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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 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 47 L/s (739 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.

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 0.6 m to 0.9 m (2 ft. to 3 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.
- Periodically using water on on-site construction roads, as required, 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 or surfactants for dust suppression on dirt roads, in clearing and grading operations, and construction activities. Water conservation will be considered when deciding how often dust suppression water sprays will be applied.
- 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 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.

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.

- BMPs will also be used for dust control associated with excavation and fill operations during construction. Water conservation will be considered when deciding how often dust suppression sprays will be applied.
- 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 diesel storage tanks will be bermed.
- 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. When required, water will be applied to control dust in construction areas. Water conservation will be considered when deciding how often dust suppression sprays will be applied.
- 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.
- Precautions will be taken during land clearing activities to protect migratory birds during nesting season.
- 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 Safe-by-Design GEVS 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.
- Construction BMPs will be applied to minimize fugitive dusts.
- Applying gravel to the unpaved surface of secondary access road.
- Imposing speed limits on unpaved secondary access road.
- 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. All noise suppression systems on vehicles will be kept in proper operation.

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.

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 and diesel fuel in bulk storage tanks, above ground tank integrity testing, and oil 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.

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6.0 ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

6.1 RADIOLOGICAL MONITORING

6.1.1 Effluent Monitoring Program

The Nuclear Regulatory Commission (NRC) requires, pursuant to 10 CFR 20 (CFR, 2008x) that licensees conduct surveys necessary to demonstrate compliance with these regulations and to demonstrate that the amount of radioactive material present in effluent from the facility has been kept as low as reasonably achievable (ALARA). In addition, the NRC requires, pursuant to 10 CFR 70 (CFR, 2008b), that licensees submit semiannual reports, specifying the quantities of the principal radionuclides released to unrestricted areas and other information needed to estimate the annual radiation dose to the public from effluent discharges. The NRC has also issued Regulatory Guide 4.15 "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment" (NRC, 1979) and Regulatory Guide 4.16 "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants" (NRC, 1985b) that reiterate that concentrations of hazardous materials in effluent must be controlled and that licensees must adhere to the ALARA principal such that there is no undue risk to the public health and safety at or beyond the site boundary.

Refer to Figure 6.1-1, Effluent Release Points and Meteorological Tower, and Figure 6.1-2, Modified Site Features With Proposed Sampling Stations and Monitoring Locations. Effluents are sampled as indicated in Table 6.1-1, Effluent Monitoring Program. For gaseous effluents, liquid condensate samples from the Evaporator exhaust vent and continuous air sampler filters are analyzed for gross alpha and gross beta each week. The filters, or liquid condensate samples, are composited quarterly and an isotopic analysis is performed if a specified gross alpha or gross beta action level is exceeded (as specified in Table 6.1-1).

The guidance in "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors" (NRC, 1991) and Regulatory Guide 4.16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants" (NRC, 1985b) was followed for determining sample locations, analyses, frequencies, durations, and lower limits of detection for both effluent and environmental samples. Sample sizes are set in accordance with standard commercial laboratory requirements.

Public exposure to radiation from routine operations at the Eagle Rock Enrichment Facility (EREF) may occur as the result of discharge of airborne effluents, including controlled releases from the uranium enrichment process lines during decontamination and maintenance of equipment. In addition, radiation exposure to the public may result from the transportation and storage of uranium hexafluoride (UF_6) feed cylinders, product cylinders, and depleted uranium cylinders. Of these potential pathways, discharge of gaseous effluent has the highest possibility of introducing facility-related uranium into the environment. The plant's procedures and facilities for solid waste handling, storage, and monitoring result in safe storage and timely disposition of the material. ER Section 1.3, Applicable Regulatory Requirements, Permits and Required Consultations, describes all applicable federal and Idaho state standards for discharges, as well as required permits issued by local, Idaho, and Federal governments.

Compliance with 10 CFR 20.1301 (CFR, 2008x) is demonstrated using a calculation of the total effective dose equivalent (TEDE) to the individual who is likely to receive the highest dose in accordance with 10 CFR 20.1302(b)(1) (CFR, 2008x). The determination of the TEDE by pathway analysis is supported by appropriate models, codes, and assumptions that accurately represent the facility, site, and the surrounding area. The assumptions are reasonably conservative, input data is accurate, and all applicable pathways are considered. ER Section 4.12, Public and Occupational Health Impacts, presents the details of these determinations.

The computer codes used to calculate dose associated with potential gaseous effluent from the plant follow the methodology for pathway modeling described in Regulatory Guide 1.109 (NRC, 1977b), and have undergone validation and verification. The dose conversion factors used are those presented in Federal Guidance Reports Numbers 11 (EPA, 1988) and 12 (EPA, 1993).

Administrative action levels are established for effluent samples and monitoring instrumentation as an additional step in the effluent control process. All action levels are sufficiently low so as to permit implementation of corrective actions before regulatory limits are exceeded. Effluent samples that exceed the action level are cause for an investigation into the source of elevated radioactivity. Radiological analyses will be performed more frequently on ventilation air filters if there is a significant increase in gross radioactivity or when a process change or other circumstances cause significant changes in radioactivity concentrations. Additional corrective actions will be implemented based on the level, automatic shutdown programming, and operating procedures to be developed in the detailed alarm design. Under routine operating conditions, radioactive material in effluents discharged from the facility complies with regulatory release criteria.

Compliance is demonstrated through effluent and environmental sampling data. If an accidental release of uranium should occur, then routine operational effluent data and environmental data will be used to assess the extent of the release. Processes are designed to include, when practical, provision for automatic shutdown in the event action levels are exceeded. Appropriate action levels and actions to be taken are specified for effluent releases. Data analysis methods and criteria used in evaluating and reporting environmental sample results are appropriate and will indicate when an action level is being approached in time to take corrective actions.

Periodic audits of the effluent monitoring program will be conducted by AES. Written procedures will be in place to ensure the collection of representative samples, use of appropriate sampling methods and equipment, proper locations for sampling points, and proper handling, storage, transport, and analyses of effluent samples. In addition, the plant's written procedures also ensure that sampling and measuring equipment, including ancillary equipment such as airflow meters, are properly maintained and calibrated at regular intervals. Moreover, the effluent monitoring program procedures include functional testing and routine checks to demonstrate that monitoring and measuring instruments are in working condition. Employees involved in implementation of this program are trained in the program procedures.

The EREF will ensure, when sampling particulate matter within ducts with moving air streams, that sampling conditions within the sample probe are maintained to simulate as closely as possible the conditions in the duct. This will be accomplished by implementing the following criteria: (1) calibrating air sampling equipment so that the sample is representative of the effluent being sampled in the duct; (2) maintaining the axis of the sampling probe head parallel to the air stream flow lines in the ductwork; (3) sampling (if possible) at least ten duct diameters downstream from a bend or obstruction in the duct; and (4) using shrouded-head air sampling probes when they are available in the size appropriate to the air sampling situation. Particle size distributions will be determined from process knowledge or measured to estimate and compensate for sample line losses and momentary conditions not reflective of airflow conditions in the duct.

The EREF will ensure that sampling equipment (pumps, pressure gages, and air flow calibrators) are calibrated by qualified individuals. All air flow and pressure drop calibration devices (e.g., rotometers) will be calibrated periodically using primary or secondary air flow calibrators (wet test meters, dry gas meters, or displacement bellows). Secondary air flow calibrators will be calibrated annually by the manufacturer(s). Air sampling train flow rates will be verified and/or calibrated each time a filter is replaced or a sampling train component is replaced or modified. Sampling equipment and lines will be inspected for defects, obstructions, and cleanliness. Calibration intervals will be developed based on applicable industry standards.

6.1.1.1 Gaseous Effluent Monitoring

As a matter of compliance with regulatory requirements, all potentially radioactive effluent from the facility is discharged only through monitored pathways. See ER Section 4.12.2.1.1, Routine Gaseous Effluent, for a discussion of pathway assessment. The effluent sampling program for the EREF is designed to determine the quantities and concentrations of radionuclides discharged to the environment. The uranium isotopes ^{238}U, ^{236}U, ^{235}U, and ^{234}U are expected to be the prominent radionuclides in the gaseous effluent. The annual uranium source term for routine gaseous effluent releases from the 6.6 million SWU EREF plant has been conservatively assumed to be 19.5 MBq (528 μCi) per year, which is proportional to the 4.4 MBq (120 μCi) per year source term applied to the 1.5 million SWU plant described in NUREG-1484 (NRC, 1994). This is a very conservative annual release estimate used for bounding analyses. Additional details regarding source term are provided in ER Section 4.12, Public and Occupational Health Impacts. Representative samples are collected from each release point of the facility. Because uranium in gaseous effluent may exist in a variety of compounds (e.g., depleted hexavalent uranium, triuranium octoxide, and uranyl fluoride), effluent data will be maintained, reviewed, and assessed by the facility's Radiation Protection/Chemistry Manager to assure that gaseous effluent discharges comply with regulatory release criteria for uranium. Table 6.1-1, Effluent Monitoring Program, presents an overview of the effluent sampling program.

The gaseous effluent monitoring program for the EREF is designed to determine the quantities and concentrations of gaseous discharges to the environment.

Gaseous effluent from the EREF, which has the potential for airborne radioactivity (albeit in very low concentrations) will be discharged through the four Separations Building Gaseous Effluent Ventilation Systems (GEVS), the Technical Support Building (TSB) GEVS, the Centrifuge Test and Post Mortem Facilities GEVS, the Centrifuge Test and Post Mortem Facilities Exhaust Filtration System, the Ventilated Room Heating, Ventilating, and Air Conditioning (HVAC) System, and the TSB Contaminated Area HVAC System. Monitoring for each of these systems is as follows:

- Separations Building GEVS: The GEVS for each of the four Separations Building Modules (SBMs) discharges to exhaust vents on the SBM roofs. Each Separations Building GEVS provides for continuous monitoring and sampling of the gaseous effluent in the exhaust vents in accordance with the guidance in NRC Regulatory Guide 4.16 (NRC, 1985b). The GEVS exhaust vent sampling systems provide the required samples. The exhaust vents are equipped with monitors for alpha radiation and hydrogen fluoride (HF). The SBM Module 1 GEVS also provides process services for the Blending, Sampling, and Preparation Building (BSPB).
- TSB GEVS: This system discharges to an exhaust vent on the TSB roof. The TSB GEVS provides for continuous monitoring and sampling of the gaseous effluent in the exhaust vent in accordance with the guidance in NRC Regulatory Guide 4.16 (NRC, 1985b). The TSB

GEVS exhaust vent sampling system provides the required samples. The exhaust vent contains monitors for alpha radiation and HF.

- Centrifuge Test and Post Mortem Facilities GEVS: This system discharges through an exhaust vent on the Centrifuge Assembly Building (CAB) roof. The Centrifuge Test and Post Mortem Facilities GEVS exhaust vent sampling system provides for continuous monitoring and sampling of the gaseous effluent in the exhaust vent in accordance with the guidance in NRC Regulatory Guide 4.16 (NRC, 1985b). The exhaust vent is provided with an alpha radiation monitor and an HF monitor.
- Centrifuge Test and Post Mortem Facilities Exhaust Filtration System: This system discharges through an exhaust vent on the CAB roof. When the Centrifuge Test Facility or the Centrifuge Post Mortem Facility is in operation, the Centrifuge Test and Post Mortem Facilities Exhaust Filtration exhaust vent sampling system provides for continuous monitoring and sampling of the gaseous effluent in the exhaust vent in accordance with the guidance in NRC Regulatory Guide 4.16 (NRC, 1985b). The exhaust vent is provided with an alpha radiation monitor and an HF monitor.
- TSB Contaminated Area HVAC System: This system maintains the temperature in various areas in the TSB. For the potentially contaminated areas in the TSB, which include the Chemical Trap Workshop, Mobile Unit Disassembly and Reassembly Workshop, Valve and Pump Dismantling Workshop, Decontamination Workshop, and Maintenance Facility, the TSB Contaminated Area HVAC system maintains a negative pressure in these rooms and discharges the room air to an exhaust vent on the TSB roof. The system provides for continuous alpha and HF monitoring and sampling of the discharged room air from the rooms served by the TSB Contaminated Area HVAC system in accordance with the guidance in NRC Regulatory Guide 4.16 (NRC, 1985b).
- Ventilated Room HVAC System: This system maintains a negative pressure in the Ventilated Room, which is located in the BSPB, and discharges the room air to an exhaust vent on the BSPB roof. The system provides for continuous alpha and HF monitoring and sampling of the discharged room air from the Ventilated Room, in accordance with the guidance in NRC Regulatory Guide 4.16 (NRC, 1985b).

The HVAC systems serving all process areas will have the necessary access to periodically sample exhaust air, in accordance with the guidance in NRC Regulatory Guide 4.16 (NRC, 1985b).

Saturated air from the Evaporator (which is part of the Liquid Effluent Collection and Treatment System) is discharged to the environment through an exhaust vent on the TSB roof. An air sampler in this vent line will sample the discharged air and trap the condensed distillate. The liquid condensate will be periodically sampled and analyzed for isotopic uranium.

The gaseous effluent sampling program supports the determination of quantity and concentration of radionuclides discharged from the facility and supports the collection of other information required in reports to be submitted to the NRC. A minimum detectable concentration (MDC) of at least 1.8×10^{-9} Bq/ml (5.0×10^{-14} μCi/ml) is a program requirement (NRC, 2002a) for all analyses performed on gaseous effluent samples. That MDC value represents 5% of the limit for any applicable uranium isotope (Class W). Liquid condensate samples from the evaporator discharge are analyzed to an MDC equivalent to 5% or less of the appropriate 10 CFR 20 Appendix B, Table 2, Col. 1 (Air) value (CFR, 2008x). Table 6.1-2, Required Lower Limit of Detection for Effluent Sample Analyses, summarizes detection requirements for effluent sample analyses.

6.1.1.2 Stormwater and Sewage Treatment Plant Liquid Effluent Monitoring

General site stormwater runoff is routed to the Site Stormwater Detention Basin. (See sections 3.4 and 4.4 for descriptions of the discharges from this basin.) The two Cylinder Storage Pads Stormwater Retention Basins collect stormwater runoff from the Cylinder Storage Pads (i.e., Full Feed Cylinder Storage Pads, Full Tails Cylinder Storage Pads, Full Product Cylinder Storage Pad, and Empty Cylinder Storage Pads) as well as treated water from the Domestic Sanitary Sewage Treatment Plant. Approximately 18,700 m^3 (4,927,500 gal) of Domestic Sanitary Sewage Treatment Plant effluent are expected to be discharged to the two Retention Basins (combined) each year. Approximately 150,415 m^3 (39.7 million gal) of stormwater are expected to be collected each year (mean annual) by the Detention and Retention basins combined. Both of these basins will be included in the site Radiological Environmental Monitoring Program described below in ER Section 6.1.2.

6.1.2 Radiological Environmental Monitoring Program

The Radiological Environmental Monitoring Program (REMP) at the EREF is a major part of the effluent compliance program. It provides a supplementary check of containment and effluent controls, establishes a process for collecting data for assessing radiological impacts on the environs and estimating the potential impacts on the public, and supports the demonstration of compliance with applicable radiation protection standards and guidelines.

The primary objective of the REMP is to provide verification that the operations at the facility do not result in detrimental radiological impacts on the environment. Through its implementation, the REMP provides data to confirm the effectiveness of effluent controls and the effluent monitoring program. In order to meet program objectives, representative samples from various environmental media are collected and analyzed for the presence of plant-related radioactivity. The types and frequency of sampling and analyses are summarized in Table 6.1-3, Radiological Environmental Monitoring Program. Environmental media identified for sampling consist of ambient air, groundwater, soil/sediment, and vegetation. All environmental samples will be analyzed onsite. However, samples may also be shipped to a qualified independent laboratory for analyses. The MDCs for gross alpha (assumed to be uranium) in various environmental media are shown in Table 6.1-4, Required MDC for Environmental Sample Analysis. Monitoring and sampling activities, laboratory analyses, and reporting of facility-related radioactivity in the environment will be conducted in accordance with industry-accepted and regulatory-approved methodologies.

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

Monitoring procedures will employ well-known acceptable analytical methods and instrumentation. The instrument maintenance and calibration program will be appropriate to the given instrumentation, in accordance with manufacturers' recommendations.

The EREF will ensure that the onsite laboratory and any contractor laboratory used to analyze EREF samples participates in third-party laboratory intercomparison programs appropriate to the media and analytes being measured. Examples of these third-party programs are: (1) Mixed Analyte Performance Evaluation Program (MAPEP) and the DOE Quality Assurance Program (DOEQAP) that are administered by the Department of Energy; and (2) Analytics, Inc.

Environmental Radiochemistry Cross-Check Program. The EREF will require that all radiological and non-radiological laboratory vendors are certified by the National Environmental Laboratory Accreditation Program (NELAP) or an equivalent state laboratory accreditation agency for the analytes being tested.

Reporting procedures will comply with the requirements of 10 CFR 70.59 (CFR, 2008b) and the guidance specified in Regulatory Guide 4.16 (NRC, 1985b). Reports of the concentrations of principal radionuclides released to unrestricted areas in effluents will be provided and will include the Minimum Detectable Concentration (MDC) for the analysis and the error for each data point.

The REMP includes the collection of data during pre-operational years in order to establish baseline radiological information that will be used in determining and evaluating impacts from operations at the plant on the local environment. The REMP will be initiated at least two years prior to plant operations in order to develop a sufficient database. The early initiation of the REMP provides assurance that a sufficient environmental baseline has been established for the plant before the arrival of the first uranium hexafluoride shipment. Radionuclides in environmental media will be identified using technically appropriate, accurate, and sensitive analytical instruments. Data collected during the operational years will be compared to the baseline generated by the pre-operational data. Such comparisons provide a means of assessing the magnitude of potential radiological impacts on members of the public and in demonstrating compliance with applicable radiation protection standards.

During the course of facility operations, revisions to the REMP may be necessary and appropriate to assure reliable sampling and collection of environmental data. The rationale and actions behind such revisions to the program will be documented and reported to the appropriate regulatory agency, as required. REMP sampling focuses on locations within 4.8 km (3 mi) of the facility, but may also include distant locations as control sites. REMP sampling locations have been determined based on NRC guidance found in the document, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors" (NRC, 1991), meteorological information, and current land use. The sampling locations may be subject to change as determined from the results of periodic review of land use.

Atmospheric radioactivity monitoring is based on plant design, demographic, geologic, meteorological, and land use data. Because operational releases are anticipated to be very low and subject to rapid dilution via dispersion, distinguishing plant-related uranium from background uranium already present in the site environment is a major challenge of the REMP. The gaseous effluent is released from roof-top discharge points, which will result in ground-level releases. A characteristic of ground-level plumes is that plume concentrations decrease continually as the distance from the release point increases. It logically follows that the impact at locations close to the release point is greater than at more distant locations. The radioactive materials in gaseous effluents from the EREF are expected to be very low concentrations of uranium because of process and effluent controls. Consequently, air samples collected at locations that are close to the plant would provide the best opportunity to detect and identify plant-related radioactivity in the ambient air. Therefore, air-monitoring activities will concentrate on collection of data from locations that are relatively close to the plant, such as the plant perimeter fence or the plant property line. Air monitoring stations will be situated along the three site boundary locations of highest predicted atmospheric deposition. Since there are no communities or residences within 8 km (5 mi) of the facility footprint, an additional air sampler will be located at the site boundary in the same sector as the nearest residence, which is situated in the East sector at approximately 8 km (5 mi) from the facility footprint.

A control sample location will be established beyond 8 km (5 mi) in an upwind sector (the sector with a non-prevalent wind direction) that is not in the vicinity of any other facility with a significant radiological source term. Refer to Sections 3.6, Meteorology, Climatology and Air Quality and 4.6, Air Quality Impacts, for information on meteorology and atmospheric dispersion. All environmental air samplers operate on a continuous basis with sample retrieval for a gross alpha and beta analysis occurring on a biweekly basis (or as required by dust loading).

Vegetation and soil samples from locations near the Owner Controlled Area fence line will be collected on a quarterly basis in each sector during the pre-operational REMP. This is to assure the development of a sound baseline. During the operational years, vegetation, and soil sampling will be performed semiannually in eight sectors, including three with the highest predicted atmospheric deposition. Vegetation samples may include vegetables and grass, depending on availability. Soil samples will be collected in the same vicinity as the vegetation samples. Vegetation and soil samples will also be collected from an off-site control location.

