

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

**Chapters 1 through 10 and  
Appendices A through G**

**Final Report**

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



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## **Chapters 1 through 10 and Appendices A through G**

### **Final Report**

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**Division of Waste Management and Environmental Protection  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001**



## 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 ( $^{235}\text{U}$ ) up to 5 weight percent by the gas centrifuge process with a nominal 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 Environmental Impact Statement (EIS) was prepared in compliance with the *National Environmental Policy Act* (NEPA) and the NRC regulations for implementing NEPA. This EIS evaluates the potential environmental impacts of the proposed action and its reasonable alternatives. This 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 proposed mitigation measures.

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## EXECUTIVE SUMMARY

### BACKGROUND

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

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 ( $^{235}\text{U}$ ) isotope. Uranium ore usually contains approximately 0.72 weight percent  $^{235}\text{U}$ . 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 EIS is for LES to construct, operate, and decommission a uranium enrichment facility, the proposed 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 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 constructed on land owned by Lea County and leased to LES (as of December 8, 2004) for 30 years, after which LES would purchase the land from Lea County.

The proposed NEF would produce  $^{235}\text{U}$  enriched up to 5 weight percent by a gas centrifuge process with a nominal production of 3 million separative work units per year. If the license is approved, facility construction would begin in 2006 and continue for 8 years through 2013. The proposed NEF would begin initial production in 2008. The facility peak production would be reached in 2013. Operations would continue at peak production until approximately 9 years before the license expired. Decommissioning activities would then begin and be completed by 2036.

### PURPOSE OF 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 an additional source of low-enriched uranium to be used in commercial nuclear power plants. Nuclear power currently supplies approximately 20 percent of the Nation's electricity. The United States Enrichment Corporation (USEC) is the sole U.S. supplier of low-enriched uranium for nuclear fuel in the United States. USEC has one operating enrichment plant near Paducah, Kentucky, which can supply approximately 14 percent of the current U.S. demand for low-enriched uranium. USEC also imports

downblended (diluted) weapons-grade uranium from Russia to supply an additional 42 percent of the U.S. demand. The remaining 44 percent is imported from foreign suppliers. The dependence on a single U.S. supplier and foreign sources for low-enriched uranium imposes reliability risks for the nuclear fuel supply to U.S. nuclear power plants. The Administration's energy policy, which was issued in May 2001, recognized the importance of having a reliable source of enriched uranium for national energy security. 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 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 from current conditions. Enrichment services would continue to be performed by existing domestic and foreign uranium enrichment suppliers.

Before submitting the license application in December 2003, LES considered 44 alternative sites throughout the United States. LES evaluated these sites based on various technical, safety, economic, and environmental criteria. LES concluded that the site considered in the proposed action met all of the criteria. The NRC staff reviewed the site selection process and determined that none of the other candidate sites were obviously superior to LES's preferred site in Lea County, New Mexico. Therefore, no other site was further analyzed.

The NRC staff examined two reasonable alternatives to satisfy 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.

The NRC staff also evaluated several alternative technologies to the gas centrifuge process: 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 therefore were not further considered.

### ***Determining 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.*

## **POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION**

The EIS evaluates the potential environmental impacts of the proposed action. The environmental impacts from the proposed action are generally SMALL to MODERATE and could be mitigated by the methods described in Chapter 5. Environmental monitoring methods are described in Chapter 6.

### **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 is sufficient land around the proposed site for relocation of the pipeline and cattle grazing. The installation of the necessary municipal water supply piping, natural gas supply piping, and electrical transmission lines would result in only short-term impacts (due to construction), since they would be installed along existing county right-of-way easements.

### **Historical and Cultural Resources**

Small Impact. There are seven archaeological sites 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 along the access road. Based on the terms and conditions of a Memorandum of Agreement, a historic properties treatment plan would be fully implemented before construction of the proposed facility. A written plan for inadvertent discoveries has been developed.

### **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 hours per year (44 hours per year). The proposed NEF site received the lowest scenic-quality rating using the U.S. Bureau of Land Management visual resource inventory process.

### **Air Quality**

Small Impact. Air concentrations of the criteria pollutants predicted for vehicle emissions and emissions of particulate matter of less than 10 microns (PM<sub>10</sub>) from 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 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 on the geology and soil would occur within the 81-hectare (200-acre) part of the site on which the proposed NEF structures would be built. Clay and gravel from a nearby site might 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 might occur. There would be no construction or operational impacts on unique mineral deposits or geological resources.

### **Water Resources**



**Small Impact.** There are no existing surface water resources. National Pollutant Discharge Elimination System 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 might form a perched layer on top of the Chinle Formation, but there would be limited downgradient transport because of the soil's 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 indirect use of the Ogallala Aquifer's water through the Eunice and Hobbs water supply systems would constitute a small portion of the aquifer reserves in New Mexico.

## **Ecological Resources**

**Small Impact.** Construction, operation, and decommissioning of the proposed NEF would have SMALL impacts on ecological resources. There are no wetlands or unique habitats for threatened or endangered plant or animal species on the proposed NEF site. A large part of the site would remain undisturbed and in its natural state. The impacts of the use of water detention/retention basins would be SMALL because animal-friendly fencing and netting or other suitable material over the basins would be used to minimize animal intrusion. Revegetation using native plant species would be conducted in any areas impacted by proposed NEF activities. The design and construction of the electrical transmission lines would address the protection of birds from electric shock.

## **Socioeconomics**

**Moderate Impact.** During the 8-year construction period, an average of 397 jobs per year would be created (about 19 percent of the Lea, Andrews, and Gaines Counties' construction labor force). Employment would peak at 800 jobs in the fourth year. Spending on goods and services and wages would create about 582 new jobs per year on average. Construction would cost \$1.24 billion (in 2004 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 on local schools would be minimal. During operation, the proposed NEF would employ a maximum of 210 people annually and would indirectly create an additional 173 jobs. The 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 (DUF<sub>6</sub>) could extend the operating life of the conversion facility and, therefore, the socioeconomic impacts of the operation. If a new private conversion facility were 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.** The environmental justice study focused on an area within 80 kilometers (50 miles) of the proposed NEF site. Demographic data from the Year 2000 census data were analyzed to characterize minority and low-income populations near the proposed NEF site. In addition, State and local governments and representatives of the minority communities were contacted. The largest minority population within 80 kilometers (50 miles) of the proposed NEF site is the Hispanic/Latino population. Although the impacts to the general population were SMALL to MODERATE, an examination of the various environmental pathways by which low-income and minority populations could be affected found no disproportionately high and adverse impacts from construction, operation, or decommissioning on

minority and low-income populations living near the proposed NEF or along the transportation routes into and out of the proposed NEF.

## **Noise**

Small Impact. Noise would come predominantly from traffic. Construction activities could be limited to normal daytime working hours. The nearest residence is 4.3 kilometers (2.6 miles) from the proposed site, and noises from construction activities would be negligible at this distance. 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. Three injuries and less than one fatality might occur during the peak construction employment year due to workforce traffic and delivery of construction materials. Peak truck traffic during construction might 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 expected annually due to traffic accidents. Truck shipments of feed, product, and waste materials (including DUF<sub>6</sub>) would result in two latent cancer fatalities to the general population over the life of the proposed NEF due to vehicle emissions and fewer than  $3 \times 10^{-2}$  latent cancer fatalities due to direct radiation. All rail shipments of feed, product, waste materials, and empty cylinders would result in fewer than  $8 \times 10^{-2}$  latent cancer fatalities to the general population over the life of the proposed NEF due to vehicle emissions and  $1 \times 10^{-1}$  latent cancer fatalities from direct radiation. If a rail accident involving the shipment of DUF<sub>6</sub> occurred in an urban area, up to 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<sub>6</sub> in an urban area could have temporary adverse chemical impacts on as many as 1,700 people.

