TABLE OF CONTENTS

LIST OF TABLES

None

LIST OF FIGURES

None

5.0 MITIGATION MEASURES

This chapter summarizes the mitigation measures that will be in place to reduce adverse impacts that occur during construction and any other kind of operation of the Eagle Rock Enrichment Facility (EREF).

5.1 IMPACT SUMMARY

This section summarizes the environmental impacts that may result from the construction and operation of the EREF. Complete details of these potential impacts are provided in Chapter 4 of this Environmental Report (ER).

5.1.1 Land Use

Impacts from land use have been characterized in Section 4.1, Land Use Impacts. The site will be converted largely from agricultural to industrial use although much of the site will remain open space. Of the approximate 1,700 ha (4,200 ac) available, only a small portion, approximately 240 ha (592 ac), will be used for construction and permanent structures.

Construction impacts to land will be limited to grading activities necessary to prepare the site and subsequent construction of structures. Impacts to land are expected to be small on a short-term and long-term basis with little cumulative impact to the region.

Impacts will not be substantive as related to the following:

- Land use impact and impact of any related Federal action that may have cumulatively significant impacts. As noted in Section 4.1, construction of the Component Test Facility supporting the High Temperature Gas Reactor at INL is not anticipated to be significant.
- Area and location of land disturbed on either a short-term or long-term basis.

Minor impacts related to erosion control on the site may occur but will be short-term and limited. Mitigation measures associated with these impacts are listed in Section 5.2.1, Land Use.

5.1.2 Transportation

Transportation impact has been characterized in Section 4.2, Transportation Impacts.

With respect to construction-related transportation, no substantive impacts will exist related to the following:

- Construction of the access roads to the facility. Two construction access roads will be constructed from U.S. Highway 20.
- Transportation route and mode for conveying construction material to the facility.
- Impacts of construction transportation such as fugitive dust, emissions, scenic quality, and noise.

Impacts related to construction traffic such as fugitive dust, noise, and emissions will be small and are discussed in Section 4.2.1, Impacts of Construction of Highway Entrances and Access Roads. Additional information on noise impacts is contained in Section 4.7.1, Predicted Noise Levels. Impacts due to traffic volume increases during construction (e.g., from heavy haul vehicles and construction worker commuting) are anticipated to be moderate to large, while the impacts of traffic volume increases associated with operation and decommissioning of the EREF will be small as discussed in Section 4.2.4, Traffic Impacts. Mitigation measures associated with transportation impacts are listed in Section 5.2.2, Transportation.

With respect to the transport of radioactive materials, no substantive impacts will exist related to the following activities:

- Transportation by truck and routes from originating site to the destination.

- Estimated transportation distance from the originating site to the destination.
- Treatment and packaging procedure for radioactive wastes.
- Radiological dose equivalents for incident-free scenarios to the public and workers.
- Impacts of operating transportation vehicles on the environment (radioactive material released from a truck accident).
- Non-radioactive impacts (fatalities from traffic accidents, health effects from exposure to truck emissions).

Impacts related to the transport of radioactive material are addressed in Section 4.2.7, Radioactive Material Transportation. The radioactive materials that will be transported to and from the EREF by truck within the scope of the environmental impacts previously evaluated by the Nuclear Regulatory Commission (NRC) are determined to have a small to moderate impact on overall traffic. Because these impacts have been addressed in previous NRC environmental impact statements (NUREG-0170; NUREG-1790) (NRC, 1977a; NRC, 2005b), no additional mitigation measures are proposed (Section 5.2.2, Transportation).

5.1.3 Geology and Soils

The potential impacts to the geology and soils have been characterized in Section 4.3, Geology and Soils Impacts. Although construction activities may cause short-term increases in soil erosion and dust generation at the site, no substantive impacts will exist related to excavation activities during construction.

The operation phase of the proposed facility will not involve additional disruption of the local bedrock and therefore, is expected to have no impact on the site geology. Also, during operation of the proposed facility, BMPs will be used to manage stormwater runoff. Mitigation measures associated with these impacts are listed in Section 5.2.3, Geology and Soils.

5.1.4 Water Resources

The potential impacts to the water resources have been characterized in Section 4.4, Water Resources Impacts. No substantive impacts will exist related to the following:

- Impacts on surface water and groundwater quality
- Impacts of consumptive water uses (e.g., groundwater depletion) on other water users and adverse impacts on surface-oriented water users resulting from facility activities. The EREF water supply will be obtained from on-site groundwater supply wells. The wells could supply up to 1,713 m^3/day (452,500 gal/day) for industrial use and up to 147 m^3/day (38,800 gal/day) for seasonal irrigation under the AREVA Enrichment Services (AES) water appropriation. The predicted daily water consumption for operation of the EREF is expected to be approximately 68.2 m^3/day (18,000 gal/day) and peak water requirements are expected to be 42 L/s (664 gal/min). The normal annual water usage rate will be 24,870,000 L/yr (6,570,000 gal/yr), which is a very small fraction (i.e., about 4%) of the water appropriation value of 625,000,000 L/yr (165,000,000 gal/yr) for industrial use. The peak water usage is developed based on the assumption that all water users are operating simultaneously. Furthermore, the peak water usage assumes that each water user is operating at maximum demand. This combination of assumptions is very unlikely to occur during the lifetime of the EREF. Nevertheless, the peak water usage is used to size the piping system and pumps. Given that the normal annual water usage rate for the EREF is a

very small fraction of the appropriation value, momentary usages of water beyond the expected normal water usage rate is expected to be well within the water appropriation value for the EREF.