Groundwater samples from onsite monitoring wells will be collected semiannually for radiological analysis. The locations of the groundwater sampling (monitoring) wells are shown on Figure 6.1-2, Modified Site Features with Proposed Sampling Stations and Monitoring Locations. The rationale for the locations is based on the predominant groundwater flow under the EREF site and proximity to key site structures. Nine deep monitoring wells will be located as follows: one down-gradient (i.e., west-southwest) of the plant footprint, three near the down-gradient edge of the plant footprint, three cross-gradient, and two up-gradient of the site to serve as control locations. An additional shallow monitoring well will be located down-gradient of the site. Sediment samples will be collected semiannually from the two Cylinder Storage Pads Stormwater Retention Basins and the Site Stormwater Detention Basin to look for any buildup of uranic material being deposited. The two Cylinder Storage Pads Stormwater Retention Basins will also receive treated domestic sanitary effluent from the Domestic Sanitary Sewage Treatment Plant.

The site Domestic Sanitary Sewage Treatment Plant will receive only treated domestic sanitary wastes. No plant process-related effluents will be introduced. Samples will, however, be collected semiannually from the sanitary sewage treatment system and will be analyzed for isotopic Uranium.

Direct radiation in offsite areas from processes inside the facility building is expected to be minimal because the low-energy radiation associated with the uranium will be shielded by the process piping, equipment, and cylinders to be used at the EREF. However, the uranium cylinders stored on the Cylinder Storage Pads may have an impact in some offsite locations due to direct and scatter (skyshine) radiation. The offsite impact from the storage pads has been evaluated and is discussed in Section 4.12, Public and Occupational Health Impacts.

The conservative evaluation showed that an annual TEDE of < 0.1 mSv (≤10 mrem) is expected at the highest impacted area at the site boundary.

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

Figure 6.1-2, Modified Site Features With Proposed Sampling Stations and Monitoring Locations, indicates the location of REMP sampling locations.

The REMP may be enhanced during the operation of the facility as necessary to maintain the collection and reliability of environmental data based on changes to regulatory requirements or facility operations. The REMP includes administrative action levels (requiring further analysis) and reporting levels for radioactivity in environmental samples.

Written procedures to ensure representative sampling, proper use of appropriate sampling methods and equipment, proper locations for sampling points, and proper handling, storage, transport, and analyses of effluent samples will be a key part of the REMP. In addition, written procedures ensure that sampling and measuring equipment, including ancillary equipment such as airflow meters, are properly maintained and calibrated at regular intervals. Moreover, the REMP implementing procedures will include functional testing and routine checks to demonstrate that monitoring and measuring instruments are in working condition.

Each year, the EREF will submit a summary report of the environmental sampling program to the NRC, including all associated data as required by 10 CFR 70 (CFR, 2008b). The report will include the types, numbers, and frequencies of environmental measurements and the identities and activity concentrations of facility-related radionuclides found in environmental samples, in addition to the MDC for the analyses and the error associated with each data point. Significant positive trends in activities will also be noted in the report, along with any adjustment to the program, unavailable samples, and deviation to the sampling program.

TABLES

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

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

Notes:

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

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

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

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

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

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

Notes:

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

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

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

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

Notes:

[a] Isotopic analysis for Uranium.

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

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

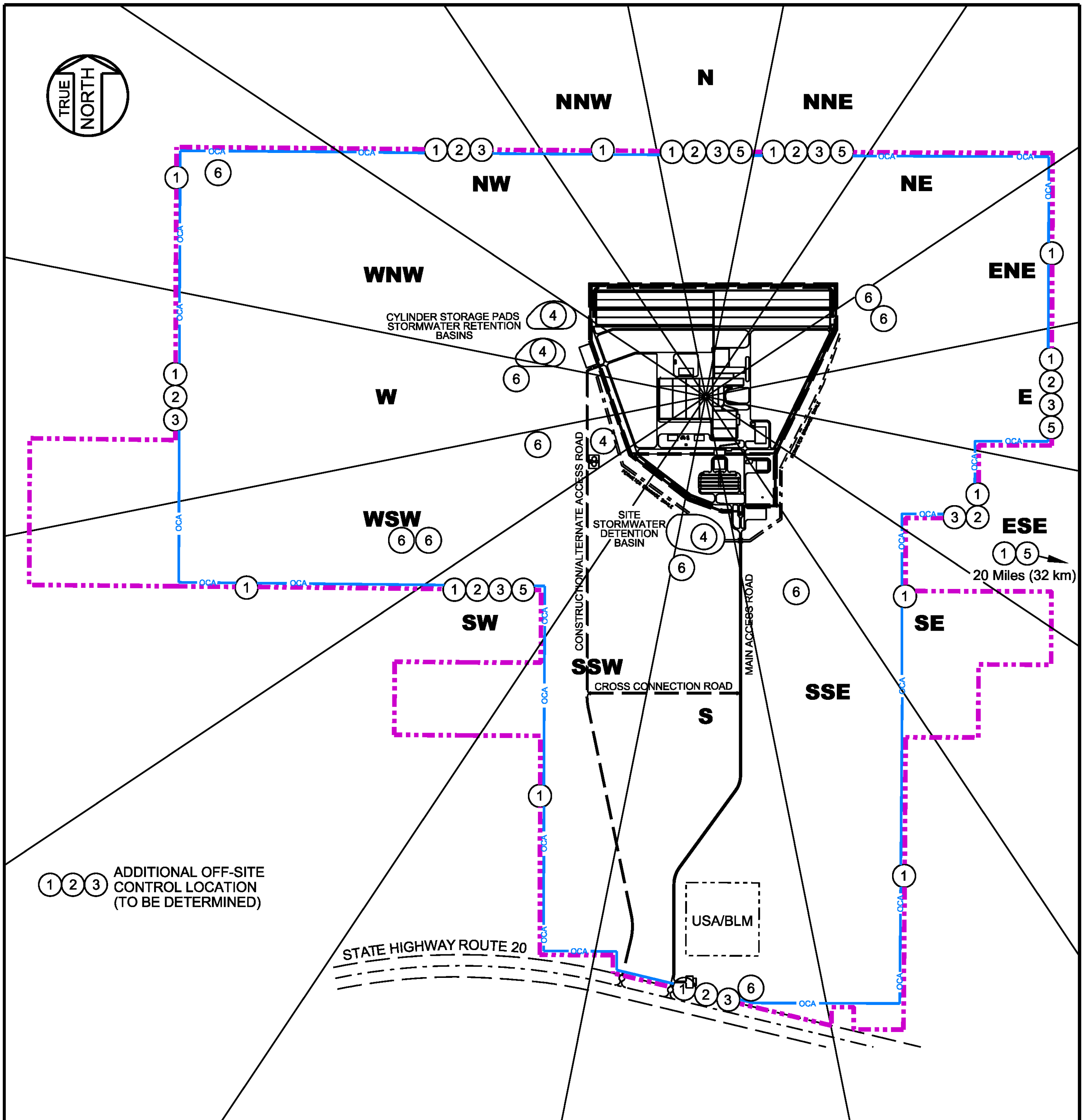
Table 6.1-4 Required MDC for Environmental Sample Analysis
(Page 1 of 1)

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

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

FIGURES

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



LEGEND:

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

SCALE: FEET (0, 1500, 3000, 6000)

SCALE: METERS (0, 500, 1000, 2000)

FIGURE 6.1-2 **Rev. 1**

Modified Site Features with Proposed Sampling Stations and Monitoring Locations

EAGLE ROCK ENRICHMENT FACILITY ENVIRONMENTAL REPORT

6.2 PHYSIOCHEMICAL MONITORING

6.2.1 Introduction

A physiochemical monitoring program will be implemented at the proposed EREF. The primary objective of physiochemical monitoring is to provide verification that the operations at the EREF do not result in detrimental chemical impacts on the environment. Effluent controls, which are discussed in Sections 3.12, Waste Management, and 4.13, Waste Management Impacts, are in place to ensure that chemical concentrations in gaseous effluents are maintained as low as reasonably achievable (ALARA). In addition, physiochemical monitoring provides data to confirm the effectiveness of effluent controls.

Administrative action levels will be implemented prior to facility operation to ensure that chemical discharges will remain below the limits specified in the facility discharge permits. The limits are specified in any applicable discharge permits administrated by EPA Region 10 and the Idaho State Department of Environmental Quality.

Specific information regarding the source and characteristics of all non-radiological plant effluents and wastes that will be collected and disposed of offsite, or discharged in various effluent streams is provided in Sections 3.12, Waste Management, and 4.13, Waste Management Impacts.

In conducting physiochemical monitoring, sampling protocols and emission/effluent monitoring will be performed for routine operations with provisions for additional evaluation in response to potential accidental release.

The facility will have environmental laboratory areas consisting of various rooms which will be equipped with analytical instruments needed to ensure that the operation of facility activities complies with federal, state and local environmental regulations and requirements. Commercial, offsite laboratories may also be contracted to perform physiochemical analyses of samples.

Compliance will be demonstrated by monitoring and sampling at various facility and process locations, analyzing the samples, comparing results to applicable criteria defined in permits, and reporting the results of these analyses to the appropriate agencies. The sampling/monitoring locations will be selected by the Environmental, Health, Safety, and Licensing (EHS&L) organization staff in accordance with EREF permits and good sampling practices. Parameters to be monitored will be identified in environmental permits obtained for the proposed EREF operations.

Monitoring procedures will employ well-known, acceptable analytical methods and instrumentation. The instrument maintenance and calibration program will comply with manufacturer recommendations. Environmental personnel at the proposed EREF will follow certified sampling and analysis protocols and implement appropriate steps to make sure that the onsite laboratory and any contractor laboratories participate in third-party laboratory inter-comparison programs appropriate to the media and parameters being measured.

The radiological environmental laboratory areas are located in the Technical Support Building (TSB). The non-radiological Environmental Laboratory areas are located in the Operation Support Building (OSB) and are used to perform analyses that include the following:

- Hazardous material presence in waste samples
- pH, oil and other contaminants in liquid waste streams

The environmental laboratory areas will be available to perform analyses on air, water, soil, and flora samples obtained from designated areas around the plant.

In addition to its environmental and radiological capabilities, the capability exists to perform bioassay analyses when necessary. Commercial, offsite laboratories may also be contracted to perform bioassay analyses.

All waste liquids, solids and gases from enrichment-related processes and decontamination operations will be analyzed and/or monitored for chemical and radiological contamination to determine safe disposal methods and/or further treatment requirements. A description of the radiological monitoring program at the EREF is provided in Section 6.1, Radiological Monitoring.

6.2.2 Evaluation and Analysis of Samples

Samples of liquid streams, solids, and gaseous effluents from plant processes will be analyzed in the TSB and OSB environmental laboratory areas. Results of process samples analyses are used to verify that process parameters are operating within expected performance ranges. Results of liquid stream sample analyses will be used to determine if corrective action is required in facility process and/or effluent collection and treatment systems.

6.2.3 Effluent Monitoring

Each year, AES will submit a summary of the environmental sampling program and associated data to the proper regulatory authorities, as required. This summary will include the types, numbers and frequencies of samples collected.

Physiochemical monitoring will be conducted via sampling of stormwater, soil, sediment, surface water (if present in intermittent stream drainage), vegetation, and groundwater as defined in Table 6.2-1, Physiochemical Sampling, to confirm that trace, incidental chemical discharges are below regulatory limits. In the event of any accidental release from the facility, sampling protocols will be initiated immediately and on a continuing basis to document the extent/impact of the release until conditions have been abated and mitigated. Sampling locations are shown in Figure 6.2-1, Physiochemical Monitoring Locations.

Parameters for continuing environmental performance will be developed from the baseline data in the Environmental Report and additional preoperational sampling. Operational monitoring surveys will be conducted using sampling sites and at frequencies established from baseline sampling data and as determined based on permit requirements. The monitoring program will be enhanced as appropriate to maintain the collection and reliability of environmental data. Specific monitoring point locations will be determined during detailed design.

The site packaged Domestic Sanitary Sewage Treatment Plant will receive only typical sanitary wastes. No chemical sampling is planned because no plant process related effluents will be introduced into this system.

6.2.4 Stormwater Monitoring Program

A stormwater monitoring program will be initiated during construction of the facility. Data collected from the program will be used to evaluate the effectiveness of measures taken to prevent the contamination of stormwater and to retain sediments within property boundaries. A temporary detention basin will be used as a sediment control basin during construction as part of the overall sedimentation erosion control plan.

Stormwater monitoring will continue with the same monitoring frequency upon initiation of facility operation. During plant operation, samples will be collected from the two Cylinder Storage Pads Stormwater Retention Basins and the Site Stormwater Detention Basin in order to demonstrate that runoff does not contain any contaminants. A list of parameters to be monitored and monitoring frequencies for stormwater is presented in Table 6.2-2, Stormwater Monitoring Program for Detention and Retention Basins. This monitoring program will be refined to reflect applicable requirements as determined during the National Pollutant Discharge Elimination System (NPDES) process.

6.2.5 Environmental Monitoring

The purpose of this section is to describe the surveillance-monitoring program, which will be implemented to measure non-radiological chemical impacts upon the natural environment.

The ability to detect and contain any potentially adverse chemical releases from the facility to the environment will depend on chemistry data to be collected as part of the effluent and stormwater monitoring programs described in the preceding sections. Data acquisition from these programs encompasses both onsite and offsite sample collection locations and chemical element/compound analyses. Final constituent analysis requirements will be in accordance with permit mandates.

Sampling locations will be determined based on meteorological information and current land use. The sampling locations may be subject to change as determined from the results of any observed changes in land use.

The range of chemical surveillance incorporated into all the planned effluent monitoring programs for the facility are designed to be sufficient to predict any relevant chemical interactions in the environment related to facility operations.

Vegetation and soil sampling will be conducted. Vegetation samples will include grasses, and if available, vegetables. Soil will be collected in the same vicinity as the vegetation samples. The samples will be collected from both on site and off site locations in various sectors. Sectors are chosen based on air modeling. Onsite soil and vegetation sampling will include the outfall at the Site Stormwater Detention Basin. This outfall is further discussed in Section 4.4, Water Resources Impacts. Sediment samples will be collected from discharge points to the different collection basins onsite. Groundwater samples will be collected from a series of wells installed around the facility. The locations of the groundwater sampling (monitoring) wells are shown in Figure 6.2-1, Physiochemical Monitoring Locations.

Stormwater collected in the two Cylinder Storage Pads Stormwater Retention Basins will be sampled to ensure no contaminants are present in the runoff from the cylinder storage pads. If water is present, a surface water sample will be collected from the intermittent stream drainage in the southwest corner of the site.

6.2.6 Meteorological Monitoring

In order to monitor and characterize meteorological phenomena (e.g., wind speed, wind direction, air temperature and humidity) during plant operation as well as consider interaction of meteorology and local terrain, conditions will be monitored with a 40-m (132-ft) instrumented tower located onsite. These data will assist in evaluating the potential locales on and off property that could be influenced by any emissions. The instrumented tower will be located at a site approximately the same elevation as the finished facility grade and in an area where facility structures will have little or no influence on the meteorological measurements. An area approximately ten times the obstruction height around the tower towards the prevailing wind direction will be maintained in accordance with established standards for meteorological monitoring. This practice will be used to avoid spurious measurements resulting from local building-induced turbulence. The program for instrument maintenance and servicing, combined with redundant data recorders, assures at least 90% data recovery.

The data this equipment provides is recorded in the Control Room and can be used for dispersion calculations. Equipment will also measure temperature and humidity, which will be recorded in the Control Room.

6.2.7 Biota

The monitoring of impacts to biota is detailed in Section 6.3, Ecological Monitoring.

6.2.8 Quality Assurance

The physiochemical monitoring program for EREF will use a set of formalized and controlled procedures for sample collection, laboratory analysis, chain of custody, reporting of results, and corrective actions. Samples sent to laboratories will include blanks and duplicates at specified frequencies to provide data for identifying routine reporting or analytical errors as part of quality assurance checks on the data. Analyses will only be performed at laboratories with appropriate EPA and State of Idaho certifications. The laboratory analyses will be conducted using the best available standard techniques at state or EPA certified laboratories.

Corrective actions will be instituted when an administrative action level is exceeded for any of the measured parameters. Action levels will be divided into three priorities: (1) if the sample parameter is three times the normal background level; (2) if the sample parameter exceeds any existing administrative limits, or; (3) if the sample parameter exceeds any regulatory limit. The third scenario represents the worst case, which will be prepared for but is not expected. Corrective actions will be implemented to ensure that the cause for the action level exceedance can be identified and immediately corrected, applicable regulatory agencies are notified, if required, communications to address lessons learned are dispersed to appropriate personnel, and applicable procedures are revised accordingly if needed. All action plans will be commensurate to the severity of the exceedance.

6.2.9 Lower Limits of Detection

Lower limits of detection (LLD) will be met for sampling parameters listed in Tables 6.2-1, Physiochemical Sampling, and 6.2-2, Stormwater Monitoring Program for Detention and Retention Basins, and will be based on the baseline surveys and the type of matrix (sample type).

TABLES

Table 6.2-1 Physiochemical Sampling
(Page 1 of 1)

Media	Number of Locations	Monitoring Frequency	Sample Type	Analysis[a]
Groundwater	9 deep wells and 1 shallow well used for baseline monitoring.	Semiannually for deep wells; semiannually for shallow wells when water is present	Grab	Metals, organics and pesticides; water level elevations
Soil[b]/sediment	3 minimum soil samples at locations to be determined by environmental staff plus one at the detention basin outfall.	Quarterly, near vegetation sample locations; one sample at each location	Surface grab	Metals, organics, pesticides and fluoride uptake
	Retention and detention basin sediments at discharge points to the basins.	Quarterly for one sample at each location	Surface grab	Metals, organics, pesticides and fluoride uptake
Surface water[b]	Potential location in intermittent stream drainage on southwestern corner of site.	Quarterly if water present	Grab	Metals, organics and pesticides
Stormwater[b]	Retention and detention basins at locations to be determined by environmental staff.	Quarterly if water present	Grab	See Table 6.2-2
Vegetation[b]	4 minimum	Quarterly if present (i.e., during growing seasons); one sample at each location	Surface grab	Fluoride uptake
Meteorology	1 on-site station augmented by records from nearby meteorological stations	Daily	Continuous	Wind direction and wind speed, temperature, and humidity

Notes:

[a] Analyses will meet EPA Lower Limits of Detection (LLD), as applicable, and will be based on the baseline surveys and the type of matrix (sample type).

[b] Location to be established by Environmental, Health, Safety and Licensing (EHS&L) organization staff.