Small Impact during Decommissioning. SMALL impacts would occur if DUF<sub>6</sub> were temporarily stored at the proposed NEF for the duration of operations. Assuming that all of the material were shipped during the first 8 years (the final radiation survey and decontamination would occur during the ninth year), the proposed NEF would ship approximately 1,966 truckloads per year. If the trucks were limited to weekday, non-holiday shipments, approximately 10 trucks per day or 2½ railcars per day would leave the site for the DUF<sub>6</sub> conversion facility.

## **Public and Occupational Health and Safety**

Small Impact during Construction and Normal Operations. During construction, a fatality would be unlikely (the 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 proposed NEF begins operations. 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 be exposed to 1 millisievert (100 millirem) of radiation annually. A typical cylinder yard worker could be exposed to 3 millisieverts (300 millirem) of radiation annually. All public radiological exposures are significantly below the 10 CFR Part 20 regulatory limit of 1 millisievert (100 millirem) and the 40 CFR Part 190 regulatory limit of 0.25 millisieverts (25 millirem) for uranium fuel cycle facilities. The nearest resident would receive less than  $1.3 \times 10^{-5}$  millisieverts ( $1.3 \times 10^{-3}$  millirem) due to proposed NEF operations.

Small to Moderate Impact for Accidents. The most severe accident is estimated to be the release of UF<sub>6</sub> caused by the rupture of an overfilled and/or overheated cylinder, which could result in a collective population dose of 120 person-sieverts (12,000 person-rem) and seven latent cancer fatalities. The design of the proposed NEF would include certain features to significantly reduce the likelihood of this event.

## **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 on 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 DUF<sub>6</sub> Waste Management. Public and occupational exposures would be monitored and controlled to meet NRC regulations for radiation protection. LES identified two potential means for disposing of DUF<sub>6</sub>: by private conversion and disposal facilities or by DOE through Section 3113 of the USEC Privatization Act. LES's preferred strategy is to use private facilities outside of the State of New Mexico to convert and dispose of the DUF<sub>6</sub> byproduct. No final location has yet been determined for a private conversion facility. Alternatively, DOE would process the DUF<sub>6</sub> by extending the operation of its conversion facilities. This would prolong the impacts of DOE's conversion facilities, as described in DOE's NEPA documentation. A private conversion facility would have much the same impacts as the planned DOE conversion facilities at Paducah, Kentucky, and Portsmouth, Ohio.

## **SUMMARY OF THE COSTS AND BENEFITS OF THE PROPOSED ACTION**

The costs of construction activities would be approximately \$1.24 billion (in 2004 dollars), excluding escalation, contingencies, and interest. About one-third of the cost of constructing the facility would be spent locally for goods, services, and wages.

During operations, about \$10.9 million in wages and benefits and \$9.9 million for 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 from gross receipts and income would go primarily to the State of New Mexico and would total between \$148 million and \$180 million (in 2004 dollars) over the life of the proposed NEF. Property taxes would total between \$10.4 million and \$14.5 million (in 2004 dollars) and go to Lea County, New Mexico.

Decontamination and decommissioning are estimated to cost approximately \$941.6 million (in 2004 dollars). Locating a private conversion facility near the proposed NEF would have a greater economic impact on the local community, creating approximately 180 jobs, than if the DUF<sub>6</sub> were shipped to another location for conversion.

## **COMPARISON OF ALTERNATIVES**

In 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 downblending of highly enriched uranium 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 to supply more than 85 percent of U.S. nuclear power plants' demand until other new domestic enrichment facilities were

constructed and operated. In the long term, this could lead to increased 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; socioeconomics; environmental justice; transportation; and waste management. However, the failure to construct and operate the proposed NEF could have SMALL to MODERATE impacts on historical and cultural resources; historical sites identified at the proposed NEF could be exposed to further weathering and the possibility of human intrusion, unless applicable Federal and State historic preservation laws and regulations were followed. Additional domestic enrichment facilities could be constructed in the future with impacts expected to be SMALL to MODERATE, depending on the site-specific conditions.

In comparison to the no-action alternative, the proposed action would also have SMALL impacts on 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 that might occur, the rupture of an overfilled and/or overheated cylinder, would have SMALL to MODERATE impacts. Waste management impacts could be SMALL to MODERATE if the uranium byproduct cylinders are temporarily stored on site until decommissioning begins, though this is not contemplated by LES. Transportation impacts are expected to be MODERATE during the construction period due to increased traffic on New Mexico Highway 234. Otherwise, transportation impacts are expected to be SMALL.

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## ACRONYMS AND ABBREVIATIONS

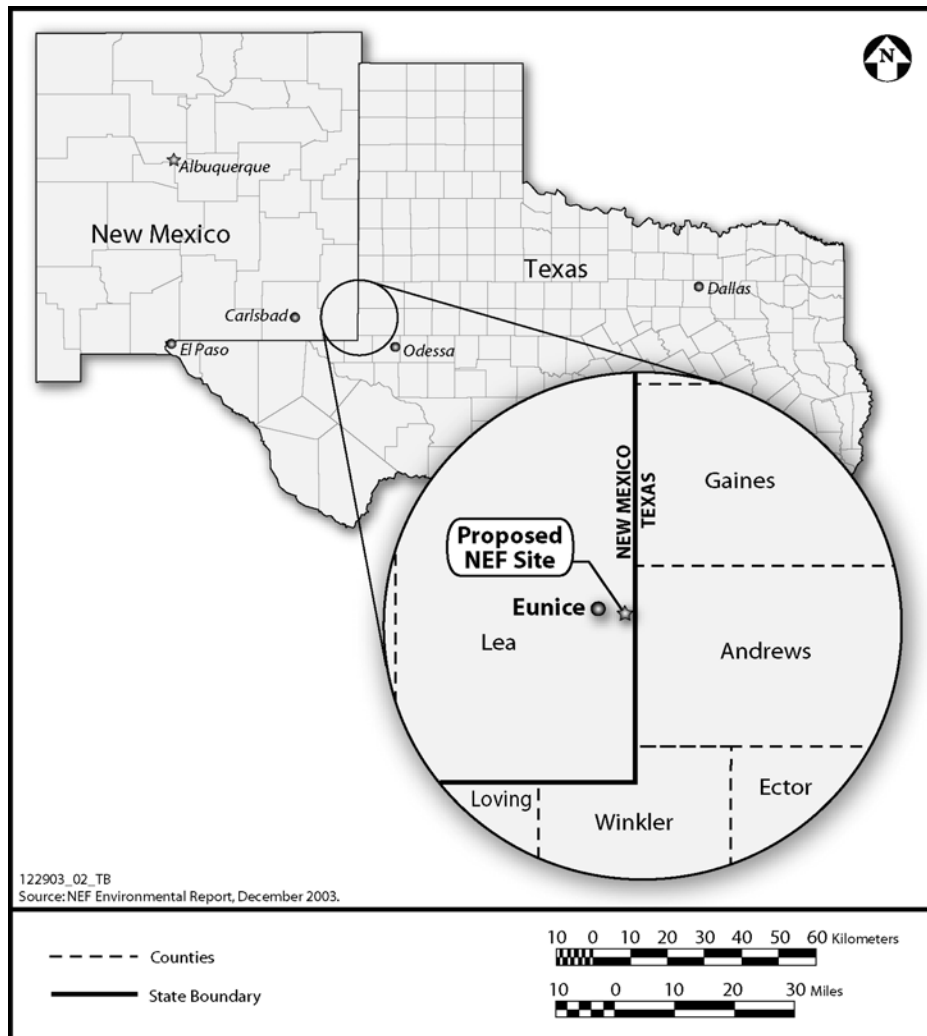
$^{235}\text{U}$	uranium-235
$^{238}\text{U}$	uranium-238
ADAMS	Agencywide Documents Access and Management System
ALARA	as low as reasonably achievable
ASLB	Atomic Safety and Licensing Board
BLM	U.S. Bureau of Land Management
BMP	best management practice
$\text{CaF}_2$	calcium fluoride
CEDE	committed effective dose equivalent
CFR	<i>U.S. Code of Federal Regulations</i>
CO	carbon monoxide
$\text{CO}_2$	carbon dioxide
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
$\text{DUF}_4$	depleted uranium tetrafluoride
$\text{DUF}_6$	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
MOX	mixed oxide fuel
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
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>
NMDOT	New Mexico Department of Transportation
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 <sub>3</sub> O <sub>8</sub>	triuranium octaoxide
UO <sub>2</sub> F <sub>2</sub>	uranyl fluoride
UBC	uranium byproduct cylinder
UF <sub>4</sub>	uranium tetrafluoride
UF <sub>6</sub>	uranium hexafluoride
USEC	U.S. Enrichment Corporation
USGS	U.S. Geological Survey
WCS	Waste Control Specialists

