



Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico

Draft Report for Comment

**U.S. Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Washington, DC 20555-0001**



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ABSTRACT

Louisiana Energy Services (LES) has submitted a license application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission a gas centrifuge uranium enrichment facility near Eunice, New Mexico, in Lea County. The proposed facility, referred to as the National Enrichment Facility (NEF), would produce enriched uranium-235 (^{235}U) up to 5 weight percent by the gas centrifuge process with a production of 3 million separative work units per year. The enriched uranium would be used in commercial nuclear power plants. The proposed NEF would be licensed in accordance with the provisions of the *Atomic Energy Act*. Specifically, an NRC license under Title 10, "Energy," of the *U.S. Code of Federal Regulations* (10 CFR) Parts 30, 40, and 70 would be required to authorize LES to possess and use special nuclear material, source material, and byproduct material at the proposed NEF site.

This Draft Environmental Impact Statement (Draft EIS) was prepared in compliance with the *National Environmental Policy Act* (NEPA) and the NRC regulations for implementing NEPA. This Draft EIS evaluates the potential environmental impacts of the proposed action and its reasonable alternatives. This Draft EIS also describes the environment potentially affected by LES's proposal, presents and compares the potential environmental impacts resulting from the proposed action and its alternatives, and describes LES's environmental monitoring program and mitigation measures.

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EXECUTIVE SUMMARY

BACKGROUND

The U.S. Nuclear Regulatory Commission (NRC) is considering whether to issue a license, pursuant to Title 10, "Energy", of the *U.S. Code of Federal Regulations* (10 CFR) Parts 30, 40, and 70, that would allow the construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility near Eunice in Lea County, New Mexico. This action would be taken in response to an application filed with the NRC by Louisiana Energy Services, Limited Partnership (LES) by letter dated December 12, 2003. To support its licensing decision on the proposed National Enrichment Facility (NEF), the NRC determined that an Environmental Impact Statement (EIS) is required by the NRC's *National Environmental Policy Act* (NEPA)-implementing regulations in 10 CFR Part 51.

The enriched uranium produced at the proposed NEF would be used to manufacture nuclear fuel for commercial nuclear power reactors. Enrichment is the process of increasing the concentration of the naturally occurring and fissionable uranium-235 (^{235}U) isotope. Uranium ore usually contains approximately 0.72 weight percent ^{235}U . In order to be useful in nuclear power plants as fuel for electricity generation, the uranium must be enriched up to 5 weight percent.

THE PROPOSED ACTION

The proposed action considered in this Draft Environmental Impact Statement (Draft EIS) is for LES to construct, operate, and decommission a uranium enrichment facility known as NEF at a site near Eunice in Lea County, New Mexico. By letter dated December 12, 2003, LES filed an application with the NRC for a license to possess and use special nuclear material, source material, and byproduct material at the site. The proposed NEF, if approved, would be situated on Section 32 located approximately 32 kilometers (20 miles) south of Hobbs, New Mexico, 8 kilometers (5 miles) east of Eunice, New Mexico, and about 0.8 kilometer (0.5 mile) from the New Mexico/Texas State line on New Mexico Highway 234. The proposed NEF would be built on land for which a 35-year easement has been granted by the State of New Mexico, which owns the property.

The proposed NEF would produce ^{235}U enriched up to 5 weight percent by a gas centrifuge process with a nominal production of 3 million separative work units (SWUs) per year. If the license is approved, facility construction would be scheduled to begin in 2006 and continued for 8 years through 2013. The proposed NEF operation would begin in 2008 with initial production beginning in 2008. Peak production would be achieved in 2013. Operations would continue at peak production until approximately 9 years before the license expires, at which time decommissioning activities would be phased in with completion by 2036.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The proposed NEF would provide an additional, reliable, and economical domestic source of enrichment services. This facility would contribute to the attainment of national energy security policy objectives by providing for additional source of low-enriched uranium. Nuclear power plants are currently supplying approximately 20 percent of the Nation's electricity requirements, but only about 15 and 14 percent of the enrichment services that were purchased by U.S. nuclear reactors in 2002 and 2003, respectively, were provided by enrichment plants located in the United States. Currently, the only uranium enrichment facility in operation in the United States is located in Paducah, Kentucky, imposing reliability risks for the supply of domestically generated enriched uranium. The Administration's energy policy, which was

released in May 2001, recognized this need and stated the importance of having a reliable source of enriched uranium for national energy security purposes. The production of enriched uranium at the proposed NEF would be equivalent to about 25 percent of the current and projected demand for enrichment services within the U.S.