- Hydrological system alterations or impacts.
- Withdrawals and returns of ground water.
- Cumulative effects on water resources.

The EREF will not obtain any water from on-site surface water resources. Daily treated domestic sanitary wastewater will be discharged to the lined Cylinder Storage Pads Stormwater Retention Basins along with stormwater runoff from the Cylinder Storage Pads.

Stormwater from developed portions of the site, excluding the Cylinder Storage Pads, will be collected in the Site Stormwater Detention Basin, as described in Section 3.4, Water Resources. Minor impacts to water resources are discussed in Section 4.4, Water Resources Impacts. Mitigation measures associated with these potential impacts are listed in Section 5.2.4, Water Resources.

5.1.5 Ecological Resources

The potential impacts to the ecological resources have been characterized in Section 4.5, Ecological Resources Impacts. No substantive impacts will exist related to the following:

- Total area of land to be disturbed
- Area of disturbance for each habitat type
- Use of chemical herbicides, roadway maintenance, and mechanical clearing
- Areas to be used on a short-term basis during construction
- Communities or habitats that have been defined as rare or unique or that support threatened and endangered species
- Impacts of elevated construction equipment or structures on species (e.g., bird collisions, nesting areas)
- Impact on important biota.

Impacts to ecological resources will be minimal. Mitigation measures associated with these impacts are listed in Section 5.2.5, Ecological Resources.

5.1.6 Air Quality

The potential impacts to the air quality have been characterized in Section 4.6, Air Quality Impacts. No substantive impacts exist related to the following activities:

- Gaseous effluents
- Visibility impacts.

Impacts to air quality will be minimal. Construction activities will result in interim increases in carbon monoxide, nitrogen dioxide, sulfur dioxide and particulate matter due to vehicle emissions and dust. Impacts from plant operation will consist of emissions of small quantities of volatile organic compounds (VOCs) emissions and trace amounts of HF, UO_2F_2, and other uranic compound effluents remaining in treated air emissions from plant ventilation systems.

A small quantity of VOCs will also be emitted during vehicle refueling that will occur during construction and plant operations. These effluents are significantly below regulatory limits. Mitigation measures associated with air quality impacts are listed in Section 5.2.6, Air Quality.

5.1.7 Noise

The potential impacts related to noise generated by the facility have been characterized in Section 4.7, Noise Impacts. No substantive impacts will exist related to the following activities:

- Predicted typical noise levels at facility perimeter
- Impacts to sensitive receptors (i.e., hospitals, schools, residences, wildlife).

Noise levels will increase during construction and operation of the EREF, but not to a level that will cause significant impact to nearby residents or users of the Bureau of Land Management Hell's Half Acre Wilderness Study Area (WSA) and the Wasden Complex. The nearest residence is about 7.7 km (4.8 mi) east of the proposed site. While the WSA borders the south boundary of the site, the WSA is approximately 2.4 km (1.5 mi) away from the proposed EREF footprint. Mitigation measures associated with noise impacts are listed in Section 5.2.7, Noise.

5.1.8 Historical and Cultural Resources

The potential impacts to historical and cultural resources have been characterized in Section 4.8, Historical and Cultural Resources Impacts. No substantive impacts are anticipated pursuant to the following activities:

- Construction, operation, or decommissioning
- Impact on historic properties
- Potential for human remains to be present in the project area
- Impact on archeological resources.

Most of the facilities, when constructed, would be obscured due to an intervening ridgeline and due to distance from the EREF. Construction activities would also be difficult to observe due to these topographical features. As a result of consultation between AES and the Idaho State Historic Preservation Officer, AES is considering planting 2 m to 3 m (7 ft to 10 ft) tall native vegetation to further mask the portions of the EREF buildings that may be visible from the Wasden Complex. Within the EREF area of direct effects, impacts to historical and cultural resources are expected to be small. Mitigation measures associated with these impacts, if required, are listed in Section 5.2.8, Historical and Cultural Resources.

5.1.9 Visual/Scenic Resources

The potential impacts to visual/scenic resources have been characterized in Section 4.9, Visual/Scenic Resources Impacts. No substantive negative impacts will exist related to the following:

- Impacts on the aesthetic and scenic quality of the site
- Impacts from physical structures
- Impacts on historical, archaeological, or cultural properties of the site
- Impacts on the character of the site setting.

Visual/scenic impacts due to the development of the EREF will result from visual intrusions in the existing landscape character. No structures are proposed that will require the removal of natural or built barriers, screens, or buffers. Mitigation measures associated with these impacts are listed in Section 5.2.9, Visual/Scenic Resources.

5.1.10 Socioeconomic

The potential socioeconomic impacts to the community have been characterized in Section 4.10, Socioeconomic Impacts. No substantive negative impacts will exist related to the following:

- Impacts to population characteristics (e.g., ethnic groups and population density)
- Impacts to housing, health and social services, or educational and transportation resources
- Impacts to the area's tax structure and distribution.