# 1 INTRODUCTION

## 1.1 Background

The U.S. Nuclear Regulatory Commission (NRC) prepared this Environmental Impact Statement (EIS) in response to an application submitted by Louisiana Energy Services (LES), for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility near Eunice in Lea County, New Mexico (Figure 1-1). The proposed facility is referred to as the National Enrichment Facility (NEF).



**Figure 1-1 Location of the Proposed National Enrichment Facility (LES, 2005a)**

The NRC's Office of Nuclear Material Safety and Safeguards and its consultants, Advanced Technologies and Laboratories International, Inc. (ATL), and Pacific Northwest National Laboratory, prepared this EIS in accordance with Title 10, "Energy," of the *U.S. Code of Federal Regulations* (10 CFR) Part 51, which implements the requirements of the *National Environmental Policy Act of 1969* (NEPA), as amended (Public Law 91-190). This EIS assesses the potential environmental impacts of the proposed action.



## 1.2 The Proposed Action

The proposed action considered in this EIS is for LES to construct, operate, and decommission a uranium enrichment facility (referred to as the proposed NEF) at a site near the city of Eunice in Lea County, New Mexico. LES would own the operation and be responsible for its performance. The proposed NEF property and facilities would remain the property of Lea County until they are deeded over to LES at license termination. The proposed NEF would produce enriched uranium-235 ( $^{235}\text{U}$ ) up to 5 weight percent by the gas centrifuge process. The enriched uranium would be used in commercial nuclear power plants. Uranium enrichment is a step in the nuclear fuel cycle (Figure 1-2) in which natural uranium is converted and fabricated so it can be used as nuclear fuel in commercial nuclear power plants. The proposed NEF would not alter the total amount of enriched uranium used in the U.S. nuclear fuel cycle.

Uranium ore usually contains approximately 0.72 weight percent  $^{235}\text{U}$ , and this percentage is significantly less than the 3 to 5 weight percent  $^{235}\text{U}$  enrichment required by nuclear power plants as fuel for electricity generation. Therefore, uranium must be enriched. Enrichment is the process of increasing the percentage of the naturally occurring and fissionable  $^{235}\text{U}$  isotope and decreasing the percentage of uranium-238 ( $^{238}\text{U}$ ).

The nominal production capacity of the proposed NEF would be 3 million separative work units (SWUs) per year. A SWU is a measure of enrichment in the uranium enrichment industry, and it represents the level of effort or energy required to raise the concentration of  $^{235}\text{U}$  to a specified level.

The proposed NEF would be licensed in accordance with the *Atomic Energy Act*. The license would be issued in accordance with 10 CFR Parts 30, 40, and 70. It would allow LES to possess and use special nuclear materials, source materials, and by-product materials so that the proposed NEF could process its own materials.

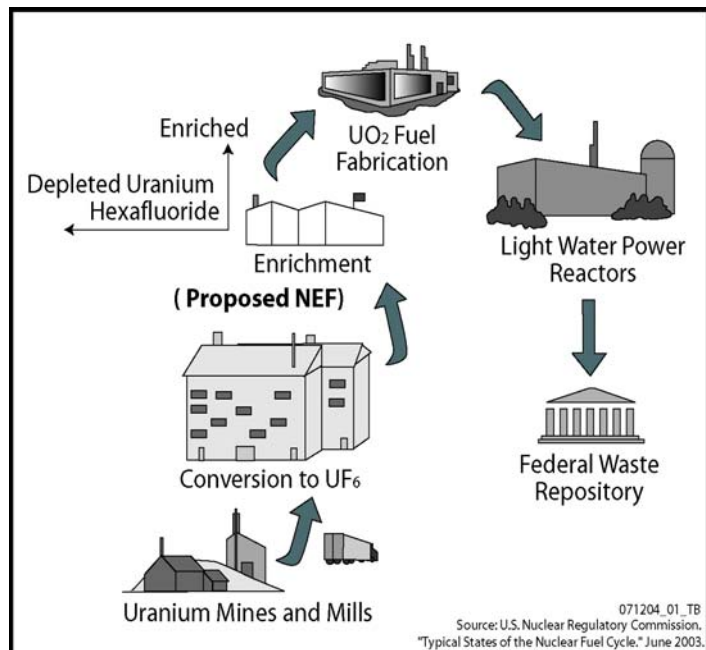


Figure 1-2 Nuclear Fuel Cycle (NRC, 2003a)

## 1.3 Purpose and Need for the Proposed Action

The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of enrichment services. The proposed NEF would contribute to the attainment of the national energy security policy objectives. The Administration's energy policy, which was released in May 2001, called the expansion of nuclear energy dependence "a major component of our national energy policy" (NEP, 2001).

### 1.3.1 Background

Nuclear power plants are currently supplying approximately 20 percent of the Nation's electricity requirements (EIA, 2003a). Of the 11.5 million SWUs that were purchased by U.S. nuclear reactors in

2002, only about 1.7 million SWUs—or 15 percent—were provided by enrichment plants located in the United States (EIA, 2003b). In 2003, the domestic enrichment facilities provided 14 percent of the total 12 million SWUs purchased (EIA, 2004a).

Over the past 50 years, several uranium enrichment facilities have been used in the United States, including the gaseous diffusion plants near Portsmouth, Ohio (herein referred to as the Portsmouth Gaseous Diffusion Plant), and Paducah, Kentucky (herein referred to as the Paducah Gaseous Diffusion Plant). Both plants are operated by the United States Enrichment Corporation (USEC); only the Paducah Gaseous Diffusion Plant currently remains in operation (USEC, 2003). The end of enriched uranium production at the Portsmouth Gaseous Diffusion Plant in May 2001 has led to reliability risks of U.S. domestic enrichment supply capability. In addition, the Highly Enriched Uranium Agreement deliveries<sup>1</sup> provide for additional U.S. enrichment product. This Agreement is scheduled to expire in 2013. A supply disruption associated with the Paducah Gaseous Diffusion Plant production or the Highly Enriched Uranium Agreement deliveries could impact national energy security because domestic commercial reactors would be fully dependent on foreign sources for enrichment services. Moreover, U.S. Department of Energy (DOE) anticipates “the inevitable cessation of all domestic gaseous diffusion enrichment operations” due to the higher cost of operating diffusion facilities like the Paducah Gaseous Diffusion Plant relative to operating centrifuge facilities (DOE, 2001).