ALTERNATIVES

The no-action alternative is considered in this Draft EIS. Under the no-action alternative, the proposed NEF would not be constructed, operated, and decommissioned in Lea County, New Mexico. The proposed NEF site uses and characteristics would remain unchanged. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.

Prior to submitting the license application in December 2003, LES considered alternative sites. Alternative sites proposed by LES included 44 sites throughout the United States. These sites were evaluated by LES based on various technical, safety, economic, and environmental factors. LES concluded that the site considered in the proposed action met all of these objectives and criteria. The NRC staff reviewed the site selection process and determined that none of the candidate sites were obviously superior to the LES preferred site in Lea County, New Mexico; therefore, no other site was selected for further analysis.

The NRC staff examined two reasonable alternatives to fulfill domestic enrichment needs: (1) reactivate the Portsmouth Gaseous Diffusion Facility near Piketon, Ohio; and (2) purchase low-enriched uranium from foreign sources. These alternatives were eliminated from further consideration based on costs, excessive energy consumption, and national energy security vulnerability.

Alternative technologies to the gas centrifuge process were also considered. These technologies included the Electromagnetic Isotope Separation Process, Liquid Thermal Diffusion, Atomic Vapor Laser Isotope Separation, and the Separation of Isotopes by Laser Excitation. These technologies, however, are not economically viable or remain at the research developmental scale and were therefore eliminated from further consideration.

POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Potential environmental impacts of the proposed action are evaluated in this Draft EIS and summarized below. The environmental impacts from the proposed action are generally SMALL to MODERATE and would be mitigated by methods described in Chapter 5. Environmental monitoring methods are described in Chapter 6.

Determination of the Significance of Potential Environmental Impacts

A standard of significance has been established for assessing environmental impacts. Based on the Council on Environmental Quality's regulations, each impact is to be assigned one of the following three significance levels:

- ***Small:*** *The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.*
- ***Moderate:*** *The environmental effects are sufficient to noticeably alter but not destabilize important attributes of the resource.*
- ***Large:*** *The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.*

Land Use

Small Impact. Construction activities would occur on about 81 hectares (200 acres) of a 220-hectare (543-acre) site that would be fenced. The land is currently undisturbed except for a gravel access road, cattle grazing, and the presence of a carbon dioxide pipeline. There are sufficient lands surrounding the proposed site for relocation of the pipeline and cattle grazing.

Historical and Cultural Resources

Small Impact. Seven archaeological sites were recorded on the proposed site. These sites are considered eligible for listing on the National Register of Historic Places. Two sites would be impacted by construction activities and a third is located along the access road. Based on the terms and conditions of a Memorandum of Agreement that is being prepared, a historic properties treatment plan would be fully implemented prior to construction of the proposed facility. A written plan for inadvertent discoveries would be developed prior to construction.

Visual and Scenic Resources

Small Impact. Impacts from construction activities would be limited to fugitive dust emissions that can be controlled using dust-suppression techniques. The cooling towers could contribute to the creation of fog 0.5 percent of the total number of hours per year. The proposed NEF site received the lowest scenic-quality rating using the U.S. Bureau of Land Management (BLM) visual resource inventory process.

Air Quality

Small Impact. Air concentrations of the criteria pollutants predicted for vehicle emissions and particulate matter of less than 10 microns (PM₁₀) emissions for fugitive dust during construction would all be below the National Ambient Air Quality Standards. Fugitive dust emissions would be temporary and localized. A National Emissions Standards for Hazardous Air Pollutants (NESHAP) Title V permit would not be required for operations due to the low levels of estimated emissions. All stack emissions would be monitored.