Table 6.2-2 Stormwater Monitoring Program for Detention and Retention Basins (see Figure 4.4-1)[a]

(Page 1 of 1)

Monitored Parameter	Monitoring Frequency	Sample Type	LLD[b] (ppm)
Oil and Grease	Quarterly, if standing water exists	Grab	0.5
Total Suspended Solids	Quarterly, if standing water exists	Grab	0.5
Five-Day Biological Oxygen Demand	Quarterly, if standing water exists	Grab	2
Chemical Oxygen Demand	Quarterly, if standing water exists	Grab	1
Total Phosphorus	Quarterly, if standing water exists	Grab	0.1
Total Kjeldahl Nitrogen	Quarterly, if standing water exists	Grab	0.1
pH	Quarterly, if standing water exists	Grab	0.01 units
Nitrate plus Nitrite Nitrogen	Quarterly, if standing water exists	Grab	0.2
Metals	Quarterly, if standing water exists	Grab	Varies by metal

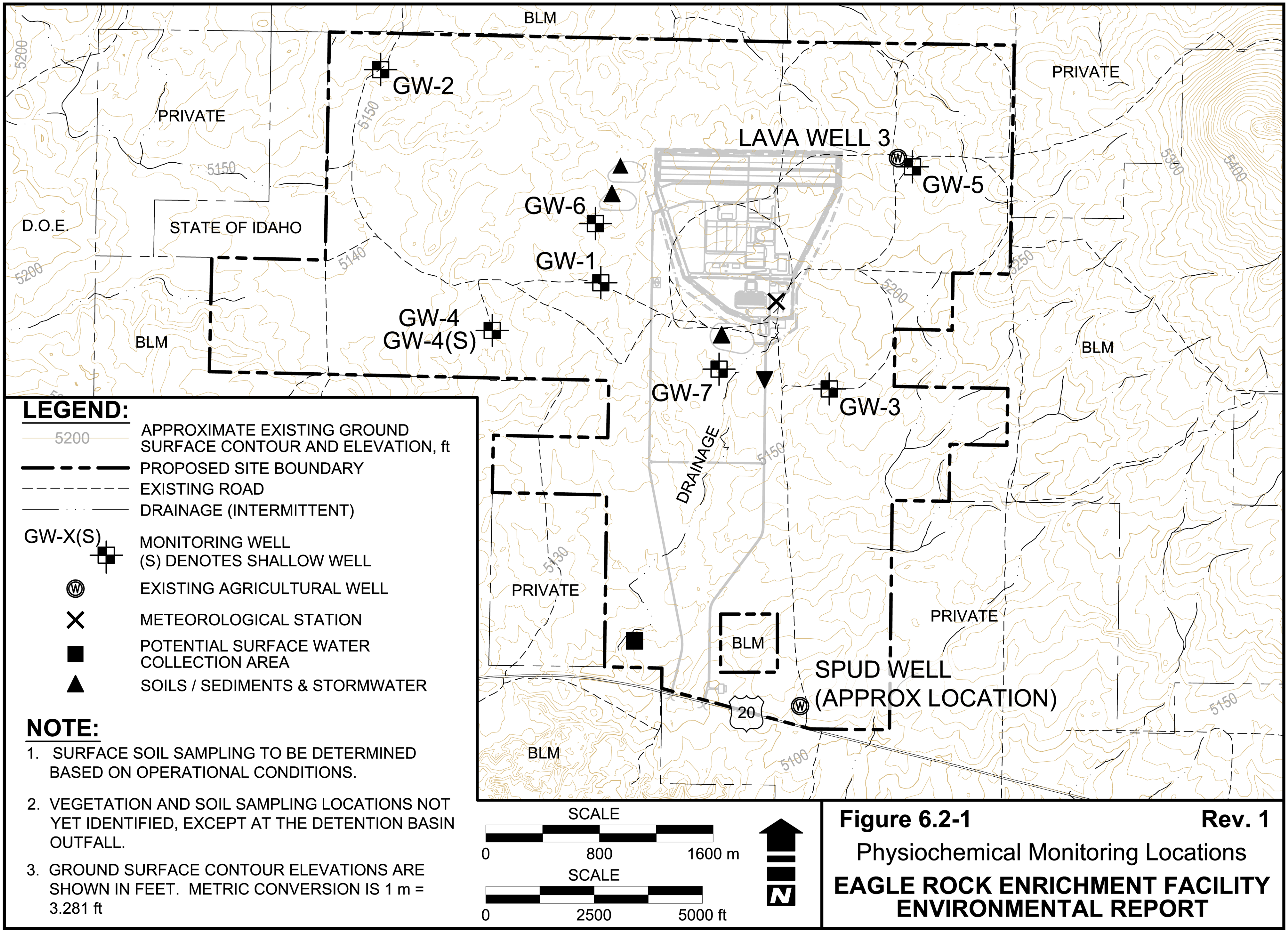
Notes:

[a] Site Stormwater Detention Basin, Cylinder Storage Pads Stormwater Retention Basins and any temporary basin(s) used during construction.

[b] Lower limit of detection; Analyses will meet EPA LLD, as applicable, and will be based on the baseline surveys and the type of matrix (sample type).

Note: Radiological monitoring parameters are addressed separately in ER Section 6.1, Radiological Monitoring.

FIGURES



NOTE:

1. SURFACE SOIL SAMPLING TO BE DETERMINED BASED ON OPERATIONAL CONDITIONS.
2. VEGETATION AND SOIL SAMPLING LOCATIONS NOT YET IDENTIFIED, EXCEPT AT THE DETENTION BASIN OUTFALL.
3. GROUND SURFACE CONTOUR ELEVATIONS ARE SHOWN IN FEET. METRIC CONVERSION IS 1 m = 3.281 ft

Figure 6.2-1 **Rev. 1**

Physiochemical Monitoring Locations

EAGLE ROCK ENRICHMENT FACILITY
ENVIRONMENTAL REPORT

6.3 ECOLOGICAL MONITORING

6.3.1 Maps

See Figure 6.3-1, Modified Site Features with Proposed Ecological Sampling Locations.

6.3.2 Affected Important Ecological Resources

The existing natural habitats on the proposed Eagle Rock Enrichment Facility (EREF) site and the 8-km (5-mi) area surrounding the site have been impacted by domestic livestock grazing, reseeding, and inter-seeding of habitat, farming, and road development. These current and historic land uses have resulted in reduction of plant and animal community diversity, productivity, and fragmentation of the remaining native sagebrush steppe habitat type.

The sagebrush steppe vegetation community at the proposed EREF site has been influenced by agricultural practices. There is active irrigated farming on about 389 ha (962 ac). In addition, about 880 ha (2,180 ac) has been dryland farmed as recently as four to five years ago. Existing vegetation on these areas is dominated by herbaceous species and limited brush associated with basalt outcrops. The remaining 430 ha (1,060 ac) is sagebrush steppe vegetation dominated by big sagebrush. Seasonal livestock grazing occurs throughout the entire proposed site. Sagebrush steppe is characterized by big sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus nauseosa*), and grass species.

The site provides habitat for greater sage grouse (*Centrocerus* urophasianus) and is potential habitat for the pygmy rabbit (*Brachylagus idahoensis*). The closest breeding ground for greater sage grouse is between 6.4 and 8 km (4 and 5 mi) northwest of the proposed site on Idaho National Laboratory (INL) land. The closest known population of the pygmy rabbit is on the eastern area of the INL about 8.8 km (5.5 mi) west of the proposed site. Both species (i.e., greater sage grouse and pygmy rabbit) are under review for listing under the Endangered Species Act. The area does not provide habitat for species currently protected under the Endangered Species Act.

Based on ecological surveys that have been performed onsite, AES has concluded that the sagebrush steppe habitat is the ecological system on the proposed site that is the most sensitive. This vegetation type is used by big game (pronghorn (*Antilocapra americana*), deer (*Odocoileus hemionus*), and elk (*Cervus elaphus*)) and by greater sage grouse for feeding and likely brood rearing habitat. The proposed site is at the southern end of an area identified by the BLM as crucial winter-spring habitat for pronghorn. However, the area is not considered essential breeding for big game and does not contain breeding grounds for greater sage grouse. The quantity of sagebrush steppe on the proposed site is relatively small, about 430 ha (1,060 ac), and the site is located at the southern edge between contiguous sagebrush habitat to the north and west and farmland and barren lava flows to the south and east. Big game and greater sage grouse are mobile and have individual ranges that are much greater than the habitat on the proposed site. These species do not use the proposed site preferentially and are not found in high concentrations compared to other parts of their range.

6.3.3 Monitoring Program Elements

Several elements have been chosen for the ecological monitoring program. These elements include vegetation, birds, mammals, and reptiles/amphibians. Currently there is no action or reporting level for each specific element. However, additional consultation with all appropriate agencies (Idaho Department of Fish and Game, U.S. Fish and Wildlife Service, Bureau of Land

Management) will continue. Agency recommendations, based on future consultation and monitoring program data, will be considered when developing action and/or reporting levels for each element. In addition, AES will periodically monitor the proposed site (including detention- and retention-basin waters) during construction and plant operations to ensure the risk to birds and wildlife is minimized. If needed, measures will be taken to release entrapped wildlife. The monitoring program will assess the effectiveness of the entry barriers and release features to ensure risk to wildlife is minimized.

6.3.4 Observations and Sampling Design

The EREF site observations will include preconstruction, construction, and operations monitoring programs. The preconstruction monitoring program will establish the site baseline data. The procedures used to characterize the vegetation, bird, mammalian, and reptilian/amphibian communities at the proposed EREF site during pre-construction monitoring will be used for both the construction and operations monitoring programs. Operational monitoring surveys will also be conducted as described below using the same sampling sites established during the preconstruction monitoring program.

These surveys are designed to characterize gross changes in the composition of the vegetation, avian, mammalian, and reptilian/amphibian communities of the site associated with operation of the facility. Interpretation of operational monitoring results, however, must consider those changes that would be expected at the EREF site as a result of natural succession processes. Plant communities at the site will continue to change as the site begins to regenerate and mature. Changes in the bird, small mammal, and reptile/amphibian communities are likely to occur concomitantly in response to the changing habitat.

Vegetation

Ground cover will be estimated from about 20 permanent sampling locations within the proposed EREF site. Sampling will occur annually in June. Annual sampling is scheduled to coincide with the mature flowering stage of the dominant perennial species.

The sampling locations will be selected in areas outside of the proposed footprint of the EREF and will be identified using Global Positioning System coordinates. The expected positions of the sampling locations have been plotted on a site schematic (See Figure 6.3-1, Modified Site Features With Proposed Ecological Sampling Locations). The establishment of permanent sampling locations will facilitate a long-term monitoring system to evaluate vegetation trends and characteristics.

Vegetation characteristics will be quantified using the point-transect method. Points will be located in the field within the sagebrush steppe and disturbed sagebrush steppe vegetation types. Two, 50-m (164-ft) tapes will be extended perpendicular to one another from the random point; one oriented to the south, the other oriented to the east. Ground cover (e.g., bare ground, litter) will be recorded at each point. Overstory species and understory species will also be recorded at points where the point intersects vegetation. This data will be analyzed to determine species composition and to estimate ground cover. The initial monitoring will be conducted through at least the first three years of commercial operation. Following this period, program changes may be initiated based on operational experience.

Wildlife

Wildlife surveys will be conducted during late spring/early summer and late fall/early winter to verify the presence of mammals, birds, and herptiles (reptiles and amphibians) at the proposed EREF site. The spring/summer and fall/winter surveys will be designed to identify species and provide estimates of abundance. Surveys will not be conducted at a time when inclement weather (e.g., high wind, rain, heavy snow) would reduce the likelihood of observing animals because of reduced animal activity or reduced visual conditions. Weather conditions (e.g., temperature, wind speed and direction, humidity, cloud cover) will be recorded during each sampling day. Changes in weather during surveys also will be recorded.

Permanent line transects of about 1.6 km (1 mi) in length will be walked at 30 minutes before sunrise to 1.5 hours after sunrise and 1.5 hours before sunset to 30 minutes after sunset. Transects will be 0.40 to 0.80 km (0.25 to 0.50 mi) apart. Transects will be placed in the sagebrush steppe and in the disturbed sagebrush steppe habitat. Species composition and relative abundance will be determined based on visual observations of animals, sign (e.g., tracks, scat, nests, burrows), and calls. Gender and age (i.e., juvenile and adult) will be noted when possible. Behavior also will be noted (e.g., in flight, male singing and territory establishment, nesting, perching). The initial monitoring will be conducted through at least the first three years of commercial operation. Following this period, program changes may be initiated based on operational experience.

Birds

Bird populations will be sampled twice a year in the late spring during breeding, nesting, and brood rearing season and during the winter. Species and numbers observed will be recorded. In addition, behavior also will be noted (e.g., in flight, male singing and territory establishment, nesting, perching).

The avian communities are described in ER Section 3.5.2, General Ecological Conditions of the Site. All data collected will be recorded and compared to information listed in Table 3.5-2, Birds Potentially Using the Proposed Eagle Rock Enrichment Facility Site. The initial monitoring will be conducted through at least the first three years of commercial operation. Following this period, program changes may be initiated based on operational experience.

Mammals

Mammal populations will be sampled twice a year; in the late spring during breeding and nursing season and during the late fall/winter during migration and shifts to winter range. Species and numbers observed will be recorded. In addition, behavior also will be noted (e.g., fleeing, feeding, resting).

The existing mammalian communities are described in ER Section 3.5.2, General Ecological Conditions of the Site. All data collected will be recorded and compared to the information listed in Table 3.5-1, Mammals Potentially Using the Proposed Eagle Rock Enrichment Facility Site. The initial monitoring will be conducted through at least the first three years of commercial operation. Following this period, program changes may be initiated based on operational experience.

Herptiles (Reptiles and Amphibians)

Herptile populations will be sampled once during the summer, when animals are most active. Species and numbers observed will be recorded. Behavior will also be noted (e.g., breeding display, feeding, resting, thermo-regulating).

The reptile and amphibian communities are described in ER Section 3.5.2, General Ecological Conditions of the Site. The data will be compared to the information listed in Table 3.5-3, Amphibians/Reptiles Potentially Using the Proposed Eagle Rock Enrichment Facility Site. As with the programs for birds and mammals, the initial herptile monitoring program will be conducted through at least the first three years of commercial operation. Following this period, program changes may be initiated based on operational experience.

6.3.5 Statistical Validity of Sampling Program

The proposed sampling program will include descriptive statistics. These descriptive statistics will include the mean, standard deviation, standard error, and confidence interval for the mean. In each case the sampling size will be clearly indicated. The use of these standard descriptive statistics will be used to assess sample variability. A significance level of 5% will be used for the studies, which will result in a 95% confidence level.

6.3.6 Sampling Equipment

Due to the type of ecological monitoring proposed for the EREF site, no specific sampling equipment is necessary.

6.3.7 Method of Chemical Analysis

Due to the type of monitoring proposed for the EREF site, no chemical analysis is proposed for ecological monitoring.

6.3.8 Data Analysis and Reporting Procedures

AES or its contractor will analyze the ecological data collected on the proposed site. The EHS&L Manager or a staff member reporting to the EHS&L Manager will be responsible for the data analysis.

A summary report will be prepared, that will include spatial and temporal information on species composition, distribution, and relative abundance of key species.

6.3.9 Agency Consultation

Consultation was initiated with all appropriate federal and state agencies and affected Native American tribes. Refer to Appendix A, Consultation Documents, for a complete list of consultation documents and comments.

6.3.10 Organizational Unit Responsible for Reviewing the Monitoring Program on an Ongoing Basis

As policy directives are developed, documentation of the environmental monitoring programs will occur. The person or organizational unit responsible for reviewing the program on an ongoing basis will be the EHS&L Manager.

6.3.11 Established Criteria

The ecological monitoring program will be conducted in accordance with generally accepted practices and the requirements of the Idaho Department of Fish and Game and U.S. Fish and Wildlife Service. Procedures will be established as appropriate for data collection storage, analysis, reporting, and corrective actions. Data will be collected, recorded, stored, and analyzed. Actions will be taken as necessary to reconcile anomalous results.

6.3.11.1 Data Recording and Storage

Data relevant to the ecological monitoring program will be recorded in paper and/or electronic forms. These data will be kept on file for the life of the facility.

FIGURES

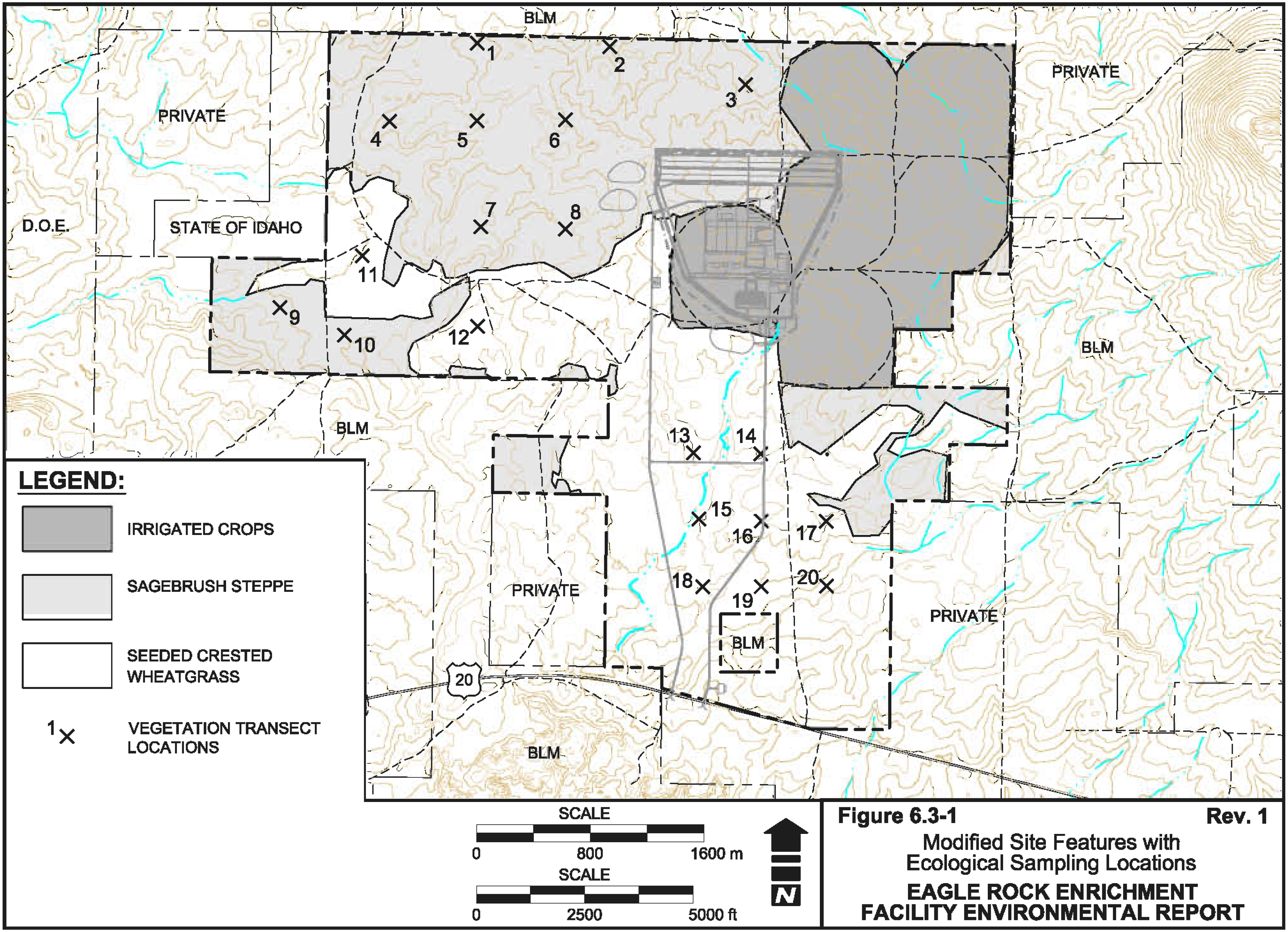


Figure 6.3-1 **Rev. 1**

Modified Site Features with Ecological Sampling Locations

EAGLE ROCK ENRICHMENT FACILITY ENVIRONMENTAL REPORT

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7.0 COST-BENEFIT ANALYSES

This chapter describes the costs and benefits for the proposed action, quantitatively and qualitatively. Environmental Report (ER) Section 7.1, Economic Cost-Benefits, Facility Construction and Operation, describes the quantitative direct and indirect economic impacts from facility construction and operation. ER Section 7.2 describes the qualitative socioeconomic and environmental impacts from facility construction and operation. ER Section 7.3, No-Action Alternative Cost-Benefit, describes the impacts of the no-action alternative of not building the proposed Eagle Rock Enrichment Facility (EREF).

7.1 ECONOMIC COST-BENEFITS, FACILITY CONSTRUCTION AND OPERATION

This analysis traces the economic impact of the proposed EREF in the 11-county region surrounding the proposed EREF, identifying the direct impacts of the facility construction and operation on revenues of local businesses, on incomes accrued to households, on employment, and on the revenues of state and local government. Further, it explores the indirect impacts of the EREF on local entities using a model showing the interaction of economic sectors in the 11-county region surrounding the proposed EREF.

7.1.1 Introduction

The purpose of ER Section 7.1, Economic Cost-Benefits, Facility Construction and Operation, is to assess the economic impact that construction and operation of the EREF would have on the surrounding area, including Bonneville, Bingham, and Jefferson Counties in Idaho. The analysis estimates the economic impact upon a contiguous 11-county region, comprised of the three previously identified counties, as well as eight more directly affected Idaho counties falling within a 80-km (50-mi) radius of the proposed site, including Bannock, Blaine, Butte, Caribou, Clark, Fremont, Madison, and Power Counties. (See Figure 7.1-1, 11-County Economic Impact Area)

Only a very small part of southeast Lemhi County is included within the 80-km (50-mi) radius of the proposed EREF. The potentially affected area is comprised of Targhee National Forest land, where no one is likely to reside. Including demographic and economic information for the entire county (with a land area of 11,821 km^2 (4,564 mi^2), 1.7 people per 2.6 km^2 (1 mi^2), and a population of 7,806 in 2000 and an estimated population of 7,717 in 2007) could skew the results of the analysis by inflating the size of the potentially affected population. Thus, Lemhi County was excluded from the data analysis (USCB, 2000dd) (USCB, 2007).

For the purpose of assessing the economic impact of the EREF, the analysis is divided into two distinct phases: Construction and Operations. For each of these two periods, both the direct and indirect impacts were assessed. Unless otherwise stated, all fiscal impacts are stated in 2007 real dollars based on the estimated costs and wages/benefits data provided, and are not adjusted for anticipated price or wage inflation over the period analyzed.