The anticipated socioeconomic impacts from construction and operation of the EREF are expected to be positive throughout the region. Refer to Section 7.1, Economic Cost-Benefits, Facility Construction and Operation). See Section 4.10, Socioeconomic Impacts, for a detailed discussion on socioeconomic impacts.

5.1.11 Environmental Justice

The potential impacts with respect to environmental justice have been characterized in Section 4.11, Environmental Justice. No impacts will exist related to the following:

- Disproportionate impact to minority or low-income population.

Based on the data analyzed and the NUREG-1748 (NRC, 2003a) guidance by which that analysis was conducted, AES determined that no further evaluation of potential environmental justice concerns was necessary, since no Census Block Group within the 6.4-km (4-mi) radius, i.e., 130 km^2 (50 mi^2) of the EREF site contained a minority or low-income population exceeding the NUREG-1748 "20%" or "50%" criteria. See Section 4.11, Environmental Justice.

5.1.12 Public and Occupational Health

This section describes public and occupational health impacts from both nonradiological and radiological sources.

5.1.12.1 Nonradiological - Normal Operations

The potential impacts to public and occupational health for nonradiological sources have been characterized in Section 4.12.1, Nonradiological Impacts. No substantive impacts exist as related to the following:

- Impact to members of the public from nonradiological discharge of liquid effluents (i.e., treated domestic sanitary waste) to water or gaseous effluents to air
- Impact to facility workers as a result of occupational exposure to nonradiological chemicals, effluents, and wastes
- Cumulative impacts to public and occupational health.

Impacts to the public and workers from nonradiological gaseous and liquid effluents will be minimal. Mitigation measures associated with these impacts are listed in Section 5.2.12.1, Nonradiological - Normal Operations.

5.1.12.2 Radiological - Normal Operations

This subsection describes public and occupational health impacts from radiological sources. It provides a brief description of the methods used to assess the pathways for exposure and the potential impacts.

5.1.12.2.1 Pathway Assessment

The potential for exposure to radiological sources included an assessment of pathways that could convey radioactive material to members of the public. These are briefly summarized below. Potential points or areas were characterized to identify:

- Nearest site boundary
- Nearest full time resident
- Location of average member of the critical group
- In addition, important ingestion pathways such as stored and fresh vegetables, milk, and meat, assumed to be grown or raised at the nearest resident location, have been analyzed. There are no off-site releases to any surface waters or Publicly Owned Treatment Works (POTW).

5.1.12.2.2 Public and Occupational Exposure

The potential impacts to public and occupational health for radiological sources have been characterized in Section 4.12, Public and Occupational Health Impacts. No substantive impacts exist as related to the following:

- Impacts based on the average annual concentration of radioactive and hazardous materials in gaseous effluents
- Impacts to the public (as determined by the critical group)
- Impacts to the workforce based on radiological and chemical exposures
- Impacts based on reasonably foreseeable (i.e., credible) accidents with the potential to result in environmental releases.

Routine operations at the EREF create the potential for radiological and nonradiological public and occupational exposure. Radiation exposure is due to the facility's use of the isotopes of uranium and the presence of associated decay products. Chemical and radiological exposures are primarily from byproducts of UF_6, UO_2F_2, hydrogen fluoride and related uranic compounds that will form inside facility equipment and from reaction with components. These are the primary products of concern in gaseous effluents that will be released from the facility. Mitigation measures associated with these impacts are listed in Section 5.2.12, Public and Occupational Health.

5.1.12.3 Accidental Releases

All credible accident sequences were considered during the Integrated Safety Analysis (ISA) performed for the facility. Accidents evaluated fell into two general types: criticality events and UF_6 releases. Criticality events and some UF_6 release scenarios were shown to result in potential radiological and HF chemical exposures, respectively, to the public. Gaseous releases of UF_6 react quickly with moisture in the air to form HF and UO_2F_2. Consequence analyses showed that HF was the bounding consequence for all gaseous UF_6 releases to the environment. For some fire cases, uranic material in waste form or in chemical traps provided the bounding case. Accidents that produced unacceptable consequences to the public resulted in the identification of various design bases, design features, and administrative controls.

During the ISA process, evaluation of most accident sequences resulted in identification of design bases and design features that prevent a criticality event or HF release to the environment. Table 4.12-28, Accident Criteria Chemical Exposure Limits by Category, lists the accident criteria chemical exposure limits (HF) by category for an immediate consequence and high consequence categories.

All HF release scenarios with the exception of those caused by one fire case are controlled through design features or by administrative procedural control measures.

The seismic accident scenario considers an earthquake event of sufficient magnitude to fail the UF_6 process piping and some UF_6 components resulting in a large gaseous UF_6 release inside the buildings housing UF_6 process systems. Several accident sequences involving HF releases to the environment due to seismic events were prevented using design features to preclude the release of UF_6 from process piping and components.

The fire accident scenario considers a fire within the Technical Support Building (TSB) that causes the release of uranic material from open waste containers and chemical traps during waste drum filling operations.

Potential adverse impacts for accident conditions are described in Section 4.12.3, Environmental Effects of Accidents. Mitigation measures associated with these impacts are listed in Section 5.2.12.3, Accidental Releases.

5.1.13 Waste Management

The potential impacts of waste generation and waste management have been characterized in Section 4.13, Waste Management Impacts. No substantive impacts exist as related to the following:

- Impact to the public due to the composition and disposal of solid, hazardous, radioactive and mixed wastes
- Impact to facility workers due to storage, processing, handling, and disposal of solid, hazardous, radioactive and mixed wastes
- Cumulative impacts of waste management.