Geology and Soils

Small Impact. Construction-related impacts to the geology and soil would occur within the 81-hectare (200-acre) portion of the site that would contain the proposed NEF structures. Only onsite soils would be used during construction. No soil contamination would be expected during construction and operations. A plan would be in place to address any spills that may occur. No construction or operational impacts would occur on unique mineral deposits or geological resources.

Water Resources

Small Impact. There are no existing surface water resources. National Pollutant Discharge Elimination System (NPDES) general permits for construction and operations would be required to manage stormwater. Retention basins (i.e., the Treated Effluent Evaporative Basin and the Uranium Byproduct Cylinder (UBC) Storage Pad Stormwater Retention Basin) would be lined to minimize infiltration of water into the subsurface. Infiltration from the Site Stormwater Detention Basin and septic system leach fields could be expected to form a perched layer on top of the Chinle Formation, but there would be

limited downgradient transport because of soil storage capacity and upward flux to the root zone. Impacts on water use would be SMALL because of the availability of excess capacity in the Hobbs and Eunice water supply systems. The proposed NEF's use of Ogallala Aquifer's waters indirectly through the Eunice and Hobbs water supply systems would constitute a small portion of the aquifer reserves in the New Mexico territory.

Ecological Resources

Small Impact. Construction, operation, and decommissioning of the proposed NEF would result in SMALL impacts to ecological resources. There are no wetlands or unique habitats for threatened or endangered plant or animal species on the proposed NEF site. A large portion of the site would remain undisturbed and in its natural status. Impacts from the use of water retention/detention basins would be SMALL because animal-friendly fencing and netting over the basins would be used to minimize animal intrusion. Revegetation using native plant species would be conducted in any areas impacted by construction activities.

Socioeconomics

Moderate Impact. During the 8-year construction period, there would be an average of 397 jobs per year created (about 19 percent of the Lea, Andrews, and Gaines Counties' construction labor force) with employment peaking at 800 jobs in the fourth year. Spending on goods and services and wages would create about 582 new jobs on average. Construction would cost \$1.2 billion (2002 dollars). About 15 percent of the construction workforce would be expected to take up residency in the surrounding community, and about 15 percent of the local housing units are unoccupied. The impact to local schools would be minimal. Operations would employ a maximum of 210 people annually with an additional 173 indirect jobs being created. Increase in demand for public services would be SMALL. Decontamination and decommissioning would generally have SMALL impacts. Use of a U.S. Department of Energy (DOE) conversion facility in Paducah, Kentucky, or near Portsmouth, Ohio, for disposition of depleted uranium hexafluoride (DUF₆) could extend the operating life of the conversion facility, and therefore, the socioeconomic impacts associated with the operation. If a new private conversion facility is constructed, the resulting socioeconomic impacts would be similar to those expected for the construction and operation of the DOE conversion facility near Portsmouth, Ohio.

Environmental Justice

Small Impact. Examination of the various environmental pathways by which low-income and minority populations could be disproportionately affected reveals no disproportionately high and adverse impacts from either construction or normal operations over a 80-kilometer (50-mile) radius. Impacts would be SMALL, and no disproportionately high and adverse impacts would occur to minority or low-income populations living near the proposed NEF or along the transportation routes into and out of the proposed NEF.

Noise

Small Impact. Noise levels would be predominately from traffic. Construction activities could be limited to normal daytime working hours. The nearest residence is 4.3 kilometers (2.6 miles) away from the proposed site and noises at this distance from construction activities would be negligible. Noise levels during operations would be within the U.S. Department of Housing and Urban Development guidelines.

Transportation

Small to Moderate Impact during Construction. Traffic on New Mexico Highway 234 would almost double during construction, and three injuries and no fatalities could occur during the peak construction employment year due to workforce traffic and delivery of construction materials. Peak truck traffic during construction could cause less than one injury and less than one fatality.