ER Section 7.1.2, The Economic Model – USBEA RIMS II Multipliers, includes a discussion of the United States Bureau of Economic Analysis model for evaluating industry impacts. ER Section 7.1.3, Regional Economic Outlook, discusses current economic conditions and the existing economic structure of the 11-county region. ER Section 7.1.4, Direct Economic Impact, is a discussion of the direct impacts associated with the EREF, which includes earnings, employment, and tax-related revenues. ER Section 7.1.5, Total Economic Impact Using RIMS II utilizes the Regional Input-Output Modeling System (RIMS) II framework to assess the total (both direct and indirect) economic impact of the EREF on the regional economy. The origin, general operation, and specific application of the RIMS II framework to the proposed action are discussed below.

7.1.2 The Economic Model – USBEA RIMS II Multipliers

A U.S. Bureau of Economic Analysis (USBEA) RIMS II model provides "multipliers" for approximately 500 industries showing the industry outputs stimulated by new activity, the associated household earnings, and the jobs generated.

The RIMS II model for the Bonneville County, Idaho area is based on the National Input-Output table, employment statistics from the Bureau of Labor Statistics, and the Regional Economic Information System (REIS). The National table is regionalized using location quotients, which compare the local proportion of industry employment to total employment to a similar proportion for the Nation. The model is solved to generate a very large table of multipliers for the entire set of industries existing in a 80 km (50 mi) region of Idaho.

Since the 1970s, the USBEA has provided models designated as RIMS (Regional Input-Output Modeling). RIMS II is the latest version of this system. The following comments are based on Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II) (USBEA, 1997).

RIMS II is based on an accounting framework called an input-output (I-O) table. For each industry, an I-O table shows the distribution of the inputs purchased and the outputs sold. A typical I-O table in RIMS II is derived mainly from two data sources: USBEA's national I-O table, which shows the input and output structure of nearly 500 U.S. industries, and USBEA's regional economic accounts, which are used to adjust the national I-O table in order to reflect a region's industrial structure and trading patterns.

The RIMS II model and its multipliers are prepared in three major steps. First, an adjusted national industry-by-industry direct requirements table is prepared. Second, the adjusted national table is used to prepare a regional industry-by-industry direct requirements table. Third, a regional industry-by-industry total requirements table is prepared, and the multipliers are derived from this table.

Unlike the national I-O tables, RIMS II includes households as both suppliers of labor inputs to regional industries and as purchasers of regional output, because it is customary in regional impact analysis to account for the effects of changes in household earnings and expenditures. Thus, both a household row and a household column are added to the national direct requirements table before the table is regionalized.

The regional industry-by-industry direct requirements table is derived from the adjusted national industry-by-industry direct requirements table. Location quotients (LQ's) are used to "regionalize" the national data. The LQ based on wages and salaries is the ratio of the industry's share of regional wages and salaries to that industry's share of national wages and salaries. The LQ is used as a measure of the extent to which regional supply of an industry's output is sufficient to meet regional demand. If the LQ for a row industry in the regional direct requirements table is greater than, or equal to, one, it is assumed that the region's demand for the output of the row industry is met entirely from regional production. In this instance, all row entries for the industry in the regional direct requirements table are set equal to the corresponding entries in the adjusted national direct requirements table.

Conversely, if the LQ is less than one, it is assumed that the regional supply of the industry's output is not sufficient to meet regional demand. In this instance, all row entries for the industry in the regional direct requirements table are set equal to the product of the corresponding entries in the adjusted national direct requirements table and the LQ for the industry.

The household row and the household column that were added to the national direct requirements table also are adjusted regionally. The household-row entries are adjusted downward, on the basis of commuting data from the Census of Population, in order to account for the purchases made outside the region by commuters working in the region. The household-column entries are adjusted downward, on the basis of tax data from the Internal Revenue Service, in order to account for the dampening effect of State and local taxes on household expenditures.

After the regional direct-requirements table is constructed it is converted into a model using a mathematical process known as "inversion." The resulting model, summarized in a 490-by-490 matrix called the "total requirements" table, now shows the impact of changes in outside sales by each industry on the outputs of every industry in the region. This data can now be manipulated to yield "multipliers."

The output multiplier for an industry measures the total dollar change in output in all industries that results from a $1 change in final demand by the industry in question.

The earnings multiplier for an industry measures the total dollar change in earnings of households employed by all industries that results from a $1 change in output delivered to final demand by the industry in question.

7.1.3 Regional Economic Outlook

A socioeconomic profile of the 11-county region surrounding the EREF provides a baseline from which to understand and measure the economic impacts expected to be derived from the EREF. This section includes a discussion of recent regional trends in output and employment, income, and other socioeconomic measures and concludes with a brief discussion on the industry structure of the region. Data was not available for all counties within the 11-county region.

7.1.3.1 Recent Trends in Economic Growth and Employment

The 11-county Idaho region had a total estimated population of 323,348 in 2006 (USCB, 2006j). Economic growth in Idaho slowed from 2005 to 2006; despite a decline over the year in the level of unemployment, the annual growth rate in gross state product was 2.5% in 2006 (IDL, 2008b). This was a drop from 7.4% in 2005 (IDL, 2008a). According to data published by the USBEA, a sharp decline in construction dropped the overall state growth rate. Strength in the manufacture of durable goods and moderate expansion in real estate, health care, retail trade, professional and business services, and agriculture offset the decline (IDL, 2008b). The unemployment rate in Idaho was 5.3% in 2006, which was above the national average of 4.6% (USBLS, 2008). In Bonneville County, the unemployment rate was 5.0% in 2006, which was just below the statewide average. Data was not available in 2006 for Bingham County and Jefferson County due to their small population levels (USCB, 2006c).

7.1.3.2 Recent Trends in Income

Per capita income in Idaho in 2006 was $21,000, below the national average of $25,267. For this region as a whole, per capita income information was available from the U.S. Census Bureau 2006 Community Survey only for Bonneville County and Bannock County. Bonneville County had a 2006 per capita income of $20,933, which was 99.7% of the state average and 82.8% of the national average. Bannock County had a 2006 per capita income of $19,135, which was 91.1% of the state average and 75.7% of the national average (USCB, 2006i).

While median household income generally has increased in Bonneville County, it has not increased as quickly as for the state. The county's median household income was 11.3% greater than the state median in 2000, but only 5.7% greater than the state in 2006. Additionally, the poverty rate in Bonneville County was 12.3% in 2006, about equal to the 12.6% in the state of Idaho (USCB, 2006c; USCB, 2006d). The U.S. Census Bureau defines poverty as those living under specified income thresholds (defined by the Office of Management and Budget) that vary by size of family and composition.

According to AREVA Enrichment Services (AES) estimates, the construction craft jobs created by the EREF would pay wages significantly higher than the regional average income. The USBEA data reported that the 2006 average wage per job in Bonneville County was $32,490, $27,568 in Bingham County, $23,000 in Jefferson County, and $32,968 in the 11-county region (USBEA, 2008b). In contrast, AES expects to pay an average salary of $65,144 to its construction craft employees, which is over 2.0 times more than the average wage per job in Bonneville, 2.4 times more than in Bingham County, 2.8 times more than in Jefferson County, and 2.0 times more than in the 11-county region (USBEA, 2008b).

Similarly, AES expects to pay an average salary of $65,983.

7.1.3.3 Regional Industry Analysis

The distribution of jobs by occupation in Bonneville County has differed in some industries from Bingham County, Jefferson County and the State of Idaho. According to the U.S. Census Bureau, the top three industries in 2000 were education, health, and social services (18.4%); followed by the professional, scientific, management, administrative, and waste services industries (17.3%); and the retail trade industry (14.1%). By 2006, this had changed somewhat to 17.0%, 15.8%, and 12.2%, respectively.

Bingham County's employment in 2000 consisted of 19.6% of the workforce employed in education, health, and social services, while 15.4% were employed in manufacturing and 10.9% in retail trade. These were the same top three employment industries as existed for the state of Idaho in 2000, but with slight variations for the percentages of employment (USCB, 2000d; USCB, 2000e; USCB, 2000f).

Jefferson County's employment in 2000 consisted of 19.4% of the workforce employed in education, health, and social services, while 12.1% were employed in agriculture, forestry, fishing and hunting, and mining, and 11.3% of the workforce was employed in retail trade (USCB, 2000z). The top three employment industries for Jefferson County were different than those in Bonneville and Bingham Counties.

While agriculture is important in the economy of the three counties, in 2000 only 3.0% of the jobs in Bonneville County, 8.8% in Bingham County, and 12.1% of Jefferson County were in the agriculture, forestry, fishing and hunting, and mining industry, as compared to approximately 5.8% for the state of Idaho (USCB, 2000d; USCB, 2000e; USCB, 2000f; USCB, 2000z).

The State of Idaho's labor force has grown since 2000. In 2006, the top eight nonfarm industry jobs were within trade, utilities, and transportation (20%); government (18%); professional and business services (12%); education and health services (11%); manufacturing (10%); leisure and hospitality (9%); construction (8%); and financial activities (5%). In 2006, there were 51,895 private sector establishments that provided 532,849 jobs in Idaho. (IDL, 2008c) (See Figure 7.1-2, Private Employment in Idaho.)

The construction and operation of the EREF would help to diversify the general economy of the three-county ROI (i.e., Bonneville, Bingham, and Jefferson Counties). The construction and operation of the facility requires a skilled labor force of craftsmen, as well as administrative and management personnel.

7.1.4 Direct Economic Impact

7.1.4.1 Introduction

In building the EREF, AES would spend approximately [*] locally over the seven-year heavy construction period and four-year assemblage and testing period. It also would spend [*] nationally and [*] internationally. The total construction cost is approximately $4.1 billion. During operations, approximately $23.8 million would be spent each year on local purchases. (See Figure 7.1-3, Total Present Value of Expected AREVA Enrichment Services Construction Purchases).

An estimated [*] is expected to be spent locally over the entire construction and operational periods. Of this amount, 60.0%, or approximately [*], would go to households in the form of employee salaries and benefits. Approximately [*], or 40.0%, would go to local businesses from the purchase of goods and services. Annual income, property, and sales and use tax payments are estimated to range from [*], for a total of $323.6 million over the life of the facility.

AES has estimated the economic impacts to the local economy during the seven-year heavy construction period to occur over eight calendar years (2011-2018) and the 30-year license period of the EREF (through 2041). This includes an eight year period when both construction and operation are simultaneous. This analysis identifies the direct impacts of the facility on revenues of local businesses, on incomes accruing to households, on employment, and on the revenues of state and local government. The analysis also estimates the indirect impacts of the EREF within an 80-km (50-mi) radius of the EREF. Details of the analysis are provided below.

* Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

7.1.4.2 Construction Expenditures

AES estimates that it would spend [*] locally on construction expenditures over the seven-year heavy construction period beginning in early 2011 and ending in early 2018 and followed by four years of assemblage and testing. The local payroll would include approximately [*] for craft workers, with an additional [*] for management. This amount would be augmented with the inclusion of the [*] in benefits paid to construction craft employees and [*] for management (based on the assumption of 35% of the average salary).

AES estimates that the construction phase would create an annual average of 304 new construction craft jobs over this period, with peak construction employment estimated at 590 jobs in 2012 (see Table 4.10-2, Estimated Number of Construction Craft Workers by Annual Pay Ranges). A majority of these craft jobs would exist in the first five years of construction, and would be at an annual salary range of [*]. Craft jobs would also exist within the upper pay range of [*]. Figure 7.1-4, Estimated Construction Craft Jobs by Annual Pay, depicts direct employment during the total eleven-year construction period, grouping jobs by salary range.

The regional construction workforce appears to be large enough to support the employment needs for the construction of the EREF. According to U.S. Census Bureau 2000 data, Bonneville County had 2,843 construction workers, Bingham County had 1,410 workers, and Jefferson County had 735 workers (USCB, 2008a; USCB; 2008b; USCB, 2000z). Thus, the construction labor force in the three-county ROI (Bonneville County, Bingham County, and Jefferson County) totaled more than 4,988 employees. The entire 11-county region had approximately 10,335 construction sector employees (IDC, 2008b). The estimated annual average of 304 new construction craft jobs would represent employment of 6.1% of the existing construction labor force in the three-county ROI and 2.9% of the existing 11-county region construction labor force. AES estimates that most construction craft employees would come from the local labor pool; however, a few positions that require specialized skills might be filled by non-local residents.

A portion of the total expenditures would be spent locally on construction goods and services, benefiting local businesses. This would amount to approximately [*] per year during the seven years of heavy construction. (See Table 7.1-3, Total Impact of Local Spending for Construction Goods and Services in the 11-County Area, for additional details of local construction expenditures.)

* Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

7.1.4.3 Operation Expenditures

During the operation period, AES estimates that it would spend $36.3 million annually for payroll and an additional $12.7 million in benefits. The operation of the facility is expected to generate approximately 550 permanent, full-time jobs. AES would pay an average annual salary of approximately $65,983 to its operating facility workers, which is 2.0 times greater than the average wage per job for Bonneville County, 2.4 times greater than for Bingham County, 2.9 times greater than for Jefferson County, and 2.0 times greater than for the 11-county region.

In addition, as shown in Table 7.1-1, Operating Facility Payroll Estimates, 90% of the jobs would have an annual salary of $48,407 or greater. According to AES, employment opportunities would range from facility operations, maintenance, and health physics positions to clerical and security-related jobs. AES plans to provide extensive training for employees, and approximately 20% of employment opportunities would involve an advanced understanding of the EREF. Refer to Table 7.1-4 for additional information about the annual impact of operations payroll.

The local labor force appears to be well positioned for these types of jobs. In 2000, the total Bonneville County civilian labor force was 40,321, the Bingham County civilian labor force was an additional 18,935, and the Jefferson County civilian labor force was 8,669. The total 11-county labor force was 148,204 (IDC, 2008b). Within the 11-county region, between 12% and 43% of the individual county residents have at least a bachelor's degree and between 64% and 90% of the individual county residents have graduated from high school (IDC, 2008b).

Approximately $23.8 million per year would be spent locally on goods and services, benefiting local businesses. (See Table 7.1-5, Annual Impact of EREF Purchases in the 11-County Area, below for additional details of local EREF purchases.)

7.1.4.4 Other Expenditures

The tax revenue to the state of Idaho and Bonneville and Bingham Counties resulting from the construction and operation of the EREF is estimated to be approximately $323.6 million over the life of the facility. Refer to Table 4.10-3, Estimated Annual Tax Payments, for further details.)

Using the State of Idaho and Bonneville County income tax rates, the average number of workers per year, and average salaries from the EREF, it is estimated that income taxes could be [*] each year during the seven-year heavy construction period and four-year assemblage and testing period and approximately [*] each year during the anticipated 30-year license period. Additionally, annual sales and use taxes paid within the State of Idaho are estimated to range from [*] from 2012 through 2019. Refer to Table 4.10-3, Estimated Annual Tax Payments, for details.

Of course, not all of the economic benefits from the construction and operation of the EREF can be quantified. For example, due to the relatively small size of the manufacturing sector in this 11-county region, the opening of the EREF should have positive spillover effects throughout the region, such as increasing the skill level of the local labor force and potentially attracting other manufacturing firms.

In addition to increasing the role of the manufacturing sector within the region, the EREF would help to diversify the regional economy. Additionally, housing values have the potential to increase from current levels as income and relatively high-paying job opportunities in the area grow, potentially attracting new residents. In 2000, the median housing value in the 11-county region was $103,664 (IDC, 2008b), which was less than the U.S. level of $119,600 (USCB, 2000f).

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7.1.5 Total Economic Impact Using RIMS II

7.1.5.1 Introduction

The RIMS II Methodology, first created by the USBEA in the 1970s, is based on an accounting framework called an Input-Output (I-O) table. For each industry, an I-O table shows the distribution of the inputs purchased and the outputs sold among individual sectors of a national or regional economy. Using RIMS II for impact analysis has several advantages. RIMS II multipliers can be estimated for any region composed of one or more counties and for any industry or group of industries characterized in the national I-O table. According to empirical tests, the estimates based on RIMS II are similar in magnitude to the estimates based on relatively expensive surveys. This analysis utilized the RIMS II regional I-O multipliers for the 11-county area around and including Bonneville County, Idaho based on data obtained from the USBEA (USBEA, 2008a).

7.1.5.2 Construction Impacts

AES estimates that it would spend [*] on payroll (excluding benefits) over the eleven-year construction, assemblage and testing periods for construction craft workers and management. It is possible to compute the total annual impact by converting this amount into an average annual number and using RIMS II multipliers. An annual payroll of approximately [*] is expected to generate a total impact on household earnings equal to [*] (i.e., [*] in direct impacts and [*] in indirect impacts) within the 11-county region (See Table 7.1-2, Annual Impact of Construction Payroll in the 11-County Area). The initial annual average [*] direct jobs ([*] craft workers and [*] management positions) created during the eleven-year total construction period are expected to produce a total employment increase of [*] jobs.

AES estimates that it would spend [*] on construction goods and services in the local economy over the seven-year heavy construction period. Using the minimum amount of expected purchases and RIMS II Final Demand Multipliers, these expenditures are expected to generate a total annual output amounting to [*] and total annual earnings of [*] (See Table 7.1-3, Total Impact of Spending for Construction Goods and Services in the 11-County Area). Additionally, these expenditures are expected to produce a total of [*] new jobs per year (i.e., [*] total new jobs for the seven-year heavy construction period).

To summarize, the construction phase of the project is expected to generate a total impact of [*] in output for local businesses, [*] in household earnings, and [*] new jobs. The total impact figures from the construction period are derived from adding the total impacts from construction payroll and employment and local construction expenditures. The output figure comes directly from Table 7.1-3, Total Impact of Local Spending for Construction Goods and Services in the 11-County Area, and the household earnings figures and the total new jobs figure come from adding the total annual impact on earnings from and new jobs, respectively, Table 7.1-2, Annual Impact of Construction Payroll in the 11-County Area, and Table 7.1-3, Total Impact of Local Spending for Construction Goods and Services in the 11-County Area, as does the total new jobs figure.

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7.1.5.3 Operations Impact

Upon completion of the EREF's construction, AES estimates that it would spend $36.3 million annually for facility operations payroll and an additional $12.7 million for benefits. Using the RIMS II Multipliers, total additional earnings of $119.1 million would be produced (i.e., $36.3 million in direct impacts and $82.8 million in indirect impacts). Additionally, a total employment of 3,289 new jobs would be created during the operational period (Table 7.1-4, Annual Impact of Operations Payroll in the 11-County Area).

The estimated $23.8 million in annual purchases by AES for goods and services associated with facility operation are expected to have a total annual impact on local business revenues equal to $35.6 million, $8.9 million for household income, and an increase in employment of 248 jobs (Table 7.1-5, Total Annual Impact of EREF Purchases During Operations in the 11-County Area).

To summarize, the operational phase of this project is expected to generate a total annual impact of $35.6 million in output for local businesses, $128.0 million in household earnings, and 3,537 new jobs including those indirect jobs created by annual purchases by AES. The total impact estimates from the operations period are derived from adding the total impacts from operations payroll and local expenditures. The output estimate comes directly from Table 7.1-5, Total Annual Impact of EREF Purchases During Operations in the 11-County Area, the household earnings estimate and new jobs figure come from adding the total annual impact on earnings and new jobs, respectively, from Table 7.1-4, Annual Impact of Operations Payroll in the 11-County Area, and Table 7.1-5, Total Annual Impact of EREF Purchases During Operations in the 11-County Area

TABLES

Table 7.1-1 Operating Facility Payroll Estimates
(Page 1 of 1)

Job Level	Proportion of Jobs	Number of Jobs	Average Annual Pay
Management	10%	55	$109,491
Professional	20%	110	$71,457
Skilled	60%	330	$48,407
Administrative	10%	55	$34,576
Total	**100%**	**550**	**Not Applicable***
		Average Annual Salary	**$65,983**
		Total Annual Payroll**	**$36,290,650**

* This figure is not applicable because a total of average annual salaries is not an appropriate measurement, and it is not used in the remainder of the analysis.

** Total Annual payroll = Total Number of Jobs x Average Annual Salary

Table 7.1-2 Annual Impact of Construction Payroll in the 11-County Area (Page 1 of 1)

	RIMS II Direct Effect Multipliers	Impact
Direct Impact On:		
Earnings by Households		$ [ ]
Indirect Impact On:		
Earnings by Households	1.7251	$ [ ]
Total Impact On:		
Earnings by Households	2.7251	$ [ ]
Direct Impact On:		
Employment (jobs)		[ ]
Indirect Impact On:		
Employment (jobs)	1.8596	[ ]
Total Impact On:		
Employment (jobs)	2.8596	[ ]

Information in “[ ]” is Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

Table 7.1-3 Total Impact of Local Spending for Construction Goods and Services in the 11-County Area (Page 1 of 1)

Industry	Local Purchases	Final Demand Multipliers			Total Impact			
		Output	Earnings	Employment*	Output	Earnings	Job-years	Jobs/year
Concrete	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Reinforcing Steel	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Structural Steel	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Lumber	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Site Preparation - Total	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Transportation (freight on all materials)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Subcontracts by type of service								
Metal Siding	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Multiple Arch/Bldg. Packages	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Equipment Installation Packages	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Mechanical/Piping/HVAC Packages	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Electrical/Controls Packages	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Total	[ ]				**[ ]**	**[ ]**	**[ ]**	
Per Year (over 6-year period	[ ]	* The employment multiplier is measured on the basis of $1-million change in output delivered to final demand			**[ ]**	**[ ]**		**[ ]**
		Indirect Impact			**[ ]**			

Note: The "Local Purchases" displayed in this table include local material and labor costs.