In a 2002 letter to the NRC, the DOE indicated that, since 2000, domestic uranium enrichment had fallen from a capacity greater than domestic demand to a level that was less than half of domestic requirements (DOE, 2002). In this letter, DOE:

- Referenced those interagency discussions led by the National Security Council where there was a clear determination that the United States should maintain a viable and competitive domestic uranium enrichment industry for the foreseeable future.
- Estimated that 80 percent of projected demand for nuclear power in 2020 could be fueled from foreign sources.
- Noted the importance of promoting the development of additional domestic enrichment capacity to maintain a viable and competitive domestic uranium enrichment industry for the foreseeable future.
- Noted that there was sufficient domestic demand to support multiple uranium enrichment facilities and that competition is important to maintain a healthy industry, and encouraged the private sector to invest in new uranium enrichment capacity.
- Indicated its support for the deployment of Urenco gas centrifuge technology in the U.S. market by expressing its support for Urenco to partner with a U.S. company or companies, transferring Urenco’s technology to new U.S. commercial uranium enrichment facilities.

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<sup>1</sup> The United States Enrichment Corporation (USEC) implements the 1993 government-to-government agreement between the United States and Russia that calls for Russia to convert 500 metric tons (550 tons) of highly enriched uranium from dismantled nuclear warheads into low-enriched uranium. This is the equivalent of about 20,000 nuclear warheads. USEC purchases the enriched portion of the blended-down material and sells it to its electric utility customers for fuel in their commercial nuclear power plants. This Agreement is also known as Megatons to Megawatts (USEC, 2004a).

### 1.3.2 Domestic Demand and Supply

Forecasts of installed nuclear-generating capacity suggest a continuing demand for uranium enrichment services both in the United States and abroad. Table 1-1 shows the uranium enrichment requirements in the United States for the next two decades as forecasted by LES (LES, 2005a) and the Energy Information Administration (EIA, 2003b). These two forecasts of uranium enrichment requirements were generally consistent. However, LES projections were adjusted for plutonium recycled in the mixed oxide fuel that would use plutonium oxide and uranium oxide mixture as fuel. DOE is planning to convert approximately 34 metric tons (37.5 tons) of surplus plutonium from nuclear weapons into a nuclear fuel comprised of a mixture of plutonium and uranium oxides, called MOX fuel, for use in selected commercial nuclear power plants (NRC, 2003b). Therefore, LES projections tended to be slightly lower than the Energy Information Administration forecast. Annual enrichment services requirements in the United States are forecasted to be 11.4 to 14.2 million SWUs in 2025. The two forecasts indicate a need for additional uranium enrichment capability to ensure national energy security.

**Table 1-1 Projected Uranium Enrichment Demand in the United States for 2002–2025 in Million SWUs**

Year	LES Projections <sup>a</sup>	EIA Projections <sup>b</sup>
2002	11.5	11.5 (actual) <sup>c</sup>
2005	11.6	14.6
2010	11.8	12.9
2015	11.4	15.4
2020	11.4	13.5
2025	Not Provided	14.2

EIA - Energy Information Agency.

SWU - Separative Work Unit.

<sup>a</sup> LES, 2005a.

<sup>b</sup> EIA, 2003b.

<sup>c</sup> EIA, 2003c.

The domestic enrichment services would be used in the production of nuclear fuel for commercial nuclear power reactors. By 2020, the United States would need about 393 gigawatts (393,000 megawatts) of new generating capacity (DOE, 2003). Installed nuclear-generating capacity in the United States is projected to increase from approximately 98 gigawatts (98,000 megawatts) in 2001 to about 103 gigawatts (103,000 megawatts) in 2025. This increase includes the uprating of existing plants equivalent to 3.9 gigawatts (3,900 megawatts) of new capacity (EIA, 2004b). This projection, including uprates, would increase U.S. nuclear capacity by more than 5 gigawatts (5,000 megawatts), the equivalent of adding about five large nuclear power reactors. As of July 2004, the NRC has granted 101 uprates (NRC, 2004a). In addition, domestic nuclear facilities reported a record high median 3-year design electrical rating capacity factor of 89.66 percent for the period 2001–2003 as compared to 70.78 percent for the period 1989–1991 (Blake, 2004).

By combining the production of enriched uranium from its domestic enrichment facilities and the downblending of foreign highly enriched uranium, USEC can provide for approximately 56 percent of the U.S. enrichment market needs (USEC, 2004b) while foreign suppliers provide the remaining 44 percent. These enrichment supplies encompass the enrichment products from its enrichment operation at the energy-intensive Paducah Gaseous Diffusion Plant (USEC, 2004a; NRC, 2004a) and the Highly Enriched Uranium Agreement deliveries from Russia, which expires in 2013 (USEC, 2002; USEC, 2004c). The current trend for domestic enrichment services is to develop more efficient, modern, and less

#### ***How Much Is a Megawatt?***

*One megawatt roughly provides enough electricity for the demand of 400–900 homes. The actual number is based on the season, time of day, region of the country, power plant capacity factors, and other factors.*

*Source: Bellemare, 2003.*

costly means to operate enrichment facilities. The gas centrifuge technology for uranium enrichment is known to be more efficient and require less energy to operate than the gaseous diffusion technology currently in use in the United States (NRC, 2004b). On January 12, 2004, USEC announced plans to build and operate a uranium enrichment plant (known as the American Centrifuge Plant) in Piketon, Ohio. This plant would cost up to \$1.5 billion, employ up to 500 people, and reach an initial annual production level of 3.5 million SWUs by 2010 (USEC, 2004b).

Purchasers of enrichment services view diversity and security of supply as vital from a commercial perspective (LES, 2005a). The proposed NEF would supplement the domestic sources of enrichment services provided by USEC's Paducah Gaseous Diffusion Plant and the proposed American Centrifuge Plant. Beginning production in 2008 and achieving full production output by 2013, the proposed NEF would provide roughly 25 percent of the current and projected U.S. enrichment services demand (EIA, 2004a; EIA, 2003b).

### **1.3.3 Global Supply and Demand**

An exclusive focus on domestic supply and demand projections clearly indicates a need for the proposed NEF, but global projections also provide context for assessing the significance of any potential domestic supply shortfall. Global enrichment forecasts indicate that international supply and demand will be in very close balance after 2010 (LES, 2005a; Grigoriev, 2002; NUKEM, 2002; DOE, 2001; Combs, 2004). Enrichment demand forecasts are based on global nuclear generation capacity forecasts and the Energy Information Administration has increased its forecast for 2020 world nuclear generation capacity by about five percent (EIA, 2004c), indicating that earlier enrichment demand forecasts were conservative. Enrichment supply forecasts reflect current sources of enrichment services, the anticipated loss of supply from diffusion technology facilities like the Paducah Gaseous Diffusion Plant, new supply from the proposed NEF and the proposed American Centrifuge Plant, and continuation of current levels of supply from the Russian high enriched uranium agreement. The current Russian high enriched uranium agreement expires in 2013 and while an extension of that agreement through 2020 is a reasonable assumption, any reduction in Russian high enriched uranium supply after 2013 could shift the close balance after 2010 to a supply shortfall. The U.S. market would be especially vulnerable to any unforeseen global supply shortfall if the Paducah Gaseous Diffusion Plant closes, as expected, without an offsetting increase in supply from the combined output of the proposed American Centrifuge Plant and the proposed NEF.