Waste generated at the EREF will be comprised of industrial (nonhazardous), radioactive and mixed, and hazardous waste categories. In addition, radioactive and mixed waste will be further segregated according to the quantity of liquid that is not readily separable from the solid material. Gaseous effluent impacts are discussed in Section 5.1.12.2, Radiological - Normal Operations. No radioactively contaminated liquid effluent impacts are anticipated since there will be no radioactively contaminated liquid effluent discharges from plant operations. Depleted

uranium tails cylinders are stored on site at an outdoor storage area and will minimally impact the environment. (See Section 5.2.13, Waste Management.)

Mitigation measures associated with waste management are listed in Section 5.2.13, Waste Management.

5.2 MITIGATIONS

This section summarizes the mitigation measures that are in place to reduce adverse impacts that may result from the construction and operation of the proposed Eagle Rock Enrichment Facility (EREF). The residual and unavoidable adverse impacts, which will remain after application of the mitigation measures, are of such a small magnitude that AREVA Enrichment Services (AES) considers that additional analysis is not necessary.

5.2.1 Land Use

The anticipated effects on the soil during construction activities are limited to a potential short-term increase in soil erosion. However, this impact will be mitigated by following construction best management practices (BMPs), including:

- Minimizing the construction footprint to the extent possible.
- Limiting site slopes to a horizontal-vertical ratio of four to one or less.
- Using a sedimentation detention basin.
- Protecting undisturbed areas with silt fencing and straw bales as appropriate.
- Using site stabilization practices such as placing crushed stone on top of disturbed soil in areas of concentrated runoff.
- Watering on-site construction roads at least twice daily (when needed) to control fugitive dust emissions.

Additional discussion is provided in ER Section 5.2.3, Geology and Soils.

After construction is complete, the site will be stabilized with natural, low water consumption, low-maintenance landscaping, and pavement.

5.2.2 Transportation

Mitigation measures will be used to reduce traffic volumes and minimize fugitive dust production, noise, and wildlife mortality. These measures will include the following:

- Encouraging car-pooling to minimize traffic due to employee travel.
- Staggering shift changes to reduce the peak traffic volume on U.S. Highway 20.
- Construction deliveries (e.g., concrete truck deliveries, engineered fill deliveries, construction supplies) will be coordinated and scheduled to avoid peak traffic periods, thereby minimizing traffic impacts.
- Constructing and using acceleration and deceleration lanes to improve traffic flow and safety on U.S. Highway 20 at the proposed EREF highway entrances.
- Using water for dust suppression at least twice daily (when needed) on dirt roads, in clearing and grading operations, and construction activities. Other fugitive dust prevention and control methods will also be implemented.
- Using adequate containment methods during excavation and/or other similar operations, including minimizing the construction footprint, limiting site slopes to a horizontal to vertical ratio of four to one or less, constructing a sedimentation detention basin, protecting

undisturbed areas with silt fencing and straw bales, and placing crushed stone on top of disturbed soil in areas of concentrated runoff.

- Covering open-bodied trucks that transport materials likely to give rise to airborne dust.
- Promptly removing earthen materials on paved roads on the EREF site carried onto the roadway by wind, trucks, or earth moving equipment.
- Promptly stabilizing or covering bare areas once roadway and highway entrance earthmoving activities are completed.
- Maintaining low speed limits on site to reduce noise and minimize impacts to wildlife.

Mitigation measures will be used to minimize the release of dirt and other matter onto Highway 20 during construction. These measures will include the following:

- Gravel pads will be built at the EREF entry/exit points along U.S. Highway 20 in accordance with the Idaho Department of Environmental Quality (IDEQ) Catalog of Stormwater Best Management Practices for Idaho Cities and Counties, Volume 2, Erosion and Sediment Controls (IDEQ, 2009). Periodic top dressing of clean stone will be applied to the gravel pads, as needed, to maintain effectiveness of the stone voids. Tire washing will be performed as needed, on a stabilized stone (gravel) area which drains to a sediment trap.
- Vehicles will be inspected for cleanliness from dirt and other matter that could be released onto Highway 20 prior to entering U.S. Highway 20.
- Open-bodied trucks will be covered (e.g., the installation of tarps over open beds) to prevent debris from falling off or blowing out of vehicles onto the highway.

5.2.3 Geology and Soils

Mitigation measures will be in place to minimize potential impact on geology and soils. These include the following items:

- The use of BMPs will be used to reduce soil erosion (e.g., earth berms, dikes, and sediment fences).
- Prompt revegetation or covering of bare areas with natural materials will be used to mitigate impacts of erosion due to construction activities.
- Watering will be used to control potentially fugitive construction dust.
- Process water will be contained within enclosed systems and will not be disposed to the subsurface bedrock or local soils.
- BMPs will be used to manage stormwater runoff from paved and compacted surfaces to drainage ditches and basins.
- Grading plans will be designed to minimize overland flow of stormwater and direct stormwater to the Site Stormwater Detention Basin.
- Standard drilling and blasting techniques, if required, will be used to minimize impact to bedrock, reducing the potential for over-excavation thereby minimizing damage to the surrounding rock, and protecting adjacent surfaces that are intended to remain intact.
- Soil stockpiles generated during construction will be placed in a manner to reduce erosion.
- On-site excavated materials will be reused whenever possible.