Source: USBEA, 2008a.

Information in "[ ]" is Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

Table 7.1-4 Annual Impact of Operations Payroll in the 11-County Area (Page 1 of 1)

	RIMS II Direct Effect Multipliers	Impact
Direct Impact On:		
Earnings by Households		$ 36,290,650
Indirect Impact On:		
Earnings by Households	2.2806	$ 82,764,456
Total Impact On:		
Earnings by Households	3.2806	$ 119,055,106
Direct Impact On:		
Employment (jobs)		550
Indirect Impact On:		
Employment (jobs)	4.9804	2,739
Total Impact On:		
Employment (jobs)	5.9804	3,289

Table 7.1-5 Total Annual Impact of EREF Purchases During Operations in the 11-County Area (Page 1 of 1)

Item	Local Purchases	Final Demand Multipliers			Total Impact		
	(Direct Impact-2007 dollars-Provided by AES)	Output	Earnings	Employment*	Output	Earnings	Employment
Landscaping	$60,000	1.7339	0.5908	33.0365	$104,034	$35,448	2
Protective Clothing	$72,000	1.4548	0.3210	10.6240	$104,746	$23,112	1
Laboratory Chemicals	$140,000	1.9313	0.3405	9.1357	$270,382	$47,670	1
Plant Spare Equipment	$500,000	1.4839	0.3308	9.5108	$741,950	$165,400	5
Office Equipment	$183,000	1.6636	0.4518	15.1490	$304,439	$82,679	3
Engineered Parts	$400,000	1.5593	0.4076	10.9617	$623,720	$163,040	4
Electrical/Electronic Parts	$640,000	1.6299	0.4222	10.1705	$1,043,136	$270,208	7
Electricity	$18,500,000	1.4492	0.3282	6.8767	$26,810,200	$6,071,700	127
Natural Gas	$0	1.4756	0.2690	5.8119	$0	$0	0
Waste Water	$170,000	1.6529	0.4546	13.2552	$280,993	$77,282	2
Solid Waste Disposal	$60,000	1.8148	0.5391	17.5413	$108,888	$32,346	1
Insurance	$0	1.6957	0.4722	13.6573	$0	$0	0
Catering	$92,000	1.8266	0.6153	43.9806	$168,047	$56,608	4
Building Maintenance	$650,000	1.7339	0.5908	33.0365	$1,127,035	$384,020	21
Custodial Services	$3390,000	1.7339	0.5908	33.0365	$676,221	$230,412	13
Professional Services	$360,000	1.7562	0.6916	18.9169	$632,232	$248,976	7
Security Services	$942,500	1.7204	0.7588	39.8107	$1,621,477	$715,169	38
Mail, Document Services	$170,000	1.6236	0.5383	25.3657	$276,012	$91,511	4
Office Supplies	$236,000	1.6580	0.5356	23.0050	$391,288	$126,402	5
Diesel	$205,000	1.6300	0.5112	14.6460	$334,150	$104,769	3
Total	$23,770,500	* The employment multiplier is measure on the basis of $1-million change in output delivered to final demand			**$35,618,950**	**$8,926,779**	**248**

FIGURES

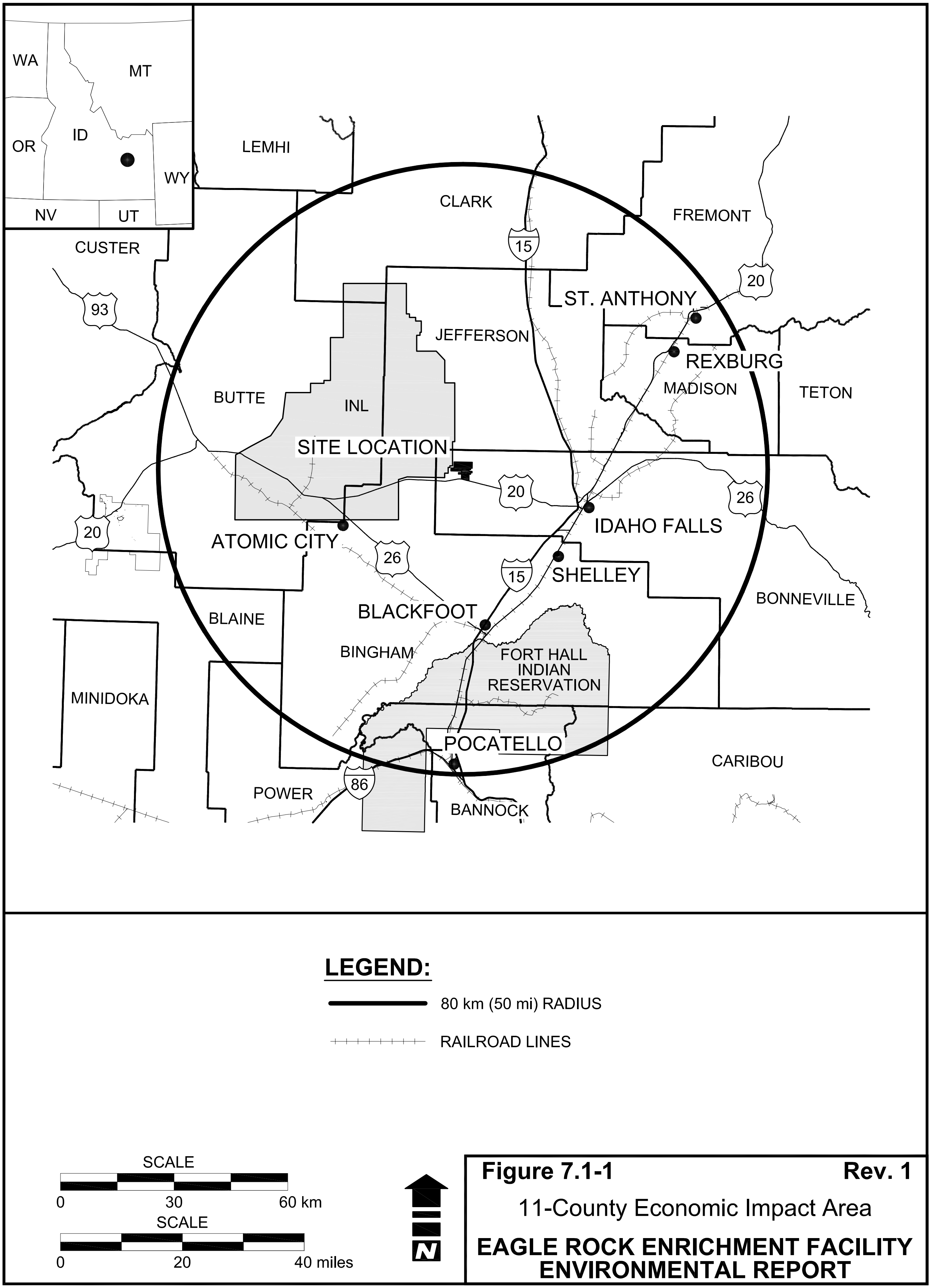

Figure 7.1-1 **Rev. 1**

11-County Economic Impact Area

EAGLE ROCK ENRICHMENT FACILITY ENVIRONMENTAL REPORT

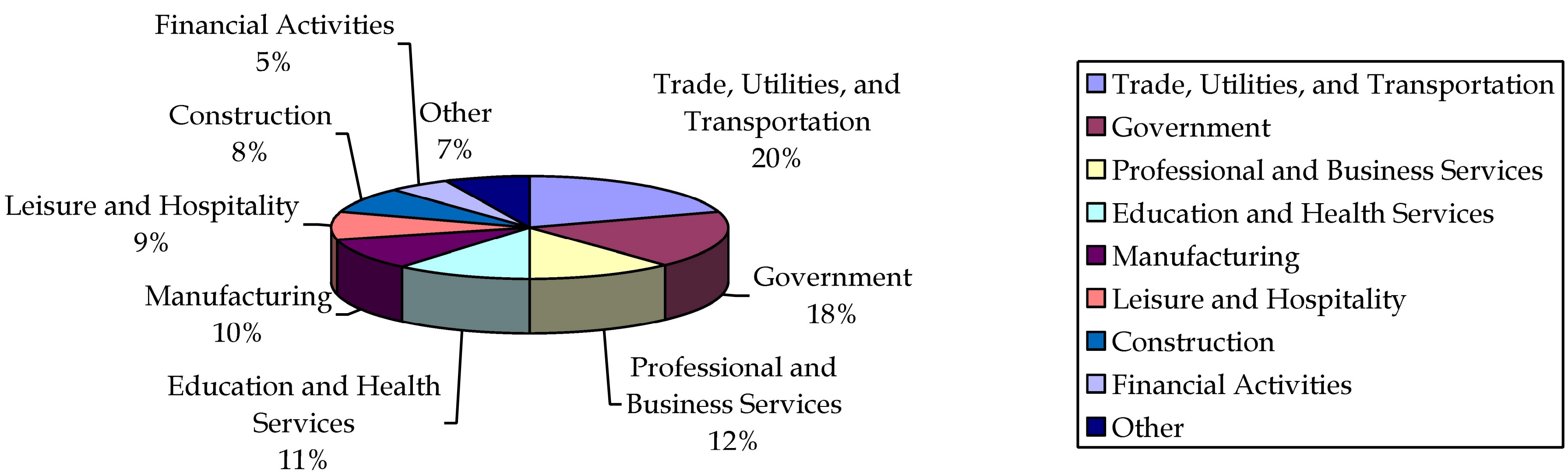

Figure 7.1-2 **Rev. 1**

Private Employment in Idaho in 2006

EAGLE ROCK ENRICHMENT FACILITY ENVIRONMENTAL REPORT

Figure 7.1-3, Total Present Value of Expected AES Construction Purchases,
is Proprietary Commercial Information
Withheld in Accordance with 10 CFR 2.390

Figure 7.1-4, Estimated Construction Craft Jobs by Annual Pay, is Proprietary Commercial Information Withheld in Accordance with 10 CFR 2.390

7.2 ENVIRONMENTAL COST – BENEFIT, PLANT CONSTRUCTION AND OPERATION

This section qualitatively describes the environmental costs and benefits of the proposed Eagle Rock Enrichment Facility (EREF) in Bonneville County, Idaho. It identifies the impacts of the plant construction and operation on the site and adjacent environment. Table 7.2-1, Qualitative Environmental Costs/Benefits of EREF During Construction and Operation, summarizes the results.

7.2.1 Site Preparation and Plant Construction

7.2.1.1 Existing Site

There will be minimal disturbance to existing site features at the project site from construction activities. Only 240 ha (592 ac) within the 1,700-ha (4,200-ac) proposed site would be impacted by clearing and earthmoving activities. Site property outside the primary plant area would generally remain in its preconstruction condition or improved through stabilization as needed.

7.2.1.2 Land Conservation and Erosion Control Measures

AREVA Enrichment Services, LLC (AES) anticipates that there would be some short-term increases in soil erosion at the site due to construction activities. Erosion impacts due to site clearing, excavation, and grading would be mitigated through the use of proper construction and erosion best management practices (BMPs). These practices would include minimizing the construction footprint to the extent possible, mitigating discharge, including stormwater runoff (i.e., the use of detention and retention ponds), the protection of all unused natural areas, and site stabilization practices to reduce the potential for erosion. Only about 14% of the site would be used for construction activities. Cleared areas would be stabilized as soon as practicable, and watering would be used to control fugitive dust.

7.2.1.3 Aesthetic Changes

Noise levels during construction of the highway entrances, access roads, and visitor center would range from 80 to 95 dBA. One highway entrance and access road would be visible off site on portions of the Wilderness Study Area (WSA), south of the proposed EREF site. Construction noise would be temporary and be reduced to about 51 to 66 dBA at the nearest hiking trail point on the WSA. Therefore, noise impacts would be small from construction of the visitor center, highway entrances, and access roads. Construction noise from the EREF footprint would have a small impact because the footprint would be about 2.4 km (1.5 mi) from public viewing areas, such as U.S. Highway 20 and the WSA.

The nearest resident would not hear the construction noise on the proposed EREF site since the residence is approximately 7.7 km (4.8 mi) east of the proposed site. The nearest resident would hear noise from construction traffic on U.S. Highway 20. Noise from construction traffic along U.S. Highway 20 would be similar to existing highway noise levels because construction activities largely occur during weekday daylight hours. Existing noise levels were recorded at the proposed site at 57 dBA, at 15 m (50 ft) from U.S. Highway 20, during peak commute times. This noise level likely would be similar during construction when construction traffic is included. However, the duration of noise that is associated with peak commute traffic would increase.

Construction of the proposed EREF would be out of character with current uses and features due to the size of the construction site and the type of buildings. However, similarly sized industrial facilities have been constructed west of the proposed site. Construction cranes and the form of taller buildings would be observable off-site. The construction area of the proposed facility would be about 2.4 km (1.5 mi) from public viewing areas such as U.S. Highway 20 and the WSA, making details of the construction of the proposed facility difficult to observe. Therefore, the impact on views would be small.

The Wasden Complex, an important group of archaeological sites, is about 1.0 km (0.6 mi) from the boundary of the proposed EREF site. AES has assessed the potential visual impact of the EREF on the Wasden Complex viewshed and has provided the results to the Idaho SHPO. The assessment of the viewshed looking from the Wasden Complex to the EREF indicates most of the facilities when constructed would be obscured due to an intervening ridgeline, and due to distance. Construction activities should also be difficult to observe due to this topographical feature. As a result of consultation between AES and the Idaho State Historic Preservation Officer (SHPO), AES is considering planting 0.6 to 0.9 m (2 to 3 ft) tall native vegetation to further mask the portion of the EREF buildings that may be visible from the Wasden Complex of sites. Therefore, the construction of the proposed EREF would have a small impact on the Wasden Complex.

7.2.1.4 Ecological Resources

Pre-construction and construction activities at the site would have a small impact on vegetation and wildlife. AES anticipates that construction activities would remove some shrub vegetation and cause wildlife to relocate on the site. Similarly, some wildlife that were using the immediate area would be displaced due to noise, lighting, traffic, and human presence. Limited direct mortality of wildlife may occur from vehicle collisions or collisions with construction cranes and fences. Proposed activities would not impact communities or habitats defined as rare or unique, or that support threatened and endangered species, since no such communities or habitats have been identified anywhere within or adjacent to the proposed site.

7.2.1.5 Access Roads and Local Traffic

All traffic into and out of the site would be along U.S. Highway 20. U.S. Highway 20 is dedicated to heavy-duty use and built to industrial standards; it would be able to handle increased heavy-duty traffic adequately. Traffic volume is low except during commute times. Therefore, the proposed EREF would potentially add to commute traffic and durations but would result in little effect during non-commute times.

7.2.1.6 Water Resources

Water quality impacts would be controlled during construction by compliance with the State of Idaho’s and EPA Region 10’s water quality regulations and the use of BMPs as detailed in the site Stormwater Pollution Prevention Plan (SWPPP). In addition, a Spill Prevention, Control, and Countermeasure (SPCC) plan would be implemented to minimize the possibility of spills of hazardous substances, minimize the environmental impact of any spills, and promptly initiate appropriate remediation. Spills that may occur during construction would most likely occur near vehicle maintenance and fueling operations, storage tanks, painting operations, and warehouses. The SPCC plan will identify sources, locations and quantities of potential spills, and response measures. The plan will also identify individuals and their responsibilities for implementation of the plan and provide for prompt notifications of state and local authorities as needed.

7.2.1.7 Noise and Dust Control Measures

Objectionable construction noises would be reduced by use of noise control equipment on all powered equipment. Shrub and vegetation outside of the construction areas would be left in place and, combined with the distances from construction areas to the public, would reduce noise. There is considerable existing traffic already present on U.S. Highway 20. Therefore, maximum noise levels from EREF traffic would not increase noise levels along U.S. Highway 20, although the duration of noise that is associated with peak commute traffic may increase.

Dust resulting from traffic and excavation activities during construction would be abated by water spraying as necessary. All potential air pollution and dust emission conditions would be monitored to demonstrate compliance with applicable health, safety, and environmental regulations.

7.2.1.8 Historic and Cultural Resources

A pedestrian cultural resource survey of the area where the proposed EREF is to be located was conducted. The survey resulted in the recording of 11 sites and 17 isolated occurrences (finds); there are three prehistoric, four historic, and four multi-component sites. Further investigation was conducted to determine the National Register of Historic Places (NRHP) eligibility for the prehistoric components of three sites (MW002, MW012, and MW015). Subsequent testing of these sites resulted in a recommendation of not eligible. This historic component of one site (MW004) is recommended as eligible. Seven sites (MW003, MW006, MW007, MW009, MW011, MW013, and MW014) are recommended not eligible for inclusion in the NRHP. The potentially eligible site is within the proposed plant footprint. A treatment mitigation plan for MW004 will be developed by AES in consultation with the Idaho State Historic Officer (SHPO) to recover significant information.

7.2.1.9 Socioeconomic

Construction of the EREF is expected to have positive socioeconomic impacts on the region. The Regional Input-Output Modeling System (RIMS II) allows estimation of various indirect impacts associated with each of the expenditures associated with the EREF. According to the RIMS II analysis, the region's residents can anticipate an annual impact of [*] in increased economic activity for local businesses, [*] in increased earnings by households, and [*] new jobs during the 7-year heavy construction period and four-year assemblage and testing period. The temporary influx of labor is not expected to overload local services and facilities within the Bonneville-BinghamJefferson Idaho area.

* Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

7.2.1.9.1 Yearly Purchases of Steel, Concrete, and Related Construction Materials

The initial construction period for EREF is approximately three years. This period will encompass site preparation and construction of most site structures. Due to the phased installation of centrifuge equipment, production will commence in the fourth year of the construction period (2014). The manpower and materials used during this phase of the project will vary depending on the construction plan. Table 7.2-2, Estimated Construction Material Yearly Purchases, provides the estimated total quantities of purchased construction materials and Table 7.2-3, Estimated Yearly Labor Costs for Construction, provides the estimated labor that will be required to install these materials. The scheduling of materials and labor expenditures is subject to the provisions of the project construction execution plan, which has not yet been developed.

Approximately [*] in local expenditures (e.g., buildings, equipment, and other materials) will be made in the local EREF site area. According to the labor survey conducted as part of the conceptual estimate, the major portion of the required craft labor forces will come from the eleven counties around the project area.

* Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

7.2.2 Plant Operation

7.2.2.1 Surface and Groundwater Quality

Liquid effluents at the EREF will include stormwater runoff and sanitary wastewater. Any radiologically contaminated, potentially radiologically contaminated, or non-radiologically contaminated aqueous liquid effluents are collected for filtration and precipitation treatment to remove uranium and fluorine. Through repeat treatments, the contamination levels are reduced to acceptable levels, at which time the liquid is sent to an evaporator for vaporization and final discharge to the atmosphere. Any removed solids are shipped for off-site low-level radioactive waste disposal.

Stormwater runoff from the Cylinder Storage Pads and daily treated domestic sanitary effluent will be collected in the Cylinder Storage Pads Stormwater Retention Basins. General site runoff will be routed to the Site Stormwater Detention Basins. During operation, stormwater discharges will be regulated, as required, by the National Pollutant Discharge Elimination System (NPDES) permit for the EREF. Approximately 65,240 m^3 (17,234,700 gal) of stormwater from the Cylinder Storage Pads are expected to be released, based on mean annual precipitation discharging to the Cylinder Storage Pads Stormwater Retention Basins. There is no infiltration in the site soils. Approximately 85,175 m^3 (22,501,000 gal) of stormwater from the site is expected to be released annually (mean) to the detention basin after taking into account infiltration into the area soils associated with landscaped areas, natural areas, and loose gravel areas of the developed portion of the site. The estimated annual release of treated sanitary effluents to the retention basin is 18,700 m^3 (4,927,500 gal).

7.2.2.2 Terrestrial and Aquatic Environments

No communities or habitats defined as rare or unique, or that support threatened or endangered species have been found or are known to occur on the proposed site. Operation of the EREF is therefore not expected to impact such communities or habitats.