### **1.4 Scope of the Environmental Analysis**

To fulfill its responsibilities under NEPA, the NRC has prepared this EIS to analyze the environmental impacts of the LES proposal as well as reasonable alternatives to the proposed action. The scope of this EIS includes consideration of both radiological and nonradiological (including chemical) impacts associated with the proposed action and the reasonable alternatives. The EIS also addresses the potential environmental impacts relevant to transportation.

This EIS addresses cumulative impacts to physical, biological, economic, and social parameters. In addition, this EIS identifies resource uses, monitoring, potential mitigation measures, unavoidable adverse environmental impacts, the relationship between short-term uses of the environment and long-term productivity, and irreversible and irretrievable commitments of resources.

The development of this EIS is the result of the NRC staff's review of the LES license application and the Environmental Report. This review has been closely coordinated with the development of the Safety

Evaluation Report (SER) prepared by the NRC to evaluate, among other aspects, the health, safety, and security impacts of the proposed action. The SER is the outcome of the NRC safety review of the LES license application and Safety Analysis Report.

#### **1.4.1 Scoping Process and Public Participation Activities**

The NRC regulations in 10 CFR Part 51 contain requirements for conducting a scoping process prior to the preparation of an EIS. Scoping was used to help identify those issues to be discussed in detail and those issues that are either beyond the scope of this EIS or are not directly relevant to the assessment of potential impacts from the proposed action.

On February 4, 2004, the NRC published in the *Federal Register* (69 FR 5374) a Notice of Intent to prepare an EIS for the construction, operation, and decommissioning of the proposed NEF and to conduct the scoping process for the EIS. The Notice of Intent set forth in Appendix A summarized the NRC's plans to prepare the EIS and presented background information on the proposed NEF. For the scoping process, the Notice of Intent invited comments on the proposed action and announced a public scoping meeting to be held concerning the project.

On March 4, 2004, the NRC staff and its consultants, ATL and Pacific Northwest National Laboratory, toured the proposed site and held a scoping meeting in Eunice, New Mexico. During the scoping meeting, a number of individuals offered oral and written comments and suggestions to the NRC concerning the proposed NEF and the development of the EIS. In addition, the NRC received written comments from various individuals during the public scoping period that ended on March 18, 2004. The NRC carefully reviewed and identified individual comments (both oral and written). These comments were then consolidated and categorized by topical areas.

After the scoping period, the NRC distributed the *Scoping Summary Report: Proposed Louisiana Energy Services National Enrichment Facility, Lea County, New Mexico* (Appendix A) in April 2004. The *Scoping Summary Report* identified categories of issues to be analyzed in detail and issues beyond the scope of the EIS.

#### ***The NRC Environmental and Safety Reviews***

*The focus of an Environmental Impact Statement (EIS) is a presentation of the environmental impacts of the proposed action.*

*In addition to meeting its responsibilities under the National Environmental Policy Act (NEPA), the NRC prepares a Safety Evaluation Report (SER) to analyze the safety of the proposed action and assess its compliance with applicable NRC regulations.*

*The safety and environmental reviews are conducted in parallel. Although there is some overlap between the content of a SER and an EIS, the intent of the documents is different.*

*To aid in the decision process, the EIS provides a summary of the more detailed analyses included in the SER. For example, the EIS does not address how accidents are prevented; rather, it addresses the environmental impacts that could result should an accident occur.*

*Much of the information describing the affected environment in the EIS also is applicable to the SER (e.g., demographics, geology, and meteorology).*

*Source: NRC, 2002; NRC, 2003c.*

### **1.4.2 Issues Studied in Detail**

As stated in the Notice of Intent, the NRC identified issues to be studied in detail as they relate to implementation of the proposed action. The public identified additional issues during the subsequent public scoping process. All the issues that have been identified by the NRC and the public could have short- or long-term impacts from the potential construction and operation of the proposed NEF. These issues are:

- Public and worker health.
- Need for the facility.
- Alternatives.
- Waste management.
- Depleted uranium disposition.
- Water resources.
- Geology and soils.
- Compliance with applicable regulations.
- Air quality.
- Transportation.
- Accidents.
- Land use.
- Socioeconomic impacts.
- Noise.
- Visual and scenic resources.
- Costs and benefits.
- Environmental justice.
- Cultural resources.
- Resource commitments.
- Ecological resources.
- Decommissioning.
- Cumulative impacts.

### **1.4.3 Issues Eliminated from Detailed Study**

The NRC has determined that detailed analysis for mineral resources was not necessary because there are no known nonpetroleum mineral resources at the proposed site that would be affected by any of the alternatives being considered. In addition, detailed analysis of the impact of the proposed NEF on connected actions that include the overall nuclear fuel cycle activities were not considered. The proposed NEF would not measurably affect the mining and milling operations and the demand for enriched uranium. The amount of mining and milling is dependent upon the stability of market prices for uranium balanced with the concern of environmental impacts associated with such operations (NRC, 1980). The demand for enriched uranium in the United States is primarily driven by the number of commercial nuclear power plants and their operation. The proposed NEF will only result in the creation of new transportation routes within the fuel cycle to and from the enrichment facility. The existing transportation routes between the other facilities are not expected to be altered. Because the environmental impacts of all of the transportation routes other than those to and from the proposed NEF have been previously analyzed, they are eliminated from further study (NRC, 1977; NRC, 1980).

### **1.4.4 Issues Outside the Scope of the EIS**

The following issues were identified in the scoping process to be outside the scope of the EIS:

- Nonproliferation.
- Security and safety.
- Terrorism.
- Credibility.

A summary of the scoping process is contained in Appendix A.

#### **1.4.5 Comments on the Draft EIS**

The NRC staff issued a Draft EIS for public review and comment on September 17, 2004 (see 69 FR 56104-56105). The public comment period on the Draft EIS began at that time. During the public comment period, the NRC staff held a public meeting in Eunice, New Mexico, on October 14, 2004. The NRC published notice of this meeting in the *Federal Register* (69 FR 56104-56105, September 17, 2004), on its web site, and in local newspapers. Approximately 60 people provided oral comments at the public meeting. A certified court reporter recorded the oral comments and prepared written transcripts. The transcripts of the public meetings are part of the public record for the proposed project and were used in developing the comment summaries contained in Appendix I. In addition to oral comments received at the public meetings, the NRC staff received written comments, letters, facsimile transmittals, and e-mails regarding the Draft EIS and associated issues over the period for comments.

The NRC staff extended the public comment period that was to end on November 6, 2004, to January 7, 2005 (69 FR 64983 and 69 FR 76485). The extension of the public comment period was enacted due to the restriction of public access of the NRC's Agencywide Documents Access and Management System (ADAMS) database accessible through the NRC's web site.

A summary of the comments and responses is included in Appendix I. The written comments and transcripts are reproduced in Appendix J. In addition to the issues identified during the scoping process for the Draft EIS (see section 1.4.1), the comments received during the public comment period identified concerns about potential impacts to water resources, accidents and risks, the conversion of the resulting depleted uranium hexafluoride (DUF<sub>6</sub>), the proper disposal of depleted uranium, and transportation risks and impacts. As presented in section 1.4.4, issues that are related to safety and security (e.g., terrorism) and nonproliferation are not part of the scope of the EIS. Other safety issues are addressed in the NRC's SER.