5.2.4 Water Resources

Mitigation measures will be in place to minimize potential impacts on water resources during construction and operation. These include employing BMPs and the control of hazardous materials and fuels. In addition, the following controls will also be implemented:

- Construction equipment will be in good repair without visible leaks of oil, greases, or hydraulic fluids.
- The control and mitigation of spills during construction will be in conformance with the Spill Prevention Control and Countermeasure (SPCC) plan.
- BMPs will be used to control stormwater runoff to prevent releases to nearby areas to the extent possible. See Section 4.1.1 for descriptions of construction BMPs.
- In addition to twice daily watering (when needed), other BMPs will also be used for dust control associated with excavation and fill operations during construction.
- Silt fencing and/or sediment traps will be used.
- External vehicle washing will use only water (no detergents).
- Stone construction pads will be placed at entrance/exits where unpaved construction access adjoins a state road.
- All temporary construction and permanent basins will be arranged to provide for the prompt, systematic sampling of runoff in the event of any special needs.
- Water quality impacts will be controlled during construction by compliance with the National Pollution Discharge Elimination System (NPDES) - Construction General Permit requirements and by applying BMPs as detailed in the site Stormwater Pollution Prevention Plan (SWPPP).
- A SPCC plan will be implemented for the facility to identify potential spill substances, sources, and responsibilities.
- All above ground gasoline and diesel fuel storage tanks will be bermed or self contained.
- Any hazardous materials will be handled by approved methods and shipped off site to approved disposal sites. Sanitary wastes generated during site construction will be handled by portable systems until the Domestic Sanitary Sewage Treatment Plant is available for site use. An adequate number of these portable systems will be provided.
- The Liquid Effluent Collection and Treatment System will use evaporators, eliminating the need to discharge treated process water to an on-site basin.
- Water from the EREF Domestic Sanitary Sewage Treatment Plant will meet required levels for all contaminants stipulated in any permit or license required for that activity.
- Control of surface water runoff will be required for activities covered by the NPDES Construction General Permit.

The proposed EREF will be designed to minimize the use of water resources as shown by the following measures:

- The use of low-water consumption landscaping versus conventional landscaping reduces water usage.
- The installation of low flow toilets, sinks, and showers reduces water usage.

- Localized floor washing using mops and self-contained cleaning machines reduces water usage compared to conventional washing with a hose.
- Laundry services will not be performed on site resulting in use of less water and laundry wash water will not have to be treated and disposed.
- Closed-loop cooling systems have been incorporated to reduce water usage.
- Cooling towers will not be used resulting in the use of less water since evaporative losses and cooling tower blowdown are eliminated.

The facility design will include two types of basins. The Site Stormwater Detention Basin will collect runoff from parking lots, roofs, roads, landscaped areas and diversions from unaltered areas around the site. The detention basin will be designed to contain runoff for a volume equal to the 24-hour, 100-year return frequency rainstorm.

The Cylinder Storage Pads Stormwater Retention Basins will collect runoff from the Cylinder Storage Pads and treated domestic sanitary waste water. The retention basin will be lined to prevent infiltration and designed to retain a volume equal to twice that for the 24-hour, 100-year frequency rain storm plus allowances for daily treated domestic sanitary discharges. The retention basins will have no flow outlets so that the only means for water loss is by evaporation. The retention basins will also be designed for sampling of the contained water and sediment.

5.2.5 Ecological Resources

Mitigation measures will be in place to minimize potential impact on ecological resources. These include the following items:

- The management of unused open areas (i.e., leave undisturbed), including areas of native grasses and shrubs for the benefit of wildlife.
- The use of native plant species (i.e., low-water consuming plants) to revegetate disturbed areas to enhance wildlife habitat.
- The stormwater discharge basins will be fenced to limit access by wildlife.
- Vehicle speeds onsite will be reduced.
- Best management practices will be used to minimize dust. Water will be applied at least twice daily (when needed) to control dust in construction areas in addition to other fugitive dust prevention and control methods.
- All lights will be focused downward.
- The existing boundary fence will be improved to ensure pronghorn access to the remaining habitat on the proposed site.
- Removal of livestock, when the plant becomes operational, to improve sagebrush habitat.
- To protect migratory birds during the construction and decommissioning of the EREF, the following measures will be taken:
    - Clearing or removal of habitat (e.g., sagebrush), including buffer zones, will be performed outside of the breeding and nesting season for migratory birds.
    - If additional areas are to be disturbed or impacted that have not been cleared outside of breeding and nesting season, surveys will be performed to identify active nests during

breeding and nesting season for migratory birds. Activities in areas containing active nests for migratory birds will be avoided.

  - AES will consult with the United States Fish and Wildlife Service to determine the appropriate actions to take a migratory bird, if needed.

- No herbicides will be used during construction, but may be used during operations in limited amounts along the access roads, plant area, and security fence surrounding the plant. Herbicides would be used according to government regulations and manufacturer's instructions to control unwanted noxious vegetation during operation of the plant.
- Any eroded areas that may develop will be repaired and stabilized, and sediment will be collected in a stormwater detention basin.
- Erosion and runoff control methods, both temporary and permanent, will follow BMPs. BMPs will include minimizing the construction footprint to the extent possible, limiting site slopes to a horizontal to vertical ratio of four to one or less, using sedimentation detention basins, protecting adjacent undisturbed areas with silt fencing and straw bales as appropriate, and using crushed stone on top of disturbed soil in areas of concentrated runoff.
- Re-seed cropland areas on the property with native species when the plant becomes operational.