7.2.2.3 Air Quality

No adverse air quality impacts to the environment, either on or off site, are anticipated to occur. Air emissions from the facility during normal facility operations will be limited to the plant ventilation air and gaseous effluent systems. All plant process/gaseous air effluents are to be filtered and monitored on a continuous basis for chemical and radiological contaminants, which could be derived from the UF_6 process system. If any UF_6 contaminants are detected in these systems' exhaust, the air is treated by appropriate filtration methods prior to its venting to the environment.

On-site diesel engines include four standby diesel generators for backup power supply, a security diesel generator, and a fire pump diesel. These engines will be used exclusively for emergency purposes. Their use will be administratively controlled and they will only run a limited number of hours per year. As a result, these engines will be exempt from air permitting requirements of the State of Idaho. Due to their limited use, the diesel generators will have negligible health and environmental impacts.

7.2.2.4 Visual/Scenic

No impairments to local visual or scenic values will result due to the operation of the EREF. The facility and associated structures will be relatively compact, and located in a rural location. No offensive noises or odors will be produced as a result of facility operations.

7.2.2.5 Socioeconomics

AREVA Enrichment Services (AES) applied the Regional Input-Output Modeling System (RIMS) II to estimate the socioeconomic impact from operation of the EREF. The results of the analysis are presented below and are in 2007 dollars. The EREF is expected to employ up to 550 people in high paying jobs relative to the region. Its operation's payroll will generate $36.3 million annually in earnings for households and another $82.8 million in additional household earnings due to indirect impacts. Annual purchases for goods and services are expected to add another $8.9 million in household income for a total increase in household earnings of $128.0 million. An annual increase of 2,987 indirect new jobs (3,537 minus the 550 direct jobs at the EREF) is anticipated during operation.

In general, no significant impacts are expected to occur on population characteristics, economic trends, housing, community services and the tax structure and tax distribution in Bonneville and Bingham Counties.

7.2.2.6 Radiological Impacts

Potential radiological impacts from operation of the EREF would result from controlled releases of small quantities of UF_6 during normal operations and releases of UF_6 under hypothetical accident conditions. As described in ER 4.12.2, Radiological Impacts, the major sources of potential radiation exposure are the gaseous effluent from the Separations Buildings, Technical Support Building and direct radiation from the Cylinder Storage Pads. It is anticipated that the total amount of uranium released to the environment via airborne effluent discharges from the EREF will be less than 20 grams (13.7 µCi or 0.506 MBq) per year. Due to the anticipated low volume of contaminated liquid waste and the effectiveness of the treatment processes, no waste in the form of liquid effluent are expected.

The estimated maximum annual effective dose equivalent and maximum annual organ (lung) committed dose to transient individuals at the maximum site boundary for the ground plane (NNE sector at 1.1 km (0.67 mi)), cloud immersion (N sector at 1.1 km (0.67 mi)), and inhalation exposure (N sector at 1.1 km (0.67 mi)) pathways are 1.5 E-04 mSv/yr (1.5 E-02 mrem/yr) and 1.2 E-03 mSv/yr (1.2E-01 mrem/yr), respectively. Although there are no residences within 8 km (5 mi) from the center of the EREF structures, for a hypothetical residence at the site boundary, the maximum annual effective dose equivalent and maximum annual organ dose (lung) to an individual for all airborne exposure pathways are 8.8 E-04 mSv/yr (8.8E-02 mrem/yr) and 6.4 E-03 mSv/yr (6.4 E-01 mrem/yr), respectively.

The dose equivalent due to external radiation (direct and sky shine) from the Full Tails, Full Feed, and Empty Cylinder Storage Pads and direct dose from product cylinders stored on the Full Product Cylinder Storage Pad, to an individual (2,000 hrs/yr) at the maximum impacted site boundary (North), is 0.0142 mSv/yr (1.42 mrem/yr). The annual dose equivalent (2000 hrs/yr) at the nearest actual off-site work location (Southwest at 4.0 km (2.5 mi)) is estimated to be <1E-12 mSv/yr (<1E-10 mrem/yr) and that to the nearest actual residence (8,766 hrs/yr) at over 8 km (5 mi) from facility structures, is less than <1E-12 mSv/yr (<1E-10 mrem/yr).

These dose equivalents due to normal operations are small fractions of the normal background radiation range of 2.0 to 3.0 mSv (200 to 300 mrem) dose equivalent that an average individual receives in the U.S., and within regulatory limits.

7.2.2.7 Other Impacts of Plant Operation

The EREF water supply will be from on-site wells. The anticipated normal water usage rate for the EREF is 68.2 m^3/d (18,000 gal/d) and the peak water usage requirement is 47 L/sec (739gpm). 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 appropriation for seasonal irrigation use will be 147 m^3/d (38,800 gal/d). 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.

Non-hazardous and non-radioactive solid waste is expected to be approximately 70,307 kg (155,000 lbs)] annually. It will be collected and disposed of off-site by a County licensed solid waste disposal contractor and disposed of in a licensed landfill that has adequate capacity to accept EREF non-hazardous waste.

The EREF is expected to generate approximately 146,500 kg (323,000 lbs) of low-level waste annually. In addition, the EREF is expected to generate approximately 5,062 kg (11,160 lbs) of hazardous wastes and 100 kg (220 lbs) of mixed waste annually. These wastes will be collected, inspected, volume-reduced, and transferred off-site to licensed low-level waste facilities.

7.2.2.8 Decommissioning

The plan for decommissioning is to decontaminate or remove all materials promptly from the site that prevent release of the facility for unrestricted use. This approach avoids the need for long-term storage and monitoring of wastes on site. Only building shells and the site infrastructure will remain. All remaining facilities, including site basins, will be decontaminated where needed to acceptable levels for unrestricted use. Excavations and berms will be leveled to restore the land to a natural contour.

Radioactive wastes will be disposed of in licensed low-level radioactive waste disposal sites. Hazardous wastes will be treated or disposed of in licensed hazardous waste facilities.

Depleted UF_6, if not already sold or otherwise disposed of prior to decommissioning, will be disposed of in accordance with regulatory requirements.

Following decommissioning, all parts of the facility and site will be unrestricted to any specific type of use.

TABLES

Table 7.2-1 Qualitative Environmental Costs/Benefits of EREF During Construction and Operation

(Page 1 of 1)

Qualitative Costs	Determination/Evaluation
Change in real estate values in areas/communities adjacent to the facility (e.g., land, homes, rental property etc.)	Unlikely to occur
Traffic increases on U.S. Highway 20	Small impacts mainly associated with Increased traffic during shift changes
Air emissions from construction dust and vehicles	Small impact
Demand on local police and fire services, public utilities, schools, etc.	Some increased utilization and some increased need for additional staff expected
Impact to natural environmental components (e.g., ecology, water quality, air quality, etc.)	Small impacts
Alteration of aesthetic, scenic, historic, or archaeological areas or values	Small impact
Change in local recreational potential	Small impact
Site soil erosion during construction	Small impact
Qualitative Benefits	
Incentive for development of other ancillary/support business development resulting from presence of EREF facility	Beneficial
Change in real estate values in areas/communities adjacent to the facility (e.g., land, homes, rental property etc.)	Potentially beneficial
Increase in local employment opportunities	Beneficial
Impacts to local retail trade and services	Beneficial
Development of local workforce capabilities	Beneficial

Table 7.2-2 Estimated Construction Material Yearly Purchases
(Page 1 of 1)

Commodity	Quantity	Total Value (Material Cost)	Yearly Purchase
Concrete/Forms/Rebar	[ ]	[ ]	[ ]
Metal Siding	[ ]	[ ]	[ ]
Structural Steel	[ ]	[ ]	[ ]
Architectural Items	[ ]	[ ]	[ ]
HVAC Systems	[ ]	[ ]	[ ]
Utility Piping	[ ]	[ ]	[ ]
Electrical Conduit & Wire	[ ]	[ ]	[ ]

Note: Material purchases displayed in this table are for local and non-local (e.g., national and elsewhere) purchases of materials only and do not include associated labor costs.

Information in "[ ]" is Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

Table 7.2-3 Estimated Yearly Labor Costs for Construction
(Page 1 of 1)

Type of Work	Number of Craft-Hours	Approx. No. People	Total Value	Yearly Purchases
Civil & Site Work	[ ]	[ ]	[ ]	[ ]
Concrete Work	[ ]	[ ]	[ ]	[ ]
Structural Steel	[ ]	[ ]	[ ]	[ ]
Metal Siding	[ ]	[ ]	[ ]	[ ]
Architectural Finishes	[ ]	[ ]	[ ]	[ ]
Utility Equipment	[ ]	[ ]	[ ]	[ ]
HVAC Sys, & Ductwork	[ ]	[ ]	[ ]	[ ]
Electrical Conduit & Wire	[ ]	[ ]	[ ]	[ ]

Information in "[ ]" is Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

7.3 NO-ACTION ALTERNATIVE COST-BENEFIT

The no-action alternative would be to not build the proposed Eagle Rock Enrichment Facility (EREF). Under the no-action alternative, the NRC would not approve the license application to construct and operate the proposed facility. As a result, it is assumed that the current owners of the private property upon which the proposed facility would be sited would be free to continue the current uses of the property and the potential impacts of constructing and operating the proposed EREF would not occur. Although the no-action alternative would avoid impacts to the EREF area, it could lead to impacts at other locations.

Under the no-action alternative, for example, reactor licensees would be required to meet their uranium enrichment service needs through existing suppliers. In the United States, this would mean that the one remaining operating enrichment facility, the gaseous diffusion facility operated by the United States Enrichment Corporation (USEC) at Paducah, Kentucky, which is expected to shut down in June 2012, would be the only domestic facility currently available to serve this purpose. Therefore, USEC in the near term would remain the sole current domestic supplier of low-enriched uranium.

In the longer term, two companies, Louisiana Energy Services (LES) and USEC, submitted applications to the NRC and received licenses to build and operate new centrifuge-based uranium enrichment plants in the United States. Construction is presently underway on both facilities, the National Enrichment Facility (NEF) and the American Centrifuge Plant (ACP). In addition, General Electric-Hitachi Nuclear Energy (GEH) has initiated work that is based on Silex laser enrichment technology. On January 30, 2009, GEH delivered its environmental report to the NRC with the rest of the license application to be submitted by June 2009 (SILEX, 2009). If GEH ultimately makes the decision to deploy Global Laser Enrichment (GLE) commercially, following results of testing that is scheduled to occur during 2009, GEH then expects to have a commercial Lead Cascade operational by 2012 or 2013.

Nonetheless, if the NEF and ACP are completed and operate in the U.S., then together with small contributions of equivalent supply from down blended U.S. Highly Enriched Uranium (HEU), and limited recycle, they would be capable of supplying only 61% of the U.S. requirements during the period of AREVA's Reference Nuclear Power Growth forecast (ER Section 1.1.2.4.2, Scenario B). In addition, these potential enrichment services alone would be inconsistent with the clear federal policy of fostering the development of additional, secure, reliable, and economical domestic enrichment capacity to promote both U.S. energy security and national security. The Department of Energy (DOE) has recognized that these energy security concerns are due, in large part, to the lack of available replacement for the aging, electric power intensive and high cost gaseous diffusion enrichment plant.

These circumstances, and the expiration of the U.S.-Russian HEU agreement in 2013, have combined to raise concerns among U.S. purchasers of enrichment services with respect to the security of their supplies. They see a world supply and requirements situation for economical uranium enrichment services that is presently in balance, exhibiting a potential for significant shortfall if plans that have been announced by two of the primary enrichers are not executed.

Not building the EREF, therefore, could have the following consequences:

- Failure to satisfy important considerations of energy and national security policy, namely the development of additional, secure, reliable, and economical domestic enrichment capacity.
- Continued reliance on the high-cost and power-intensive technology now in use at the aging Paducah gaseous diffusion plant, or, alternatively, reliance on the NEF and the proposed

USEC gas centrifuge technology which, at present, has yet to be deployed on a commercial scale.

- Continued extensive reliance on uranium enriched in foreign countries.
- The inability to ensure both security of supply and diverse domestic suppliers for U.S. purchasers of enrichment services.
- Increased risk of a uranium enrichment supply deficit with respect to the uranium enrichment requirements forecasts set forth in ER Section 1.1.2, Market Analysis of Enriched Uranium Supply and Requirements.

ER Section 2.4, Comparison of the Predictive Environmental Impacts, describes the environmental impacts of the no-action alternatives and compares them to the proposed action. Table 2.4-1, Comparison of Potential Impacts for the Proposed Action and the No-Action Alternative Scenarios, and Table 2.4-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Alternative Scenarios, summarize that comparison in tabular form for the 13 environmental categories, described in detail in ER Chapter 4, Environmental Impacts. AES anticipates the effects to the environment of all no-action alternatives to be about the same or greater than the proposed action in the short and long term. There are potentially lesser impacts in some environmental categories, which are offset by greater environmental impacts in other categories due to, for instance, the concentration of larger enrichment plants in one location. In addition, under the no-action alternative, attainment of both important national policy and commercial objectives would be, at best, delayed.

The following types of impacts would be avoided in the Bonneville County area by the no-action alternative (see Table 2.1-7, Summary of Environmental Impacts for the Proposed Action, and Table 7.2-1, Qualitative Environmental Costs/Benefits of EREF during Construction and Operation). During construction, there is the potential short-term impacts of soil erosion and fugitive emissions from dust and construction equipment; disruption to ecological habitats; noise from equipment; and traffic from worker transportation and supply deliveries. These impacts, as discussed in ER Chapter 4, are temporary and limited in scope due to construction Best Management Practices (BMPs), but, in any event, would be avoided under the no-action alternative. During operation, the no-action alternative would avoid increased traffic due to uranium cylinder deliveries and shipments and worker transportation, increased demand on utility and waste services and public and occupational exposure from effluent releases. These impacts, however, will be minimal because the area already has traffic from general trucking commerce, there is sufficient capacity of utility and waste services in the region and effluent releases will be strictly controlled, maintained on-site, monitored, and maintained below regulatory limits.

The proposed action would have moderate to significant beneficial effects (see Tables 7.1-1 through 7.1-5). Under the no-action alternative, however, these beneficial effects would not occur. The results of the economic analysis show that more fiscal impacts (i.e., 57% of total present value impacts) will derive from the eleven-year construction period associated with the proposed facility. The largest impact on local business revenues stems from local construction expenditures. Operation of the facility will also have a net positive impact on the 11-county area and will help diversify the regional economy. The most significant impact on household earnings and jobs is associated with payroll and employment projected during the operational period.

AES estimates the construction payroll will total [*], with an additional [*] in employee benefits, and approximately [*] on goods and services in direct benefits to the local economy over the eleven-year construction period.

AES anticipates the annual operating payroll to be $36.3 million, with an additional $12.7 million in employee benefits once the plant is operational. Approximately $23.8 million will be spent annually on local goods and services required for operation of the EREF.

The tax revenue to the state of Idaho and Bonneville County and Bingham County resulting from the construction and operation of the EREF is estimated to be $323.6 million over the life of the facility. Refer to Table 4.10-3, Estimated Annual Tax Payments, for further details.

The Regional Input-Output Modeling System (RIMS) II allows estimation of various indirect impacts associated with each of the expenditures associated with the operation of EREF. According to the RIMS II analysis, the region's residents can anticipate a total impact of [*] in output for local businesses, [*] in household earnings, and [*] new jobs during the construction period. Over the anticipated 30-year license period of the EREF, the project is anticipated to generate a total annual impact of $35.6 million in output for local businesses, $128.0 million in household earnings, and 3,537 new jobs directly or indirectly relating to the EREF. In general, minor and temporary impacts on community services are expected to occur for local infrastructure areas (e.g., schools, housing, water, and emergency responders). Costs of operation should be diffused sufficiently to be indistinguishable from normal economic growth.

Based on the above information, cost-benefit analyses in ER Section 7.1, Economic Cost-Benefits, Plant Construction and Operation, and ER Section 7.2, Environmental Cost-Benefit, Plant Construction and Operation, and the minimal impacts to the affected environment demonstrated in ER Chapter 4, AES has concluded that the preferred alternative is the proposed action, construction and operation of the EREF.

* Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

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8.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

8.1 INTRODUCTION

This Environmental Report (ER) was prepared by AREVA Enrichment Services (AES) to assess the potential environmental impacts of licensing the construction and operation of a uranium enrichment facility to be located in Bonneville County, approximately 32 km (20 mi) west northwest of the city of Idaho Falls (the proposed action). The proposed facility will use the centrifuge enrichment process, which is an energy-efficient, proven advanced technology. The Eagle Rock Enrichment Facility (EREF) will be owned and operated by AES, as described in Safety Analysis Report (SAR) Chapter 1, General Information, which is a Delaware limited partnership company. AES prepared this ER in accordance with 10 CFR 51 (CFR, 2008a), which implements the requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (USC, 2008a). This ER also reflects the applicable elements of the Nuclear Regulatory Commission (NRC) guidance, including format, in NUREG-1748, Environmental Review Guidelines for Licensing Actions Associated with NMSS Programs, Final Report (NRC, 2003a). This ER analyzes the potential environmental impacts of the proposed action and eventual Decontamination and Decommissioning (D&D) of the facility, and discusses the effluent and environmental monitoring programs proposed to assess the potential environmental impacts of facility construction and operation. The ER also considers a no-action alternative.

8.2 PROPOSED ACTION

The proposed action is to license the construction and operation of the Eagle Rock Enrichment Facility (EREF) in Bonneville County, Idaho. The EREF will use the gas centrifuge enrichment process to separate natural uranium hexafluoride, UF_6, feed material containing 0.71 $^{w}/_{o}$ ^{235}U into a product stream enriched up to 5.0 $^{w}/_{o}$ ^{235}U and a depleted UF_6 stream containing approximately 0.15 to 0.30 $^{w}/_{o}$ ^{235}U. Production capacity at design throughput is nominally six million separative work units (SWU) per year. Construction for the proposed EREF is scheduled for the beginning of 2011, with heavy construction continuing for seven years over eight calendar years (2011-2018). This will be followed by four years of testing and assemblage (2018-2022). Operation would commence after the completion of the first cascade. The facility is licensed for 30 years. Decontamination and Decommissioning (D&D) is projected to take nine years. AES estimates the cost of the plant to be approximately$4.1 billion (in 2007 dollars) excluding escalation, contingency, interest, tails disposition, decommissioning, and any replacement equipment required during the operational life of the facility.

8.3 NEED FOR THE PROPOSED ACTION

The proposed action will serve the clear and well-substantiated need for additional reliable and economical uranium enrichment capacity in the United States (U.S.). This underlying need for the proposed Eagle Rock Enrichment Facility (EREF) stems directly from important U.S. energy and national security concerns and the continuing demand for reliable and economical uranium enrichment services. As the Department of Energy (DOE) has noted (DOE, 2002a), these energy and national security concerns "...are due, in large part, to the lack of available replacement for the inefficient and non-competitive gaseous diffusion enrichment plants. These concerns highlight the importance of identifying and deploying an economically competitive replacement domestic enrichment capacity in the near term." By providing this needed additional domestic enrichment capacity, the EREF would also serve important commercial objectives related to the security of supply of enriched uranium in the U.S. At present, the enrichment services needs of U.S. utilities are susceptible to "a supply disruption from either the Paducah plant production or the highly-enriched uranium (HEU) Agreement deliveries."

8.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the NRC would not approve the license application to construct and operate the proposed Eagle Rock Enrichment Facility (EREF). As a result, the additional domestic source and supply of enrichment services that would result from the issuance of the license to Areva Enrichment Services (AES) would not become available to utility customers. The only domestic suppliers would be the National Enrichment Facility and the American Centrifuge Plant (an unproven commercially demonstrated technology), which are currently under construction. The latter is assumed to replace the aging, electric power intensive and high cost Paducah Gaseous Diffusion Plant, which is expected to shutdown in June 2012, the only currently operating source of domestic enrichment services. As described in ER Section 1.1, this situation would result in a deficit between the available supply of low-enriched uranium and domestic requirements. In addition, these potential enrichment services alone would be inconsistent with the clear federal policy of fostering the development of additional, secure, reliable, and economical domestic enrichment capacity to promote both U.S. energy security and national security.

Section 2.4, Comparison of the Predicted Environmental Impacts, describes the environmental impacts of the no-action alternative scenarios and compares them to the proposed action. ER Table 2.4-1, Comparison of Potential Impacts for the Proposed Action and the No-Action Alternative Scenarios and Table 2.4-2, Comparison of Environmental Impacts for the Proposed Action and the No-Action Alternative Scenarios, summarizes that comparison in tabular form for the thirteen environmental categories that are described in detail in ER Chapter 4, Environmental Impacts. In Summary, AES anticipates that the effects to the environment of all alternative no-action scenarios would either have about the same or greater environmental impact than the proposed action in both the short and long term. The no-action alternative would also result in an increased uranium supply deficit and increased dependence on foreign suppliers. In addition, the important objective of security of supply is delayed.