#### **1.4.6 Changes from the Draft EIS**

This EIS reflects modifications to the Draft EIS that were made in response to:

- New information received regarding water resources near the proposed NEF, the local infrastructure and support services, transportation, and waste management options for disposal of the DUF<sub>6</sub>.
- Corrections to the Draft EIS.
- Public comments received on the Draft EIS.

#### **1.4.7 Public Hearing**

By law, a license to construct and operate the proposed NEF cannot be issued until completion of a hearing before the NRC's Atomic Safety and Licensing Board. Notice of the hearing, including guidance on certain aspects, was provided by the Commission in a notice published in the *Federal Register* on February 6, 2004. Thereafter, a Licensing Board comprised of three administrative judges was established to conduct the hearing. Three parties have been permitted to intervene in the proceeding: Nuclear Information and Resource Services and Public Citizen, the New Mexico Attorney General, and the New Mexico Environment Department. These parties have advanced contentions which are under consideration by the Licensing Board. From February 7 to 10, 2005, the Licensing Board conducted an evidentiary hearing on contentions relating to the Draft EIS. Based on the evidence presented, the Licensing Board issued a Partial Initial Decision on June 8, 2005, resolving the contentions in favor of the

Staff and/or LES and upholding the adequacy of the Draft EIS. Additional evidentiary hearings are expected to be conducted in order to consider other admitted contentions. In addition, the Licensing Board will conduct a mandatory hearing. Following completion of these hearings, the Licensing Board will issue a final decision as to whether the requested license should be issued. The evidence submitted during the hearing and the decisions of the Licensing Board are publically available except to the extent that they contain proprietary information.

#### **1.4.8 Redaction**

The NRC has a duty to balance the need for public disclosure of relevant information with the need to protect sensitive information that could, in the wrong hands, pose a danger to the public. To address security concerns about information that could be used to undermine the safety of operations at the proposed NEF, the NRC redacted certain information from the Draft EIS. The NRC made a redacted version of the Draft EIS available to the public in December 2004, replacing the original Draft EIS on its project-specific web site and in ADAMS. Thereafter, in the interest of providing full public disclosure, the unredacted version was placed on the web site and in ADAMS.

#### **1.4.9 Related NEPA and Other Relevant Documents**

The following NEPA documents were reviewed as part of the development of this EIS to obtain information related to the issues raised.

- *National Enrichment Facility Environmental Report, Revision 4, Louisiana Energy Services, NRC Docket No. 70-3103, April 2005.* This report was developed by LES as part of its license application to assess the environmental impacts associated with the proposed NEF.
- *Final Environmental Impact Statement for the Construction and Operation of Claiborne Enrichment Center, Homer, Louisiana. NUREG-1484, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, August 1994.* This EIS was developed to analyze the environmental consequences for the construction, operation, and decommissioning of a uranium enrichment facility in Claiborne, Louisiana, by LES. The proposed facility, which was never constructed, was based on a similar technology to that proposed for Lea County, New Mexico. Due to the similarities in technology and facilities, the impacts resulting from implementing the proposed action in Lea County could be compared to those estimated for the Claiborne facility.
- *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride. DOE/EIS-0269, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, April 1999.* This EIS analyzes strategies for the long-term management of the DUF<sub>6</sub> inventory currently stored at three DOE sites near Paducah, Kentucky; Portsmouth, Ohio; and Oak Ridge, Tennessee. This EIS also analyzes the potential environmental consequences of implementing each alternative strategy for the period from 1999 through 2039. The results presented in this EIS are relevant to the management, use, and potential impacts associated with the DUF<sub>6</sub> that would be generated at the proposed NEF.
- *Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Paducah, Kentucky, Site. DOE/EIS-0359, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June 2004.* This site-specific EIS considers the construction, operation, maintenance, and decommissioning of the proposed DUF<sub>6</sub> conversion facility at three locations within the Paducah, Kentucky, site, which is a DOE facility; transportation of DUF<sub>6</sub> conversion products and waste materials to a disposal facility;



transportation and sale of the hydrogen fluoride produced as a conversion co-product; and neutralization of hydrogen fluoride to calcium fluoride and its sale or disposal in the event that the hydrogen fluoride product is not sold. The results presented in this EIS are relevant to the management, use, and potential impacts associated with the DUF<sub>6</sub> that would be generated at the proposed NEF.

- *Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio, Site. DOE/EIS-0360, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June 2004.* This site-specific EIS analyzes the construction, operation, maintenance, and decommissioning of the proposed DUF<sub>6</sub> conversion facility at three alternative locations within the Portsmouth, Ohio, site; transportation of all cylinders (DUF<sub>6</sub>, enriched uranium, and empty) currently stored at the East Tennessee Technology Park near Oak Ridge, Tennessee, to Portsmouth; construction of a new cylinder storage yard at Portsmouth (if required) for cylinders from the East Tennessee Technology Park; transportation of DUF<sub>6</sub> conversion products and waste materials to a disposal facility; transportation and sale of the hydrogen fluoride produced as a conversion co-product; and neutralization of hydrogen fluoride to calcium fluoride and its sale or disposal in the event that the hydrogen fluoride product is not sold. The results presented in this EIS are relevant to the management, use, and potential impacts associated with the DUF<sub>6</sub> that would be generated at the proposed NEF.
- *Environmental Assessment: Disposition of Russian Federation Titled Natural Uranium. DOE/EA-1290, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, June 1999.* This Environmental Assessment analyzed the environmental impacts of transporting natural UF<sub>6</sub> from the gaseous diffusion plants to the Russian Federation. Only domestic transportation by rail and truck were considered. The Environmental Assessment addresses both incident-free transportation and transportation accidents. The results presented in this Environmental Assessment are relevant to the transportation of UF<sub>6</sub> for the proposed NEF.

## **1.5 Applicable Regulatory Requirements**

This section provides a summary assessment of major environmental requirements, agreements, Executive Orders, and permits relevant to the construction, operation, and decommissioning of the proposed NEF.

### **1.5.1 Federal Laws and Regulations**

#### **1.5.1.1 National Environmental Policy Act of 1969, as amended (42 U.S.C. § 4321 et seq.)**

NEPA establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment to ensure for all Americans a safe, healthful, productive, and aesthetically and culturally pleasing environment. NEPA provides a process for implementing these specific goals within the Federal agencies responsible for the action. This EIS has been prepared in accordance with NEPA requirements and NRC regulations (10 CFR Part 51) for implementing NEPA.

#### **1.5.1.2 Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 et seq.)**

The *Atomic Energy Act*, as amended, and the *Energy Reorganization Act of 1974* (42 U.S.C. § 5801 et seq.) give the NRC the licensing and regulatory authority for nuclear energy uses within the commercial sector. If the license application for the proposed NEF is approved, the NRC would license and regulate the possession, use, storage, and transfer of byproduct, source, and special nuclear materials to protect public health and safety as stipulated in 10 CFR Parts 30, 40, and 70.

#### **1.5.1.3 Clean Air Act, as amended (42 U.S.C. § 7401 et seq.)**

The *Clean Air Act* establishes regulations to ensure air quality and authorizes individual States to manage permits. The *Clean Air Act*: (1) requires the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards as necessary to protect the public health, with an adequate margin of safety, from any known or anticipated adverse effects of a regulated pollutant (42 U.S.C. § 7409 et seq.); (2) requires establishment of national standards of performance for new or modified stationary sources of atmospheric pollutants (42 U.S.C. § 7411); (3) requires specific emission increases to be evaluated so as to prevent a significant deterioration in air quality (42 U.S.C. § 7470 et seq.); and (4) requires specific standards for releases of hazardous air pollutants (including radionuclides) (42 U.S.C. § 7412). These standards are implemented through plans developed by each State with EPA approval. The *Clean Air Act* requires sources to meet air-quality standards and obtain permits to satisfy those standards.