In addition to proposed wildlife management practices above, AES will consider all recommendations of appropriate state and federal agencies, including the United States Fish and Wildlife Service and the Idaho Department of Fish and Game.

5.2.6 Air Quality

Mitigation measures will be in place to minimize potential impact on air quality. These include the following items:

- The SBM GEVS with Passive IROFS that Contain Safe-by-Design Component Attributes and SBM Local Extraction GEVS are designed to collect and clean all potentially hazardous gases from the plant prior to release into the atmosphere. Instrumentation is provided to detect and signal via alarm all non-routine process conditions, including the presence of radionuclides or hydrogen fluoride (HF) in the exhaust system that will trip the system to a safe condition in the event of effluent detection beyond routine operational limits.
- The TSB GEVS is designed to collect and clean all potentially hazardous gases from the serviced areas in the TSB prior to release into the atmosphere. Instrumentation is provided to detect and signal the Control Room via alarm all non-routine process conditions, including the presence of radionuclides or HF in the exhaust stream. Operators will then take appropriate actions to mitigate the release.
- The Centrifuge Test and Post Mortem Facilities GEVS is designed to collect and clean all potentially hazardous gases from the serviced areas in the Centrifuge Assembly Building prior to release into the atmosphere. Instrumentation is provided to detect and signal the Control Room via alarm all non-routine process conditions, including the presence of radionuclides or HF in the exhaust stream. Operators will then take appropriate actions to mitigate the release.
- The TSB Contaminated Area HVAC, the Ventilated Room HVAC System in the BSPB, and the Centrifuge Test and Post Mortem Facilities Exhaust Filtration System are designed to

collect and clean all potentially hazardous gases from the serviced areas prior to release into the atmosphere.

- Fuel dispensing at the Gasoline and Diesel Fueling Station will be via automated, approved dispensing equipment to minimize emissions and spill potential.
- Construction BMPs will be applied to minimize fugitive dusts.
- Applying gravel to the unpaved surface of haul roads.
- Imposing speed limits on unpaved haul roads.
- Applying an environmentally safe chemical soil stabilizer or chemical dust suppressant to the surface of the unpaved haul roads.
- Using water spray bars at drop and conveyor transfer points.
- Limiting the height and disturbances of stockpiles.
- Applying water to the surface of stockpiles.
- Air concentrations of the Criteria Pollutants resulting from vehicle emissions and fugitive dust will be below the National Ambient Air Quality Standards.

5.2.7 Noise

Mitigation of the operational noise sources will occur primarily from the plant design, whereby cooling systems, valves, transformers, pumps, generators, and other facility equipment, will mostly reside inside plant structures. The buildings themselves will absorb the majority of the noise located within. Natural land contours, vegetation (such as scrub brush), and site buildings and structures will mitigate the impact of other equipment located outside of structures that contribute to site noise levels.

The nearest home is located approximately 7.7 km (4.8 mi) east of the proposed site; and the Bureau of Land management Hell's Half Acre Wilderness Study Area (WSA) is located immediately south of the proposed site. Both the residence and the WSA are near U.S. Highway 20. To minimize noise impacts to the residence, most of U.S. Highway 20 use will be restricted after twilight through early morning hours. Similarly, heavy truck and earth moving equipment usage during construction of the access roads and highway entrances will be restricted after twilight through early morning hours to minimize noise impacts on the WSA.

AES will minimize and manage noise and vibration impacts during construction and decommissioning by:

1. Performing construction or decommissioning activities with the potential for noise or vibration at residential areas that could have a negative impact on the quality of life during the day-time hours (7:00 a.m. – 7:00 p.m.). If it is necessary to perform an activity that could result in excessive noise or vibration in a residential area after hours, the community will be notified in accordance with the site procedures.
2. Engineered and administrative controls for equipment noise abatement, including the use of equipment and vehicle mufflers, acoustic baffles, shrouding, barriers and noise blankets.
3. Sequencing construction or decommissioning activities to minimize the overall noise and vibration impact (e.g., establishing the activities that can occur simultaneously or in succession).
4. Utilizing blast mats, if necessary.

5. Creating procedures for notifying State and local government agencies, residents, and businesses of construction or decommissioning activities that may produce high noise or vibration that could affect them.
6. Posting appropriate State highway signs warning of blasting.
7. Creating a Complaint Response Protocol for dealing with and responding to noise or vibration complaints, including entering the complaint into the site's Corrective Action Program.

5.2.8 Historical and Cultural Resources

Mitigation measures will be in place to minimize any potential impact on historical and cultural resources. In the event that any inadvertent discovery of human remains or other item of archeological significance is made during construction, the facility will cease construction activities in the area around the discovery and notify the State Historic Preservation Officer (SHPO) to make the determination of appropriate measures to identify, evaluate, and treat these discoveries.