The following types of impacts would be avoided in Bonneville County, Idaho and the surrounding area by the no-action alternative (see ER Table 2.4-2). During construction, the potential short-term impacts are soil erosion and fugitive emissions from dust and construction equipment; minor disruption to ecological habitats and cultural resources, noise from equipment; and traffic from worker transportation and supply deliveries. These impacts, as discussed in Chapter 4, are temporary and limited in scope due to the use of construction best management practices (BMPs). During operation, the no-action alternative would avoid increased traffic due to feed/product deliveries and shipments, and worker transportation; increased demand on utility and waste services; and public and occupational exposure from effluent releases. The impacts of traffic volume increases associated with construction of the EREF would be moderate to large, while the impacts of traffic volume increases associated with operation of the EREF would be small. The moderate to large impact of traffic volume increases associated with construction of the EREF may be mitigated by constructing the two highway entrances (designed to minimize the disruption of traffic flow) early in the construction process, encouraging car pooling, setting shift change times and shipment times to and from the facility to occur at times when the traffic flow on U.S. Highway 20 is low. See Section 4.2.4, Traffic Impacts.

There is sufficient capacity of utility and waste services in the region; and effluent releases will be strictly controlled, monitored, and maintained below regulatory limits (CFR, 2008x; CFR, 2008n).

While the no-action alternative would have no impact on the socioeconomic structure of the Bonneville County, Idaho area, the proposed action would have moderate to significant beneficial effects on the entire eleven-county region surrounding the plant including Bonneville county as well as the contiguous counties falling within an 80 km (50 mi) radius (see Table 7.1-2, Annual Impact of Construction Payroll in the 11-County Area, Table 7.1-3, Total Impact of Local Spending for Construction Goods and Services in the 11-County Area, Table 7.1-4, Annual Impact of Operations Payroll in the 11-County Area, and Table 7.1-5, Total Annual Impact of EREF Purchases During Operations in the 11-County Area). The results of the economic analysis show that the greatest fiscal impacts will derive from the seven-year period of heavy construction associated with the proposed facility.

The largest impact on local business revenues stems from local construction expenditures, while the most significant impact on household earnings and jobs is associated with construction payroll and employment projected during the seven-year period of heavy construction. Operation of the facility will also have a net positive impact on the eleven-county area and will help diversify the regional economy.

AES has estimated the economic impacts to the local economy during the seven-year heavy construction period to occur over eight calendar years (2011-2018), the four years of testing and assemblage, and the remaining period of the 30-year license of the EREF. This includes an eight-year period when both construction and operation are ongoing simultaneously. The analysis traces the economic impact of the proposed EREF, identifying the direct and indirect impacts of the plant on revenues of local businesses, on incomes accruing to households, on employment, and on the revenues of state and local government. The analysis also explores the indirect impacts of the EREF within an 80 km (50 mi) radius of the EREF. Details of the analysis are provided in Section 7.1, Economic Cost-Benefits, Facility Construction and Operation, and are summarized below.

AES estimates that it would spend [*] locally on construction expenditures over the seven-year heavy construction period beginning in early 2011 and ending in early 2018 and followed by four years of assemblage and testing. The local payroll would include approximately [*] for craft workers, with an additional [*] for management. This amount would be augmented with the inclusion of the [*] in benefits paid to construction craft employees and [*] for management (based on the assumption of 35% of the average salary).

A portion of the total expenditures would be spent locally on construction goods and services, benefiting local businesses. This would amount to approximately [*] per year during the seven years of heavy construction.

AES anticipates annual payroll to be $36.3 million with additional $12.7 million expenditure in employee benefits once the plant is operational. Approximately $23.8 million will be spent annually on local goods and services required for operation of the EREF.

The tax revenue to the State of Idaho and Bonneville and Bingham Counties resulting from the construction and operation of the EREF is estimated to be approximately $323.6 million over the life of the facility. Refer to Table 4.10-3, Estimated Annual Tax Payments, for further details.

Based on the cost-benefit analyses in Sections 7.1 and 7.2, and the minimal impacts to the affected environment demonstrated in Chapter 4, AES has concluded that the preferred alternative is the proposed action, construction and operation of the EREF.

* Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

8.5 ENVIRONMENTAL IMPACTS OF CONSTRUCTION

The construction of the Eagle Rock Enrichment Facility (EREF) involves the clearing of approximately 240 ha (592 acres) of previously undisturbed area within a 1700-ha (4200-acre) site. Most of this area will be graded and will form the Controlled Area that includes all support buildings and the Cylinder Storage Pads. Numerous environmental protection measures will be taken to mitigate potential construction impacts. The measures will include controls for noise, oil and hazardous material spills, and dust. Potential impacts associated with the construction phase of the EREF are primarily limited to increased dust (degraded air quality) and noise from vehicular traffic, and potential soil erosion during excavations. It is unlikely that EREF construction activities will impact water resources since the site does not have any surface water and no discharges shall be made to groundwater. Up to two wells will be used to obtain groundwater for construction activities.

During the construction phase of the EREF, standard clearing methods (i.e., the use of heavy equipment) in combination with excavation will be used. Only about 14% of the total site area will be disturbed, affording the biota of the site an opportunity to move to undisturbed areas within the EREF site as well as to additional areas of suitable habitat bordering the EREF site. Trenching associated with plant construction will be in accordance with all applicable regulations so as to minimize any direct or indirect impacts on the environment.

The anticipated effects on the soil during construction activities are limited to a potential short-term increase in soil erosion. However, this will be mitigated by proper construction best management practices (BMPs). These practices include minimizing the construction footprint to the extent possible, mitigating discharge, including stormwater runoff (i.e., the use of detention and retention ponds), the protection of all unused naturalized areas, and site stabilization practices to reduce the potential for erosion and sedimentation. Other temporary stormwater detention basins will be constructed and used as sedimentation collection basins during construction and stabilized afterwards. After construction is complete, the site will be stabilized with natural, low-water consumption landscaping, pavement, and crushed stone to control erosion.

Water quality impacts will be controlled during construction by compliance with the requirements of a National Pollutant Discharge Elimination System (NPDES) Construction General Permit and BMPs detailed in the site Stormwater Pollution Prevention Plan (SWPPP). In addition, a Spill Prevention, Control and Countermeasure (SPCC) plan will be implemented to minimize the possibility of spills of hazardous substances, minimize environmental impact of any spills, and ensure prompt and appropriate remediation. Spills during construction are more likely to occur around vehicle maintenance and fueling operations, storage tanks, painting operations and warehouses. The SPCC plan will identify sources, locations and quantities of potential spills, as well as response measures. The plan will also identify individuals and their responsibilities for implementation of the plan and provide for prompt notifications of state and local authorities.

The construction phase impacts on air quality, land use, and socioeconomics are localized, temporary, and small. The temporary influx of labor is not expected to overload community services and facilities. The impacts of traffic volume increases associated with construction of the EREF would be moderate to large. This impact can be mitigated by constructing the two highway entrances (designed to minimize the disruption of traffic flow) early in the construction process, encouraging car pooling, setting shift change times and shipment times to and from the facility to occur at times when traffic flow on U.S. Highway 20 is low.

Dust will be generated to some degree during the various stages of construction activity. The amount of dust emissions will vary according to the types of activity. The first five months of earthwork will likely be the period of highest emissions with the greatest number of construction vehicles operating on an unprepared surface. However, no more than 14% of the site, or about 240 ha (592 acres), will be involved in this type of work. Airborne dust will be controlled through the use of BMPs such as surface water sprays (when required), by ensuring trucks' loads and soil piles are covered, and by promptly removing construction wastes from the site. The application of water sprays for dust suppression will be applied only when required so that water resources can be conserved to the maximum extent possible.

Construction of the EREF is expected to have generally positive socioeconomic impacts on the region. No radioactive releases (other than natural radioactive materials, for example, in soil) will result from site development and facility construction activities.

8.6 ENVIRONMENTAL IMPACTS OF OPERATION

Operation of the Eagle Rock Enrichment Facility (EREF) would result in the production of gaseous effluent, liquid effluent, and solid waste streams. Each stream could contain small amounts of hazardous and radioactive compounds, either alone or in a mixed form. Based on the experience gained from operation of European plants, the aggregate routine airborne uranium gaseous releases to the atmosphere are estimated to be less than 20 g (0.71 ounces) annually. Extremely minute amounts of uranium and hydrogen fluoride (all well below regulatory limits) could potentially be released at the roof-top through the gaseous effluent exhaust vents. The eight exhaust vents for the eight separate and independent Separations Building (SB) Gaseous Effluent Vent Systems (GEVS) (i.e., two GEVS in each Separations Building Module); the single exhaust vent for the Technical Support Building (TSB) GEVS; and the single exhaust vent for Centrifuge Test and Post Mortem Facilities GEVS are located atop the SBMs, TSB and Centrifuge Assembly Building (CAB), respectively. Three additional exhaust vents that discharge any gaseous effluent from the Centrifuge Test and Post Mortem Facilities Exhaust Filtration System; the Technical Support Building (TSB) Contaminated Area HVAC System; and the Ventilated Room HVAC System, are located atop the CAB, TSB, and Blending, Sampling, and Preparation Building (BSPB), respectively. Gaseous effluent discharges from each of the thirteen exhaust vents are filtered for particulates and hydrogen fluoride (HF), and are continuously monitored prior to release.

Liquid effluents consist of stormwater runoff and treated domestic sanitary wastewater. All liquid effluents are discharged to one of three onsite basins.

The Site Stormwater Detention Basin is designed with an outlet structure for drainage. Local terrain serves as the receiving area for this basin. During a rainfall event larger than the design basis, the potential exists to overflow the basin if the outfall capacity is insufficient to pass beyond design basis inflows to the basin. Overflow of the basin is an unlikely event. The additional impact to the surrounding land, over that which would occur during such a flood alone, is assumed to be small. Therefore, potential overflow of the Site Stormwater Detention Basin during an event beyond its design basis is expected to have a minimal impact to surrounding land.

The two Cylinder Storage Pad Stormwater Retention Basins collect stormwater runoff from the Cylinder Storage Pads and treated domestic sanitary water discharges. They are lined to prevent infiltration and designed to retain a volume slightly more than twice that for the 24-hour, 100-year frequency storm and an allowance for maximum treated domestic sanitary effluent discharges. These lined basins have no flow outlet and all effluents are dispositioned through evaporation.

The EREF design precludes operational process discharges from the facility and treated domestic sanitary effluents flow to the lined Cylinder Storage Pad basins. There are, therefore, no anticipated impacts on natural water systems quality due to facility water use. Control of surface water runoff will be required for EREF activities covered by the NPDES General Permit. As a result, no significant impacts are expected for either surface water bodies or groundwater.

Solid waste that would be generated at EREF is grouped into nonhazardous, radioactive, hazardous, and mixed waste categories. All these wastes will be collected and transferred to authorized offsite treatment or disposal facilities. All solid radioactive waste generated will be Class A low-level waste as defined in 10 CFR 61 (CFR, 2008oo). This waste consists of industrial waste, filters and filter material, resins, gloves, shoe covers, and laboratory waste. Approximately 146,500 kg (323,000 lbs) of low-level waste would be generated annually. In addition, annual hazardous and mixed wastes generated at EREF are expected to be about

5,062 kg (11,160 lbs) and 100 kg (220 lbs), respectively. These wastes will be collected, inspected, volume-reduced, and transferred to treatment facilities or disposed of at authorized waste disposal facilities. Non-hazardous waste, including miscellaneous trash, filters, resins, and paper will be shipped offsite for compaction and then sent to a licensed landfill. The EREF is expected to produce approximately 70,307 kg (155,000 lbs) of this waste annually. Local landfill capacity is more than adequate to accept this mass of nonhazardous waste.

Operation of the EREF would also result in the annual nominal production of approximately 15,270 metric tons (16,832 tons) of depleted UF_6 at full production. The depleted UF_6 would be stored temporarily onsite in cylinders that will have little or no impact while in storage. AES will utilize the DOE deconversion facilities that are currently under construction for the final disposition and removal of the depleted UF_6 from the site.

8.7 RADIOLOGICAL IMPACTS

The assessment of potential impacts considers the entire population surrounding the proposed EREF within a distance of 80 km (50 mi).

Radiological impacts are regulated under 10 CFR 20 (CFR, 2008x), which specifies a total effective dose equivalent (TEDE) limit for members of the public of 1 mSv/yr (100 mrem/yr) from all sources and pathways from the EREF, excluding natural background sources. In addition, 10 CFR 20.1101(d) (CFR, 2008x) requires that constraints on atmospheric releases be established for the EREF such that no member of the public would be expected to receive a total effective dose equivalent in excess of 0.1 mSv/yr (10 mrem/yr) from these releases. Further, the EREF would be subject to the Environmental Protection Agency's (EPA) standards, including: standards contained in 40 CFR 190 (CFR, 2008f) that require that dose equivalents under routine operations not exceed 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid, and 0.25 mSv (25 mrem) to any other organ from all pathways.

The general public and the environment may be impacted by radiation and radioactive material from the EREF as the result of discharges of gaseous and liquid effluent discharges, including controlled releases from the uranium enrichment process lines during decontamination and maintenance of equipment. In addition, radiation exposure to the public may result from the transportation and storage of uranium hexaflouride (UF_6) feed cylinders, UF_6 product cylinders, low-level radioactive waste, and depleted UF_6 cylinders.

Potential radiological impacts from operation of the EREF would result from controlled releases of small quantities of UF_6 during normal operations and releases of UF_6 under hypothetical accident conditions. Normal operational release rates to the atmosphere from both gaseous and liquid effluent streams are expected to be less than 19.5 MBq/yr (528 µCi/yr) and 9.0E-04 MBq/yr (0.243 µCi/yr), respectively. The estimated maximum annual effective dose equivalent and maximum annual organ (lung) committed dose equivalents to transient individuals at the maximum site boundary for the ground plane (in the north-northeast (NNE)) sector at 1.1 km (0.67 mi), cloud immersion (in the north (N)) sector at 1.1 km (0.67 mi) and inhalation exposure (in the north (N)) sector at 1.1 km (0.67 m) pathways are 1.5E-04 mSv/yr (1.5E-02 mrem/yr) and 1.2E-03 mSv/yr ((1.2E-01 mrem/yr), respectively. The estimated maximum annual effective dose equivalent and maximum annual organ (lung) committed dose equivalents from discharged atmospheric effluent (gaseous and liquid waste streams combined and released as airborne effluent) to a hypothetical resident (teen) located at the plant site North Northeast (NNE) boundary are 8.8E-04 mSv (8.8E-02 mrem) and 6.4E-03 mSv (6.4E-01 mrem), respectively. The maximum effective dose equivalent and maximum annual organ (lung) dose equivalent from gaseous effluent to the nearest resident (teenager) located at least 8 km (5 mi) in any sector are expected to be less than 3.5E-05 mSv (3.5E-03 mrem) and 2.6E-04 mSv (2.6E-02 mrem), respectively.

The dose equivalent due to external radiation (skyshine and direct) from the Full Tails, Full Feed, and Empty Cylinder Storage Pads and direct dose from product cylinders on the Full Product Cylinder Storage Pad is estimated to be less than 1.5E-02 mSv (1.5 mrem) to the maximally exposed person at the nearest point on the site boundary (2,000 hrs/yr), and less than 1E-12 mSv (less than 1E-10 mrem) to the maximally exposed resident (8,766 hrs/yr) located at least 8 km (5 mi) in any direction from EREF.

With respect to the impact from the transportation of UF_6 as feed, product, or depleted material and solid low level waste, the cumulative dose impact has been found to be small. The cumulative dose equivalent to the general public (persons living near a highway route) from the combination of all transport material categories combined equaled 1.5E-01 person-Sv/year (15 person-rem/year). Similarly, the dose equivalent to the onlooker (persons driving the highway routes, plus rest-stops and inspections) and transport workers totaled 3.48 and 1.05 person-Sv/year (3.48E+02 and 1.05E+02 person-rem/year), respectively.

The dose equivalents due to normal operations are small fractions of the normal background range of 2.0 to 3.0 mSv (200 to 300 mrem) that an average individual receives in the US, and well within regulatory limits. Given the conservative assumptions used in estimating these values, these concentrations and resulting dose equivalents are insignificant and their potential impacts on the environment and health are inconsequential.

Since the EREF will operate with only natural and low enriched uranium in the form of uranium hexafluoride (UF_6), it is unlikely that an accident could result in any significant offsite radiation doses. The only chemical exposures that could impact safety are those associated with the potential release of hydrogen fluoride (HF) to the atmosphere. The possibility of a nuclear criticality occurring at the EREF is highly unlikely. The facility has been designed with operational safeguards common to the most up-to-date chemical plants. All systems are highly instrumented and abnormal conditions are alarmed in the facility Control Room.

Postulated accidents are those accidents described in the Integrated Safety Analysis (ISA) that have, for the uncontrolled case, been categorized as having the potential to exceed the performance criteria specified in 10 CFR 70.61(b) (CFR, 2008oo). No significant exposure to offsite individuals is expected from any of the accidents, since many barriers are in place to prevent or mitigate such events.

Evaluation of potential accidents at the EREF included identification and selection of a set of candidate accidents and analysis of impacts for the selected accidents. The ISA team identified UF_6 as the primary hazard at the facility. An example of an uncontrolled accident sequence is a seismic event which produces loads on the UF_6 piping and components beyond their capacity. This accident is assumed to lead to release of gaseous UF_6, with additional sublimation of solid UF_6 to gas. The UF_6 gas, when in contact with moisture in the air, will produce HF gas.

For the controlled fire accident sequence, the mitigating measures include automatic trip off for the ventilation system servicing the Chemical Trap Workshop during a fire event. This mitigating measure is designed to contain the gaseous UF_6 and HF within the room and attenuate the release of effluent to the environment. This mitigating measure will reduce the consequences of a fire event to a low consequence category as specified in 10 CFR 70.61(b) (CFR, 2008d).

For the controlled seismic accident sequence, the preventive measures include (1) seismically designed buildings (Separations Building Modules; Blending, Sampling and Preparation Building; Cylinder Receipt and Shipping Building; and the Technical Support Building) designed to withstand a Design Basis Earthquake (DBE) and (2) design features in the Separations Building Modules to preclude the release of UF_6 from the process piping and components that would exceed a low consequence category as specified in 10 CFR 70.61(b) (CFR, 2008oo).

Exposures to workers would most likely be higher than those to offsite individuals and highly dependent on the workers proximity to the incident location. All workers at the EREF are trained in the physical characteristics and potential hazards associated with facility processes and materials. Therefore, facility workers know and understand how to lessen their exposures to chemical and radiological substances in the event of an incident at the facility.

Liquefied UF_6 is present only in the Product Liquid Sampling System, where safety process control systems are backed up by redundant safety protection circuits to preclude the occurrence of cylinder overheating. Fire protection systems, administrative controls, and limits on cylinder transporter fuel inventory limit the likelihood of cylinder-overheating in a fire. Thus, this accident scenario is highly unlikely. AES concludes that through the combined result of plant and process design, protective controls, and administrative controls, operation of the EREF does not pose a significant threat to public health and safety.

8.8 NONRADIOLOGICAL IMPACTS

Numerous design features and administrative procedures are employed to minimize gaseous and liquid effluent releases and keep them within regulatory limits. Potential nonradiological impacts of operation of the EREF include releases of inorganic and organic chemicals to the atmosphere and surface water impoundments during normal operations. Other potential impacts involve land use, transportation, soils, water resources, ecological resources, air quality, historic and cultural resources, socioeconomic and public health. Impacts from hazardous, radiological, and mixed wastes and radiological effluents have been discussed earlier.

The other potential nonradiological impacts from the construction and operation of EREF are discussed below:

Land-Use Impacts

The anticipated effects on the soil during construction activities are limited to a potential short-term increase in soil erosion. However, this will be mitigated by proper construction best management practices (BMPs). These practices include minimizing the construction footprint to the extent possible, limiting site slopes, using a sedimentation detention basin, protecting undisturbed areas with silt fencing and straw bales as appropriate, and employing site stabilization practices such as placing crushed stone on top of disturbed soil in areas of concentrated runoff. In addition, onsite construction roads will be periodically watered when required, to control fugitive dust emissions. After construction is complete, the site will be stabilized with natural, low-water maintenance landscaping, and pavement.