#### **1.5.1.4 Clean Water Act, as amended (33 U.S.C. § 1251 et seq.)**

The *Clean Water Act* requires the EPA to set national effluent limitations and water-quality standards, and establishes a regulatory program for enforcement. Specifically, Section 402(a) of the Act establishes water-quality standards for contaminants in surface waters. The *Clean Water Act* requires a National Pollutant Discharge Elimination System (NPDES) permit before discharging any point source pollutant into U.S. waters. EPA Region 6 administers this program with an oversight review by the New Mexico Environment Department Water Quality Bureau. The NPDES General Permit for Industrial Stormwater is required for point source discharge of stormwater runoff from industrial or commercial facilities to State waters. Construction of the proposed NEF would require an NPDES Construction Stormwater General Permit from EPA Region 6 and an oversight review by the New Mexico Environment Department Water Quality Bureau. Section 401(a)(1) of the *Clean Water Act* requires States to certify that the permitted discharge would comply with all limitations necessary to meet established State water-quality standards, treatment standards, or schedule of compliance.

In April 2004, the State of New Mexico began the process of assuming NPDES permitting responsibilities within the State (NMED, 2004a). Jurisdiction would be transferred from EPA Region 6 to the New Mexico Environment Department Surface Water Quality Bureau. The transfer could occur by early 2007 after which State implementation of NPDES permitting would be phased in over a five-year period (NMED, 2004b).

#### **1.5.1.5 Resource Conservation and Recovery Act, as amended (42 U.S.C. § 6901 et seq.)**

The *Resource Conservation and Recovery Act* (RCRA) requires the EPA to define and identify hazardous waste; establish standards for its transportation, treatment, storage, and disposal; and require permits for persons engaged in hazardous waste activities. Section 3006 of the RCRA (42 U.S.C. § 6926) allows States to establish and administer these permit programs with EPA approval. EPA Region 6 has delegated regulatory jurisdiction to the New Mexico Environment Department Hazardous Waste Bureau for nearly all aspects of permitting as required by the *New Mexico Hazardous Waste Act*. The EPA regulations

implementing the RCRA are found in 40 CFR Parts 260 through 283. Regulations imposed on a generator or on a treatment, storage, and/or disposal facility vary according to the type and quantity of material or waste generated, treated, stored, and/or disposed. The method of treatment, storage, and/or disposal also impacts the extent and complexity of the requirements. The proposed NEF would generate small quantities of hazardous waste that are expected to be not greater than 100 kilograms (220 pounds) per month. There would be no plans to store these wastes in excess of 90 days; thus, the proposed NEF would qualify as a small quantity hazardous waste generator in accordance with Section 20.4.1 of the *New Mexico Administrative Code* and RCRA requirements.

#### **1.5.1.6 *Low-Level Radioactive Waste Policy Act of 1980, as amended (42 U.S.C. § 2021 et seq.)***

The *Low-Level Radioactive Waste Policy Act of 1980* amended the *Atomic Energy Act* to specify that the Federal Government is responsible for disposal of low-level radioactive waste generated by its activities and that States are responsible for disposal of other low-level radioactive waste. The *Low-Level Radioactive Waste Policy Act of 1980* provides for and encourages interstate compacts to carry out the State responsibilities. Low-level radioactive waste would be generated from activities conducted from the proposed NEF. The State of New Mexico is a member of the Rocky Mountain compact.

#### **1.5.1.7 *Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. § 11001 et seq.) (also known as SARA Title III)***

The *Emergency Planning and Community Right-to-Know Act of 1986*, which is the major amendment to the *Comprehensive Environmental Response, Compensation, and Liability Act* (42 U.S.C. § 9601), establishes the requirements for Federal, State, and local governments; Indian tribes; and industry regarding emergency planning and “Community Right-to-Know” reporting on hazardous and toxic chemicals. The “Community Right-to-Know” provisions increase the public’s knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities working with facilities can use the information to improve chemical safety and protect public health and the environment. This Act requires emergency planning and notice to communities and government agencies concerning the presence and release of specific chemicals. The EPA implements this Act under regulations found in 40 CFR Parts 355, 370, and 372. This Act would require the proposed NEF to report on hazardous and toxic chemicals used and produced at the facility, and to establish emergency planning procedures in coordination with the local communities and government agencies.

#### **1.5.1.8 *Safe Drinking Water Act, as amended (42 U.S.C. § 300f et seq.)***

The *Safe Drinking Water Act* was enacted to protect the quality of public water supplies and sources of drinking water. The New Mexico Environment Department Drinking Water Bureau, under 42 U.S.C. § 300g-2 of the Act, established standards applicable to public water systems. These regulations include maximum contaminant levels (including those for radioactivity) in public water systems. Other programs established by the *Safe Drinking Water Act* include the Sole Source Aquifer Program, the Wellhead Protection Program, and the Underground Injection Control Program. In addition, the Act provides underground sources of drinking water with protection from contaminated releases and spills (for example, implementing a Spill Prevention Control and Countermeasure Plan). The proposed NEF would not use onsite groundwater or surface water supplies and would obtain potable water from nearby municipal water supply systems (i.e., the cities of Eunice and Hobbs, New Mexico). The proposed NEF is required to obtain a Groundwater Discharge Permit/Plan for the septic systems from the New Mexico Environment Department Groundwater Quality Bureau to comply with this Act.

**1.5.1.9 *Noise Control Act of 1972, as amended (42 U.S.C. § 4901 et seq.)***

The *Noise Control Act* delegates the responsibility of noise control to State and local governments. Commercial facilities are required to comply with Federal, State, interstate, and local requirements regarding noise control. The proposed NEF is located in Lea County, which does not have a noise control ordinance.

**1.5.1.10 *National Historic Preservation Act of 1966, as amended (16 U.S.C. § 470 et seq.)***

The *National Historic Preservation Act* (NHPA) was enacted to create a national historic preservation program, including the National Register of Historic Places and the Advisory Council on Historic Preservation. Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties. The Advisory Council on Historic Preservation regulations implementing Section 106, found in 36 CFR Part 800, were revised and became effective on August 5, 2004 (ACHP, 2004). These regulations call for public involvement in the Section 106 consultation process, including Indian tribes and other interested members of the public, as applicable. The NRC staff has initiated the Section 106 consultation process addressing the potential archaeological sites that have been identified on the proposed NEF site (see section 1.5.6.2 and Appendix B).

**1.5.1.11 *Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 et seq.)***

The *Endangered Species Act* was enacted to prevent the further decline of endangered and threatened species and to restore those species and their critical habitats. Section 7 of the Act requires consultation with either or both the U.S. Fish and Wildlife Service (FWS) of the U.S. Department of the Interior and the National Marine Fisheries Service of the U.S. Department of Commerce to determine whether endangered and threatened species or their critical habitats are known to be in the vicinity of the proposed action. The NRC has completed the consultation process with the FWS for the proposed NEF (see section 1.5.6.1 and Appendix B).

