to levels that are "As Low as Reasonably Achievable" (ALARA). These measures include:

- Routine facility radiation and radiological surveys to characterize and minimize potential radiological dose/exposure
- Monitoring of all radiation workers via the use of dosimeters and area air sampling to ensure that radiological doses remain within regulatory limits and are ALARA
- Radiation monitors are provided in the gaseous effluent vents to detect and alarm, and affect the automatic safe shutdown of process equipment in the event contaminants are detected in the system exhaust. Systems will automatically shut down, switch trains, or rely on operator actions to mitigate the potential release.

5.2.12.3 Accidental Releases

Mitigation measures will be in place to minimize the impact of a potential accidental release of radiological and/or nonradiological effluents. For example, one accident sequence involving UF_6 releases to the environment due to a fire event was mitigated using design features to delay and reduce the UF_6 releases inside the buildings from reaching the outside environment. This mitigative feature includes automatic shutoff of room HVAC system during a fire event.

With mitigation, the dose consequences to the public for this accident sequence, has been reduced to a level below that considered "intermediate consequences," as that term is defined in (10 CFR 70.61(c)) (CFR, 2008oo).

5.2.13 Waste Management

Mitigation measures will be in place to minimize both the generation and impact of facility wastes. Solid and liquid wastes and gaseous effluents will be controlled in accordance with regulatory limits. There will be no radioactively contaminated liquid effluent discharges from facility operations. Mitigation measures include the following.

- System design features are in place to minimize the generation of solid waste, liquid waste, and gaseous effluent. Gaseous effluent design features were previously described in ER Section 5.2.12, Public and Occupational Health.
- There will be no onsite disposal of waste at the EREF. Waste will be stored in designated areas of the plant, until an administrative limit is reached. When the administrative limit is reached, the waste will then be shipped off site to a licensed disposal facility.

Insert D

Potential solvent alternatives, such as citrus-based, aqueous-based, petroleum hydrocarbons, and glycol ethers, would be evaluated based on their performance as a replacement solvent for methylene chloride, their toxicity and safety characteristics, and costs.

AES will also consider implementing potential source reduction strategies and best management practices (BMPs) for methylene chloride. These activities could include the use of pre-moistened industrial solvent wipers, management of used solvent wipers (storage in leak-free accumulation containers, keeping the container closed when not adding waste to the container), training of maintenance personnel, and establishing a solvent inventory and use tracking system.

Table 1.1-1 Estimated Annual Gaseous Effluent
(Page 1 of 1)

Area		Discharge Rate m^3/yr (SCF/yr) (STP)
Gaseous Effluent Vent System	NA	2.6×10^8 (9.18×10^9)
HVAC Systems	NA	
Radiological Areas	NA	1.93×10^9 (max) (6.8×10^{10})
Non-Radiological Areas	NA	2.2×10^9 (max) (7.8×10^{10})
Total Gaseous HVAC Discharge	NA	4.13×10^9 (max) (14.6×10^{10})
Constituents:	**Quantity (yr^1)**	
Helium	880 m^3(STP) (31,080 ft^3)	NA
Nitrogen	104 m^3 (Liquid) (3,672 ft^3)	NA
Ethanol	80 L (21.1 gal)	NA
Laboratory Compounds	Traces (HF)	NA
Argon	380 m^3 (STP) (13,420 ft^3)	NA
Hydrogen Fluoride	<2.0 kg (<4.4 lb)	NA
Uranium	<20 g (<0.0441 lb)	NA
Methylene Chloride	~~1,220 L (322 gal)~~	NA
Thermal Waste:		
Summer Peak	55.2×10^9 J/hr (52.3×10^6 BTU/hr)	NA
Winter Peak	78×10^9 J/hr (74×10^6 BTU/hr)	NA

800 L (211 gal)

Table 1.1-4 Estimated Annual Non-Radiological Wastes
(Page 1 of 1)

Waste	Annual Quantity
Spent Blasting Sand	249.5 kg (550 lbs)
Miscellaneous Combustible Waste	13,472 kg (29,700 lbs)
Cutting Machine Oils	90 L (23.8 gal)
Spent Degreasing Water (from clean workshop)	2 m^3 (528 gal)
Spent Demineralizer Water (from clean workshop)	400 L (106 gal)
Empty Spray Paint Cans*	40 each
Empty Cutting Oil Cans	40 each
Empty Propane Gas Cylinders*	10 each
Acetone*	54 L (14.3 gal)
Toluene*	4 L (1.0 gal)
Degreaser Solvent SS25*	4.8 L (1.3 gal)
Petroleum Ether*	20 L (5.3 gal)
Miscellaneous Scrap Metal	4,183 kg (9,221 lbs)
Motor Oils (for I. C. engines)	3,387 L (895 gal)
Oil Filters	250 each
Air Filters (vehicles)	50 each
Air Filters (building ventilation)	45,359 kg (100,000 lbs)
Hydrocarbon Sludge*	20 kg (44 lbs)
Methylene Chloride*	~~3,687 L (974 gal)~~ 2,415 L (638 gal)

* Hazardous waste as defined in 40 CFR 261 (in part or whole) (CFR, 2008i)