A Spill Prevention, Control, and Countermeasures (SPCC) plan will also be implemented during construction to minimize environmental impacts from potential spills and ensure prompt and appropriate remediation. Spills during construction are likely to occur around vehicle maintenance and fueling locations, storage tanks, and painting operations. The SPCC plan will identify sources, locations and quantities of potential spills, and response measures. The plan will also identify individuals and their responsibilities for implementation of the plan and provide for prompt notification of state and local authorities, as required.

Waste management BMPs will be used to minimize solid waste and hazardous materials. These practices include the placement of waste receptacles and trash dumpsters at convenient locations and the designation of vehicle and equipment maintenance areas for the collection of oil, grease and hydraulic fluids. Where practicable, materials suitable for recycling will be collected. If external washing of construction vehicles is necessary, no detergents will be used, and the runoff will be diverted to onsite retention basins. Adequately maintained sanitary facilities will be provided for construction crews.

The EREF facility will require the installation of water well(s) and electrical utility lines. In lieu of connecting to a public sewer system, an on-site domestic sanitary sewage treatment plant will be installed for the treatment of sanitary and non contaminated wastes.

Potable water will be provided from one or more site wells. Since there are no bodies of surface water on the site, no waterways will be disturbed. No natural gas will be used at the EREF.

The two electrical transmission lines that will provide a dual source of electrical feed to the EREF will be constructed along an existing right-of-way, Route 20, and the site access road. In this way, land use impacts will be minimized.

Overall land use impacts to the site and vicinity will be changing the use from agriculture to industrial. However, a majority of the site (approximately 86%) will remain undeveloped, and the placement of most utility installations will be along highway easements. Therefore, the impacts to land use would be small.

Transportation Impacts

Impacts from construction and operation on transportation will include the generation of fugitive dust, changes in scenic quality, added environmental noise and small radiation dose to the public from the transport of UF_6 feed and product cylinders, as well as low-level radioactive waste.

Dust will be generated to some degree during the various stages of construction activity. The amount of dust emissions will vary according to the types of activity. AES estimated that fugitive dust emissions are expected to be below the National Ambient Air Quality Standards (CFR, 2008nn).

Impacts to visual and scenic resources from construction of the highway entrances and access roads would include the presence of construction equipment and dust. Although construction equipment would be out of character with the current uses and features of the site and the surrounding properties, road and road access construction would be relatively short-term. Additionally, construction equipment would not be tall, thereby minimizing the potential for the equipment to obstruct views, and dust suppression mitigations would be used to minimize visual impacts. Therefore, impacts to visual resources from construction of the highway entrances and access roads would be small.

Noise levels from construction of the highway entrances would be louder and of longer duration during the day than existing noise generated by traffic along U.S. Highway 20. However, these elevated noise levels would occur only during the construction of the highway entrances and a short portion of the access roads. Noise levels would be heard on adjacent properties as well, including on portions of the WSA. These areas, in general, are used for grazing and few visitors or users would likely be present on a regular basis along the WSA. Overall impacts from noise generated by construction of the highway entrances and access roads, therefore, would be small.

Water Resources

The EREF water supply will be obtained from on-site wells. The anticipated normal water usage rate for the EREF is 68.2 m^3/d (18,000 gal/d) and the peak water usage requirement is 4,061 m^3/d (1.07 E+06 gal/d). The average annual water usage rate is 2.49 E+04 m^3/yr (6.57 E+06 gal/yr), which is below the water appropriation value of 6.25 E+05 m^3/yr (1.65 E+08 gal/yr).

Liquid effluents consists of Stormwater runoff and treated domestic sanitary sewage. The EREF design precludes operational process discharges from the plant to surface or groundwater at the site. All liquid effluents are discharged to either the Stormwater Detention Basin or the Cylinder Storage Pad Retention basins.

The Site Stormwater Detention Basin will collect stormwater runoff from areas of the facility that do not involve cylinder storage activities. These areas include parking lots, roofs, roads, and diversions from unaltered areas around the facilities. The detention basin will be unlined and designed to contain runoff for a volume equal to a 24-hour, 100-year return frequency rain storm of 5.7 cm (2.24 inch) rainfall. The design capacity of the basin, maintaining a freeboard of 0.6 m (2 ft), is approximately 32,835 m^3 (26.6 acre-ft). The basin will have approximately 49,600 m^3 (40.2 acre-ft) of storage capacity available with 0.3 m (1 ft) of freeboard for unlikely extreme events. It will also be designed to discharge post-construction peak flow runoff rates from the outfall that are equal to or less than the pre-construction runoff rates from the site area.

Discharge of treated domestic sewage water and stormwater from the Cylinder Storage Pads will be discharged onsite to the two single-lined Cylinder Storage Pad Retention Basins. The ultimate disposal of the liquid effluent will be through evaporation of water and impoundment of the residual dry solids, if any, after evaporation. It is designed to contain runoff from a volume equal to two times the 24-hour, 100-year return frequency rain storm plus an allowance for daily treated domestic sanitary effluent.

In summary, the runoff control and water treatment systems incorporated into the facility design are expected to prevent impacts to the qualities of surface water and groundwater.

Ecological Resources

No communities or habitats that have been defined as rare or unique, or that support threatened or endangered species have been identified as occurring on the 1700-ha (4200-acre) EREF site. Thus, no proposed activities are expected to impact communities or habitats defined as rare or unique or that support threatened and endangered species within the site area.

Several practices and procedures have been designed to minimize adverse impacts to the ecological resources of the EREF site. These practices and procedures include the use of BMPs, i.e., minimizing the construction footprint to the extent possible, channeling site stormwater to temporary detention basins during construction, the protection of all unused naturalized areas, and site stabilization practices to reduce the potential for erosion and sedimentation. No special maintenance practices would be required to construct or operate the proposed EREF.

Historic and Cultural Resources

A pedestrian cultural resource survey of the 381-ha (941-acre) EREF site identified 11 sites and 17 isolated occurrences (finds); there are three prehistoric, four historic, and four multi-component sites. Further investigation was conducted to determine the National Register of Historic Places (NRHP) eligibility for the prehistoric components of three sites (MW002, MW012, and MW015). Subsequent testing of these sites resulted in a recommendation of not eligible. The historic component of one site (MW004) is recommended as eligible. Seven sites (MW003, MW006, MW007, MW009, MW011, MW013, and MW014) are recommended not eligible for inclusion in the NRHP. The potentially eligible site is within the proposed plant footprint. A treatment/mitigation plan for MW004 will be developed by AES in consultation with the Idaho State Historic Preservation Officer (SHPO) to recover significant information.

Given the small number of archaeological sites located in the study area, and no other projects within 16 km (10 mi) of the proposed EREF site, there would be no significant impact on historic and cultural resources.

Environmental Noise

Noise generated during construction of the proposed EREF footprint would be audible on adjacent properties, primarily north, east, southeast, and southwest of the proposed EREF footprint. (Section 4.7.1.1, Construction Impacts) While heavy construction would continue for about seven years, the impacts would be small since nearby land use is limited to grazing and few regular users or visitors on the WSA; the nearest residence is approximately 7.7 km (4.8 mi) east of the proposed site; and noise levels would be within the sound levels identified by HUD as “clearly acceptable” or “normally acceptable.”

Noise generated during operation of EREF would be primarily limited to truck movements on the road. Potential impacts to local schools, churches, hospitals, and residences are expected to be insignificant because of the large distance to the nearest sensitive receptors. The nearest home, for example, is located approximately 7.7 km (4.8 mi) from the proposed site. The nearest school, hospital, church, and other sensitive noise receptors are beyond this distance. Although the noise from the plant and the additional traffic would generally be noticeable, the operational noise from the plant is not expected to have a significant impact on adjacent properties.

Socioeconomics

The economic impacts of the construction and operation of the EREF have been estimated for the 30-year license period of the EREF. Construction of the EREF site is scheduled to begin in 2011, with heavy construction continuing for seven years over a duration of eight calendar years. This will be followed by four years of assemblage and testing. This includes an eight-year period when both construction and operation are ongoing simultaneously. The analysis traces the economic impact of the proposed EREF, identifying the direct impacts of the facility on revenues of local businesses, on incomes accruing to households, on employment, and on the revenues of the state and local government. The analysis also explores the indirect impacts of the EREF within an 80-km (50-mi) radius of the EREF. Details of the analysis are provided in ER Sections 4.10, Socioeconomic Impacts, and 7.1, Economic Cost-Benefits, Plant Construction and Operation, and are summarized below.

AES estimates that it would spend [*] locally on construction expenditures over the seven-year heavy construction period beginning in early 2011 and ending in early 2018 and followed by four years of assemblage and testing. The local payroll would include approximately [*] for craft workers, with an additional [*] for management. This amount would be augmented with the inclusion of the [*] in benefits paid to construction craft employees and [*] for management (based on the assumption of 35% of the average salary).

A portion of the total expenditures would be spent locally on construction goods and services, benefiting local businesses. This would amount to approximately [*] per year during the seven years of heavy construction. See ER Section 7.1, Economic Cost-Benefits, Plant Construction and Operation.

AES anticipates the EREF annual payroll to be $36.3 million with additional $12.7 million expenditure in employee benefits once the plant is operational. Approximately $23.8 million will be spent annually on local goods and services required for operation of the EREF.

The tax revenue to the State of Idaho and Bonneville and Bingham Counties resulting from the construction and operation of the EREF is estimated to be approximately $323.6 million over the life of the facility. Refer to Table 4.10-3, Estimated Annual Tax Payments, for further details.

The Regional Input-Output Modeling System (RIMS) II allows estimation of various indirect impacts associated with each of the expenditures listed above. According to the RIMS II analysis, the region's residents can anticipate a total impact of [*] in increased economic activity, [*] in increased earnings by households, and [*] new jobs during the heavy seven-year construction period and 4-year assemblage and testing period. See 7.1.5.2, Construction Impacts. Over the anticipated 30-year license period of the EREF, residents can anticipate an annual total of $35.6 million in increased economic activity for local businesses, $128.0 million in increased earnings by households, and 3,537 new jobs directly or indirectly relating to EREF. Table 8.8-1, Estimated Annual Economic Impacts from the Eagle Rock Enrichment Facility, summarizes the impact economic by the facility on Bonneville County and the surrounding area. A more detailed discussion of the RIMS II methodology and results is found in ER Section 7.1.5, Total Economic Impact Using RIMS II.

The major impact of facility construction on human activities is expected to be a result of the influx of labor into the area on a daily or semi-permanent basis. AES estimates that approximately 15% of the 590-person peak construction work force (89 workers), including management is expected to move into the Idaho Falls vicinity as new residents. Previous experience regarding construction for the nuclear industry projects suggests that of those who move, approximately 65% (58 of the 89 workers) will bring their families, which on average consist of the worker, a spouse, and one school-aged child. The likely increase in area population during peak construction, therefore, will total 205 (31 workers without their families plus 58 workers with their families). This is less than 0.25% of the Bonneville County's population of 82,522 in 2000, and less than 0.15% of the three-county region of influence (ROI) population of 143,412 in 2000. This minimal increase and impact would be manageable and the overall change in population density and characteristics in Bonneville County due to construction of the EREF would be small. Refer to Section 4.10.1.2, Community Characteristic Impacts.

The increase in jobs and population would lead to a need for additional housing and an increased level of community services, such as schools, fire and police protection, and medical services. However, because the growth in jobs and population would occur over a period of several years, providers of these services should be able to accommodate the projected population growth and demand for services. For example, the estimated peak increase in school-age children due to EREF construction worker families is 58, or less than 1% of Bonneville County's public enrollment of 14,254 students and the three-county ROI enrollment of 29,896. Based on the local area teacher-student ratio of approximately 1:18, the midpoint of traditional schools in the counties, and assuming an even distribution of students among all grade levels, the increase in students represents four classrooms. Because the growth in jobs and population would occur over a period of several years, providers of the above services should be able to accommodate the projected population growth and demand for services. (Refer to Section 4.10.1.2)

Similarly, an estimated 89 housing units would be needed to accommodate the new EREF construction workforce. In 2006, Bonneville County had 2,603 vacant housing units (7.2%) (estimates were not available for Bingham County and Jefferson County for 2006). In 2000, Bonneville County had 1,731 vacant units, Bingham County had 986 vacant units, and Jefferson County had 386 vacant units for a total of 3,103 in the ROI. Even if all of the in-migrating construction workforce were to reside in Bonneville County, it would only represent a 3.4% reduction in the number of vacant houses available in 2006. If they were to reside throughout the three-county region of influence, it would only represent a 2.9% reduction in the number of vacant houses available in 2000. Accordingly, there should be no measurable impact related to the need for EREF construction worker housing. (ER 4.10.1.2)

While additional investment in staff, facilities, and equipment may be necessary, local government revenues would also increase (Section 7.1 and discussion above concerning AES' anticipated payments to the State of Idaho and Bonneville County). For example, AES would pay an estimated [*] in annual property taxes to Bonneville County during the last three years of the seven-year heavy construction period for the EREF, representing a [*] increase in annual county property tax revenues and a [*] increase in total annual county revenues. AES would also pay an estimated [*] to the State of Idaho in annual sales and use taxes during the seven-year heavy construction period for the EREF. These payments would provide the source for additional government investment in facilities and equipment. That revenue increase may lag somewhat behind the need for new investment, but the incremental nature of the growth should allow local governments to more easily accommodate the increase. Consequently, minor and temporary negative impacts on community services would be expected. Refer to ER 4.10.1.2, Community Characteristic Impacts.

* Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

Public Health Impacts

Trace quantities of hydrogen fluoride (HF) are released to the atmosphere during normal separation operations. The annual HF release rate is estimated as less than 2 kg (< 4.4 lb). The HF emissions from the plant will not exceed the strictest of regulatory limits at the point of release. Standard dispersion modeling techniques estimated the HF concentration at the nearest site boundary to be 2.7 x 10^{-4} µg/m^3 and 3.2 x 10^{-5} µg/m^3 at the nearest business, located 4.7 km (2.9 mi) southwest (Reference 4.1-1). At 8 km (5 mi), the concentration is calculated to be 1.3 x 10^{-5} µg/m^3. The nearest resident to the site, or other sensitive receptor (e.g., schools and hospitals) is located beyond 8 km (5 mi). These concentrations are well below the strictest HF exposure standards in use today (Refer to Section 4.12.1.1, Routine Gaseous Effluent).

Radiological public health impacts were summarized previously in ER Section 8.7, Radiological Impacts.

Methylene chloride is used in small bench-top quantities to clean certain components. All chemicals at EREF will be used in accordance with the manufacturer's recommendations. All chemicals are used in quantities that are considered deminimus with respect to air emissions outside the EREF. Its use and the resulting emissions have been evaluated and determined to pose minimal or no public risk. All regulated gaseous effluents will be below regulatory limits as specified in permits issued by the Idaho DEQ, Air Quality Division.

AES has concluded that the public health impacts from radiological and nonradiological constituents used within EREF are minimal and well below regulatory limits at the point of discharge. All hazardous materials and waste streams will be managed and disposed of in accordance with the permit requirements issued by the EPA Region 10 and the Idaho DEQ.

TABLES

Table 8.8-1 Estimated Annual Economic Impacts from the Eagle Rock Enrichment Facility (Bonneville County and Nearby)

(Page 1 of 1)

Impact	Construction	Operations
Local Businesses Additional Revenues	[ ]	$35.6 Million
Household Additional Income	[ ]	$128.0 Million
State & Local Government Additional Tax Revenue	[ ]*	$273.0 Million**
Employment	[ ]	3,537 Jobs

*Total during period 2011-2022 (Construction of the EREF is scheduled to begin in 2011, with heavy construction continuing for seven years followed by four years of assemblage and testing. Construction is complete in February 2022. The total eleven year construction period includes an eight-year period when both construction and operation are ongoing simultaneously.)

**Total during period 2023-2040

Information in "[ ]" is Proprietary Commercial Information withheld in accordance with 10 CFR 2.390

8.9 DECONTAMINATION AND DECOMMISSIONING

Decontamination and decommissioning of the facility will be staged during facility operations and is projected to take approximately nine years. Releases will be maintained such that associated impacts are the same order of magnitude or less than normal operational impacts. Decommissioning would also result in release of the facilities and land for unrestricted use, discontinuation of water and electrical power usage, and reduction in vehicular traffic.

As European plant experience has demonstrated, conventional decontamination techniques are entirely effective for all plant items. All recoverable items will be decontaminated except for a relatively small amount of intractably contaminated material. The majority of materials requiring disposal will include centrifuge rotor fragments, trash, and residue from the effluent treatment systems. No problems are anticipated which will prevent the site from being released for unrestricted use. Additional details concerning decommissioning are provided in SAR Chapter 10, Decommissioning.

8.10 DEPLETED URANIUM DISPOSITION

Enrichment operations at the Eagle Rock Enrichment Facility (EREF) will generate an average 15,270 metric tons 16,832 tons) of depleted UF_6 (DUF_6) per year at full production. After temporary storage onsite, AES will utilize the DOE deconversion facilities that are currently under construction at the sites of the Paducah Gaseous Diffusion Plant (GDP) and the former Portsmouth GDP for final disposition of DUF_6. As discussed in Section 4.13, Waste Management Impacts, the DOE has determined that any of the disposal options that would be considered for the products of the deconversion process would adequately protect human health and the environment. On this basis, AES estimates that the environmental impacts associated with such a strategy will be small.

AES is committed to ensuring that there will be no long-term disposal or long-term storage (beyond the life of the plant) of DUF_6 onsite. As described in SAR Section 10.2, Financial Assurance Mechanism, AES will put in place as part of the NRC license a financial assurance mechanism that assures funding will be available to safely dispose of the DUF_6 generated by the EREF.

8.11 ENVIRONMENTAL JUSTICE

An analysis of census block groups (CBGs) within a 6.4-km (4-mi) radius of the site was conducted to assess whether any disproportionately large minority or low-income populations were present that warranted further analysis of the potential for disproportionately high and adverse environmental impacts upon those populations. The analysis is more fully described in ER Section 4.11.1, Census Block Group Procedure and Evaluation Criteria. As stated in Section 4.11, the evaluation was performed using the 2000 population and economic data available from the U.S. Census Bureau for that area, and was done in accordance with the procedures contained in NUREG-1748 (NRC, 2003a). This guidance was endorsed by the NRC Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (FR, 2004).

The nearest residence is approximately 7.7 km (4.8 mi) from the proposed site (see Section 3.1, Land Use). Because this is outside of the 6.4-km (4-mi) radius (130-km^2 [50-mi^2] area) required by the NRC to be examined (NRC, 2003a), no environmental justice disproportionate adverse impacts would occur to minority or low-income populations. However, the proposed site does extend across four census block groups and to show additional compliance with the NRC requirements, a census block group analysis was conducted to determine whether the remainder of those census block groups (i.e., the portions lying outside of the 6.4-km [4-mi] radius) had potential minority or low-income populations. The analysis demonstrates that none of these four CBGs are comprised of more than 50% of any individual or aggregate minority population. The percentages for the Hispanic or Latino population, the largest minority population in the four census block groups, are as follows:

- Census Tract 9715, CBG Bonneville 1 – 23.4%
- Census Tract 9715, CBG Bonneville 2 – 8.2%
- Census Tract 9503, CBG Bingham 1 – 18.2%
- Census Tract 9601, CBG Jefferson 3 – 23.1%

Moreover, none of these percentages exceeds the State of Idaho or applicable county percentages for this minority population by more than 20 percentage points.

In addition, the AREVA analysis demonstrates that no individual CBG is comprised of more than 50% of low-income households. The percentages of low-income households are as follows:

- Census Tract 9715, CBG Bonneville 1 – 15.8%
- Census Tract 9715, CBG Bonneville 2 – 6.6%
- Census Tract 9503 CBG Bingham 1 – 11.7%
- Census Tract 9601, CBG Jefferson 3 – 23.3%.

None of these populations exceeds the percentage of low-income households in the State of Idaho or applicable county by more than 20%.

Based on this analysis, AREVA has concluded that no disproportionately high minority or low income populations exist that would warrant further examination of disproportionately high and adverse environmental impacts upon such populations.

8.12 CONCLUSION

In conclusion, analysis of the potential environmental impacts associated with construction and operation of the EREF indicates that adverse impacts are small and are outweighed by the socioeconomic benefits associated with plant construction and operation. Additionally, the EREF will meet the underlying need for additional reliable and economical uranium enrichment capacity in the United States, thereby serving important energy and national security policy objectives. Accordingly, because the impacts of the proposed EREF are minimal and acceptable, and the benefits are desirable, the no-action alternative may be rejected in favor of the proposed action. AES has also completed a safety analysis of the proposed facility which demonstrates that EREF operation will be conducted in a safe and acceptable manner.

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TABLES

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Glen Seeburger				C												
Mark Strum				C		L			C							
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Erick Neher			C	C					C							
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