Mitigation of the impact to historical and cultural sites within the EREF project boundary can take a variety of forms. Avoidance and data collection are the two most common forms of mitigation recommended for sites considered eligible for inclusion in the National Register of Historic Places (NRHP). Significance criteria (a-d) serve as the basis for a determination that a site is eligible for inclusion in the NRHP. When possible, avoidance is the preferred alternative because the site is preserved in place and mitigation costs are minimized. When avoidance is not possible, data collection becomes the preferred alternative.

Data collection can take place after sites recommended eligible in the field have been officially determined eligible by the SHPO and a treatment plan has been submitted and approved. The plan describes the expected data content of the sites and the methodology for collection, analysis, and reporting. For the EREF, one site, MW004, has been recommended eligible for inclusion in the NRHP under criteria a and d. A treatment/mitigation plan for MW004 will be developed by AES to recover significant information.

Procedures to deal with unexpected discoveries will be developed in a plan prepared by AES. The plan will set forth the process for dealing with discoveries of human remains or previously unidentified archaeological materials that are discovered during ground disturbing activities and will establish procedures for the evaluation and treatment of these resources.

Materials that may be recovered for analysis during discovery or data recovery activities include artifacts and samples (e.g., bone, charcoal, sediments). Certain types of samples, such as radiocarbon samples, are usually submitted to outside analytical laboratories. All resources within the EREF are located on private land.

AES has also assessed the potential visual impact of the EREF on the Wasden Complex viewshed and has provided the assessment to the SHPO. AES is currently working with SHPO to address their concerns. AES has consulted with the Shoshone-Bannock Tribe. Consultation letters are included in ER Appendix A.

5.2.9 Visual/Scenic Resources

Mitigation measures will be in place to minimize the impact to visual and scenic resources. These include the following items:

- Accepted natural, low water consumption landscaping techniques will be used to limit any potential visual impacts. These techniques will incorporate, but not be limited to, the use of native landscape plantings and crushed stone pavements on difficult to reclaim areas.
- Aesthetically pleasing screening measures such as berms and earthen barriers, natural stone, and other physical means may be used to soften the buildings.
- Prompt revegetation or covering of bare areas with natural materials will be used to mitigate visual impacts due to construction activities.
- Neutral colors will be used for structures.
- Lighting will be limited to meet security requirements and focusing lighting toward the ground to reduce night lighting in the surrounding area.

5.2.10 Socioeconomic

No socioeconomic mitigation measures are anticipated.

5.2.11 Environmental Justice

No environmental justice mitigation measures are anticipated.

5.2.12 Public and Occupational Health

5.2.12.1 Nonradiological – Normal Operations

Mitigation measures will be in place to minimize the impact of nonradiological gaseous and liquid effluents to well below regulatory limits. The facility design incorporates numerous features to minimize potential gaseous and liquid effluent impacts including:

- Process systems that handle UF_6 operate at sub-atmospheric pressure, minimizing outward leakage of UF_6
- UF_6 cylinders are moved only when cool and when UF_6 is in solid form minimizing the risk of inadvertent release due to mishandling
- Process off-gas from UF_6 purification and other operations passes through cold traps to solidify and reclaim as much UF_6 as possible. Remaining gases pass through high-efficiency filters and chemical absorbers removing HF and uranic compounds
- Waste generated by decontamination of equipment and systems are subjected to processes that separate uranic compounds and various other heavy metals in the waste material
- Liquid and solid waste handling systems and techniques are used to control wastes and effluent concentrations
- Gaseous effluent passes through pre-filters, high efficiency particulate air (HEPA) filters, and activated carbon filters, all of which reduce the radioactivity in the final discharged effluent to very low concentrations
- Process liquid waste is routed to collection tanks, and treated through a combination of precipitation, evaporation, and ion exchange to remove most of the radioactive material prior to a final evaporation step to preclude any liquid effluent release from the facility

- All UF_6 process systems are monitored by instrumentation, which will activate alarms in the Control Room and will either automatically shut down the facility to a safe condition or alert operators to take the appropriate action (i.e., to prevent release) in the event of operational problems
- AES will investigate alternative solvents or will apply control technologies 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.

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.
- All radioactive and mixed wastes will be disposed of at off-site, licensed facilities.

Mitigation measures associated with depleted uranium tails cylinder storage are as follows:

- AES will maintain a cylinder management program to monitor storage conditions on the Full Tails Cylinder Storage Pads, to monitor cylinder integrity by conducting routine inspections for breaches, and to perform cylinder maintenance and repairs as needed.
- All tails cylinders filled with depleted uranium hexafluoride (UF_6) will be stored on concrete (or other suitable material) saddles that do not cause corrosion of the cylinders. These saddles will be placed on a concrete pad.
- The storage pad areas will be segregated from the rest of the enrichment facility by barriers (e.g., vehicle guard rails).
- Depleted uranium tails cylinders will be double stacked on the storage pad. The storage array will permit easy visual inspection of all cylinders.
- Depleted uranium tails cylinders will be surveyed for external contamination (wipe tested), prior to being placed on a Full Tails Cylinder Storage Pad or transported off site.
- Depleted uranium tails cylinder valves will be fitted with valve guards to protect the cylinder valve during transfer and storage.
- Provisions will be in place to ensure that depleted uranium tails cylinders will not have defective valves (identified in NRC Bulletin 2003-03, "Potentially Defective 1-Inch Valves for Uranium Hexafluoride Cylinders") (NRC, 2003d) installed.
- All UF_6 cylinders will be abrasive blasted and coated with anti-corrosion primer/paint when manufactured (as required by specification). Touch-up application of coating will be performed on depleted uranium tails cylinders if coating damage is discovered during inspection.
- Only designated vehicles, operated by trained and qualified personnel, will be allowed on the Full Tails Cylinder Storage Pads, Full Feed Cylinder Storage Pads, Full Product Cylinder Storage Pad and the Empty Cylinder Storage Pads. Refer to the ISA Summary, Section 3.8 for controls associated with vehicle fires on or near the Cylinder Storage Pads.