Small Impact during Normal Operations; Small to Moderate during Accidents. Truck trips removing nonradioactive waste and delivering supplies would have a SMALL impact on the traffic on New Mexico Highway 234. Workforce traffic would also have a SMALL impact on New Mexico Highway 234 with less than one injury and less than one fatality annually expected due to traffic accidents. All truck shipments of feed, product, and waste materials (including the dispositioning of DUF_6) would be expected to result in 2 latent cancer fatalities (LCFs) to the general population over the life of the proposed NEF due to vehicle emissions and less than 1×10^{-2} LCF due to direct radiation. All rail shipments of feed, product, and waste materials would be expected to result in less than 7×10^{-2} LCF to the general population over the life of the proposed NEF due to vehicle emissions and 1×10^{-1} LCF from direct radiation. If a rail accident involving the shipment of DUF_6 occurs in an urban area, approximately 28,000 people could suffer adverse, but temporary, health effects with no fatalities due to chemical impacts. A truck accident involving the shipment of DUF_6 in an urban area could cause temporary adverse chemical impacts to approximately 1,700 people.

Small Impact during Decommissioning. SMALL impacts would occur if DUF_6 is temporarily stored at the proposed NEF for the duration of operations. Assuming that all of the material is shipped during the first 8 years (the final radiation survey and decontamination would occur during year 9), the proposed NEF would ship approximately 1,966 trucks per year. If the trucks are limited to weekday, non-holiday shipments, approximately 10 trucks per day or 2-1/2 railcars per day would leave the site for the DUF_6 conversion facility.

Public and Occupational Health and Safety

Small Impact during Construction and Normal Operations. During construction, fatality would not be likely to occur (probability of fatality is less than one fatality per year). Construction workers could receive radiation doses of up to 0.05 millisievert (5 millirem) per year once the operation of the proposed NEF begins. During normal operations, there would be approximately eight injuries per year and no fatalities based on statistical probabilities. A typical operations or maintenance technician could receive 1 millisievert (100 millirem) of radiation exposure annually. A typical cylinder yard worker could receive 3 millisievert (300 millirem) of radiation exposure annually. All public radiological exposures are significantly below the 10 CFR Part 20 regulatory limit of 1 millisievert (100 millirem) and 40 CFR Part 190 regulatory limit of 0.25 millisieverts (25 millirem) for uranium fuel-cycle facilities. Members of the public who are located at least a few miles from the UBC Storage Pad would have annual direct radiation exposures combined with exposure through inhalation result in SMALL impacts significantly less than 0.01 millisievert (1 millirem), resulting in SMALL impacts.

Small to Moderate Impact for Accidents. The most severe accident is estimated to be the release of UF_6 caused by rupturing an overfilled and/or overheated cylinder, which could incur a collective population dose of 120 person-sieverts (12,000 person-rem) and 7 latent cancer fatalities. The proposed NEF design would reduce the likelihood of this event by using redundant heater controller trips.

Waste Management

Small Impact. Solid wastes would be generated during construction and operations. Existing disposal facilities would have the capacity to dispose of the nonhazardous solid wastes. The proposed NEF would implement waste management programs to minimize waste generation and promote recycling where appropriate. In particular, impacts to the Lea County landfill would be SMALL. There would be enough existing national capacity to accept the low-level radioactive waste that would be generated at the proposed NEF.

Small to Moderate Impact for Temporary Storage of UBCs. Public and occupational exposures would be monitored and controlled. Shipment of the DUF₆ would extend operations of the DOE conversion facilities, thus extending their impacts as described in their NEPA documentation. Construction of a new privately owned conversion facility, whether adjacent to the proposed NEF or potentially near Metropolis, Illinois, would have comparable impacts to the DOE conversion facilities.

SUMMARY OF THE COSTS AND BENEFITS OF THE PROPOSED ACTION

Costs associated with construction activities would be approximately \$1.2 billion (2002 dollars) excluding escalation, contingencies, and interest. About one-third of the cost to construct the facility would be spent locally for goods, services, and wages.