Depleted uranium tails cylinders will be inspected for damage prior to placing a filled cylinder on a storage pad. Depleted uranium tails cylinders will be re-inspected annually for damage or surface coating defects. These inspections will verify that:

- Lifting points are free from distortion and cracking.

- Cylinder skirts and stiffener rings are free from distortion and cracking.
- Cylinder surfaces are free from bulges, dents, gouges, cracks, or significant corrosion.
- Cylinder valves are fitted with the correct protector and cap.
- Cylinders are inspected to confirm that the valve is straight and not distorted, two to six threads are visible, and the square head of the valve stem is undamaged.
- Cylinder plugs are undamaged and not leaking.
- If inspection of a depleted uranium tails cylinder reveals significant deterioration or other conditions that may affect the safe use of the cylinder, the contents of the affected cylinder will be transferred to another good condition cylinder and the defective cylinder will be discarded. The root cause of any significant deterioration will be determined, and if necessary, additional inspections of cylinders will be made.
- Proper documentation on the status of each depleted uranium tails cylinder will be available on site, including content and inspection dates.
- The lined Cylinder Storage Pads Stormwater Retention Basins will be used to capture stormwater runoff from the Full Tails Cylinder Storage Pads.

Other waste mitigation measures will include:

- Power usage will be minimized by efficient design of lighting systems, selection of high-efficiency motors, and use of proper insulation materials.
- Processes used to clean up wastes and effluents, create their own wastes and effluent as well. Control of these process effluents will be accomplished by liquid and solid waste handling systems and techniques as described below:
    - Careful applications of basic principles for waste handling will be followed in all of the systems and processes.
    - Different waste types will be collected in separate containers to minimize contamination of one waste type with another. Materials that can cause airborne contamination will be carefully packaged, and; ventilation and filtration of the air in the area will be provided as necessary. Liquid wastes will be confined to piping, tanks, and other containers; curbing, pits, and sumps will be used to collect and contain leaks and spills.
    - Hazardous wastes will be stored in designated areas in carefully labeled containers. Mixed wastes will also be contained and stored separately.
    - Strong acids and caustics will be neutralized before entering an effluent stream.
    - Radioactively contaminated wastes will be decontaminated and/or re-used in so far as possible to reduce waste volume.
    - Collected waste such as trash, compressible dry waste, scrap metals, and other candidate wastes, will be volume reduced at a centralized waste processing facility.
    - Waste management systems will include administrative procedures and practices that provide for the collection, temporary storage, processing, and disposal of categorized solid waste in accordance with regulatory requirements.
    - Handling and treatment processes will be designed to limit wastes and effluent. Sampling and monitoring will be performed to assure that plant administrative and

regulatory limits will not be exceeded.

- Gaseous effluent will be monitored for HF and for radioactive contamination before release.
- Liquid wastes will be sampled and/or monitored in liquid waste treatment systems.
- Solid wastes will be sampled and/or monitored prior to offsite treatment and disposal.
- Process system samples will be returned to their source, where feasible, to minimize input to waste streams.

- The EREF will implement a spill control program for accidental oil spills. A Spill Prevention Control and Countermeasure (SPCC) Plan will be prepared prior to the start of operation of the facility or prior to the storage of oil on site in excess of de minimis quantities and will contain the following information:
  - Identification of potential significant sources of spills and a prediction of the direction and quantity of flow that will likely result from a spill from each source.
  - Identification of the use of containment or diversionary structures such as dikes, berms, culverts, booms, sumps, and diversion ponds at the facility to control discharged oil.
  - Procedures for inspection of potential sources of spills and spill containment/diversion structures.
  - Assigned responsibilities for implementing the plan, inspections, and reporting.
  - As part of the SPCC Plan, other measures will include control of drainage of rain water from diked areas, containment of oil, gasoline, and diesel fuel in bulk storage tanks, above ground tank integrity testing, and oil, gasoline, and diesel fuel transfer operational safeguards.

Currently, the EREF construction plan has not been developed enough to determine how much of construction debris will be recycled. As such, there is no plan in place at this time to recycle construction materials. A construction phase recycling program will be developed as the construction plan progresses to final design.

The EREF will implement a non-hazardous materials waste recycling plan during operation. The recycling effort will start with the performance of a waste assessment to identify waste reduction opportunities and to determine which materials will be recycled. Once the decision has been made of which waste materials to recycle, brokers and haulers will be contacted to find an end-market for the materials. Employee training on the recycling program will be performed so that employees will know which materials are to be recycled. Recycling bins and containers will be purchased and will be clearly labeled. Periodically, the recycling program will be evaluated (i.e., waste management expenses and savings, recycling and disposal quantities) and the results reported to the employees.