During operations, about \$10.5 million in wages and benefits and \$9.6 million in purchasing local goods and services would be spent annually. Construction and operation of the facility would have additional indirect economic impacts by creating additional employment and economic activity. Tax revenues would accrue primarily to the State of New Mexico and would total between \$177 million and \$212 million (2002 dollars) over the life of the proposed NEF.

Decontamination and decommissioning is estimated to cost approximately \$837.5 million (2002 dollars). Locating a private conversion facility near the proposed NEF would have a greater economic impact on the local community, with the creation of approximately 180 jobs, than if the DUF₆ was shipped to another location for conversion.

COMPARISON OF ALTERNATIVES

For the no-action alternative, the proposed NEF would not be constructed, operated, and decommissioned in Lea County, New Mexico. The Paducah Gaseous Diffusion Plant in Paducah, Kentucky, and the down-blending of highly enriched uranium covered under the "Megatons to Megawatts" program (both are managed by USEC) would remain the sole source of domestically generated low-enriched uranium for U.S. commercial nuclear power plants. Foreign enrichment sources would continue supplying more than 85 percent of the U.S. nuclear power plants demand until other new domestic suppliers are constructed and operated. In the long term, this could lead to increase reliance on foreign suppliers for enrichment services.

The no-action alternative would have no local impact on current land use; visual/scenic resources; air, water, and ecological resources; geology and soils; transportation; environmental justice; and waste management. However, the failure to construct and operate the proposed NEF could have SMALL to MODERATE impacts to historical and cultural resources because it could expose the historical sites identified at the proposed NEF to the possibility of human intrusion unless requirements included in applicable Federal and State historic preservation laws and regulations are followed. On the other hand,

for these reasons and for not providing additional jobs to the local community, the socioeconomic impacts would be MODERATE because all socioeconomic impacts related to employment, economic activity, population, housing, community resources, and financing would be avoided.

In comparison to the no-action alternative, the proposed action would also incur SMALL impacts to land use; historical and cultural resources; visual/scenic resources; air, water, and ecological resources; geology and soils; noise; and environmental justice. The most serious accident which could be expected to occur, the rupture of an overfilled and/or overheated cylinder, would potentially result in SMALL to MODERATE impacts. Waste management impacts could be as much as SMALL to MODERATE if it is conservatively assumed that the UBCs are temporarily stored on site until decommissioning begins even though this is not contemplated by LES. Transportation impacts are expected to be MODERATE during the two year construction period due to an increase in traffic on New Mexico Highway 234. Otherwise, transportation impacts are expected to be SMALL.

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ACRONYMS AND ABBREVIATIONS

^{235}U	uranium-235
^{238}U	uranium-238
ALARA	as low as reasonably achievable
BLM	U.S. Bureau of Land Management
BMP	best management practice
CaF_2	calcium fluoride
CEDE	committed effective dose equivalent
CFR	<i>U.S. Code of Federal Regulations</i>
CO	carbon monoxide
CO_2	carbon dioxide
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DUF_4	depleted uranium tetrafluoride
DUF_6	depleted uranium hexafluoride
EDE	effective dose equivalent
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FWS	U.S. Fish and Wildlife Service
HEPA	high efficiency particulate air
HUD	U.S. Department of Housing and Urban Development
LCF	latent cancer fatality
LES	Louisiana Energy Services
MSL	mean sea level
NEF	National Enrichment Facility
NEPA	<i>National Environmental Policy Act</i>
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	<i>National Historic Preservation Act</i>
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
RCRA	<i>Resource Conservation and Recovery Act</i>

SER	Safety Evaluation Report
SWU	separative work unit
TEDE	total effective dose equivalent
U ₃ O ₈	triuranium octaoxide
UO ₂ F ₂	uranyl fluoride
UBC	uranium byproduct cylinder
UF ₄	uranium tetrafluoride
UF ₆	uranium hexafluoride
USEC	U.S. Enrichment Corporation
USGS	U.S. Geological Survey
WCS	Waste Control Specialists