**1.5.1.12 *Occupational Safety and Health Act of 1970, as amended (29 U.S.C. § 651 et seq.)***

The *Occupational Safety and Health Act* establishes standards to enhance safe and healthy working conditions in places of employment throughout the United States. The Act is administered and enforced by the Occupational Safety and Health Administration (OSHA), a U.S. Department of Labor agency. The identification, classification, and regulation of potential occupational carcinogens are found in 29 CFR § 1910.101, while the standards pertaining to hazardous materials are listed in 29 CFR § 1910.120. The OSHA regulates mitigation requirements and mandates proper training and equipment for workers. The proposed NEF would be required to comply with the requirements of these regulations.

**1.5.1.13 *Hazardous Materials Transportation Act (49 U.S.C. § 1801 et seq.)***

The *Hazardous Materials Transportation Act* regulates transportation of hazardous material (including radioactive material) in and between States. According to the Act, States may regulate the transport of hazardous material as long as they are consistent with the Act or the U.S. Department of Transportation regulations provided in 49 CFR Parts 171-177. Title 49 CFR Part 173, Subpart I contains other regulations regarding packaging for transportation of radionuclides. Transportation of the depleted uranium cylinders from the proposed NEF would require compliance with the U.S. Department of Transportation regulations.

#### **1.5.1.14 Environmental Standards for Uranium Fuel Cycle (40 CFR Part 190, Subpart B)**

These regulations establish the maximum doses to the body or organs resulting from operational normal releases received by members of the public. These regulations were promulgated under the authority of the *Atomic Energy Act* of 1954, as amended. The proposed NEF would be required to comply with these regulations for its releases due to normal operations.

#### **1.5.2 Applicable Executive Orders**

- *Executive Order 11988* (Floodplain Management) directs Federal agencies to establish procedures to ensure that the potential effects of flood hazards and floodplain management are considered for any action undertaken in a floodplain and that floodplain impacts be avoided to the extent practicable.
- *Executive Order 12898* (Environmental Justice) requires Federal agencies to address environmental justice in minority populations and low-income populations (59 FR 7629), and directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse health or environmental effects of their programs, policies, and activities on minority populations and low-income populations.

#### **1.5.3 Applicable State of New Mexico Laws and Regulations**

Certain environmental requirements, including some discussed earlier, have been delegated to State authorities for implementation, enforcement, or oversight. Table 1-2 provides a list of applicable State of New Mexico laws, regulations, and agreements.

#### **1.5.4 Permit and Approval Status**

Several construction and operating permit applications would be prepared and submitted, and regulator approval and/or permits would be received prior to construction or facility operation. Table 1-3 lists the required Federal and State permits and their status.

**Table 1-2 Applicable State of New Mexico Laws, Regulations, and Agreements**

<b>Law/Regulation/Agreement</b>	<b>Citation</b>	<b>Requirements</b>
<i>New Mexico Air Quality Control Act</i>	NMSA, Chapter 74, “Environmental Improvement”, Article 2, “Air Pollution”, and implementing regulations in NMAC Title 20, Environmental Protection, Chapter 2, “Air Quality”	Establishes air-quality standards and requires a permit prior to construction or modification of an air-contaminant source. Also, requires an operating permit for major producers of air pollutants and imposes emission standards for hazardous air pollutants.
<i>New Mexico Radiation Protection Act</i>	NMSA, Chapter 74, Article 3, “Radiation Control”	Establishes State requirements for worker protection.
<i>New Mexico Water Quality Act</i>	NMSA, Chapter 74, Article 6, Water Quality, and implementing regulations found in NMAC Title 20, Chapter 6, “Water Quality”	Establishes water-quality standards and applies to permitting prior to construction, during operation, closure, post-closure, and abatement, if necessary. Also, all monitoring wells would require a permit from the New Mexico Office of the State Engineer.
<i>New Mexico Groundwater Protection Act</i>	NMSA, Chapter 74, Article 6B, “Groundwater Protection”	Establishes State standards for protection of groundwater from leaking underground storage tanks.
<i>New Mexico Solid Waste Act</i>	NMSA, Chapter 74, Article 9, <i>Solid Waste Act</i> , and implementing regulations found in NMAC Title 20, Environmental Protection, Chapter 9, “Solid Waste”	Establishes State standards for the management of solid wastes.
<i>New Mexico Hazardous Waste Act</i>	NMSA, Chapter 74, Article 4, Hazardous Waste, and implementing regulations found in NMAC Title 20, Environmental Protection, Chapter 4, “Hazardous Waste”	Establishes State standards for the management of hazardous wastes.
<i>New Mexico Hazardous Chemicals Information Act</i>	NMSA, Chapter 4, Article 4E-1, Hazardous Chemicals Information	Implements the hazardous chemicals information and toxic release reporting requirements of the <i>Emergency Planning and Community Right-to-Know Act of 1986</i> (SARA Title III) for covered facilities.

<b>Law/Regulation/Agreement</b>	<b>Citation</b>	<b>Requirements</b>
<i>New Mexico Wildlife Conservation Act</i>	NMSA, Chapter 17, Game and Fish, Article 2, Hunting and Fishing Regulations, Part 3, <i>Wildlife Conservation Act</i>	Requires a permit and coordination if a project may disturb habitat or otherwise affect threatened or endangered species.
<i>New Mexico Raptor Protection Act</i>	NMSA, Chapter 17, Articles 2–14	Makes it unlawful to take, attempt to take, possess, trap, ensnare, injure, maim, or destroy any species of hawks, owls, and vultures.
<i>New Mexico Endangered Plant Species Act</i>	NMSA, Chapter 75, Miscellaneous Natural Resource Matters, Article 6, Endangered Plants	Requires coordination with the State if a proposed project affects an endangered plant species.
<i>Threatened and Endangered Species of New Mexico</i>	NMSA Title 19, Natural Resources and Wildlife, Chapter 33, Endangered and Threatened Species 19.33.6.8	Establishes the list of threatened and endangered wildlife species.
<i>Endangered Plant Species</i>	NMAC Title 19, Chapter 21, Endangered Plants	Establishes endangered plant species list and rules for collection.
<i>Transportation and Highway</i>	NMAC Chapter 18, Title 31, Part 6, State Highway Access Management Requirements	Establishes state highway access management requirements that will protect the functional integrity of, and investment in, the state highway system.
<i>State Trust Lands Land Exchanges</i>	NMAC Title 19, Chapter 21, Natural Resources and Wildlife	Establishes State standards and procedures for exchanges of lands held in trust, including consideration of cultural and natural resources and wildlife.
<i>New Mexico Cultural Properties Act</i>	NMSA, Chapter 18, Libraries and Museums, Article 6, Cultural Properties	Establishes State Historic Preservation Office and requirements to prepare an archaeological and historic survey and consult with the State Historic Preservation Office.

NMSA - *New Mexico Statutes Annotated*

NMAC - *New Mexico Administrative Code*.

Sources: LES, 2005a; NMCPR, 2004; Conway, 2003.

**Table 1-3 Required Federal and State Permits**

<b>Requirement</b>	<b>Agency</b>	<b>Comments/Status</b>
<i>Federal</i>		
10 CFR Part 70, 10 CFR Part 40, 10 CFR Part 30	NRC	The proposed NEF license application is being reviewed.
NPDES General Permit for Industrial Stormwater	EPA Region 6 <sup>a</sup>	LES has the option of claiming “No Exposure” exclusion or filing for coverage under the Multi-Sector General Permit. A decision regarding the option is pending.
NPDES Construction Stormwater General Permit	EPA Region 6 <sup>a</sup>	LES will file for coverage under the General Construction Permit for all construction activities onsite. LES will develop a Stormwater Pollution Prevention Plan and file a Notice of Intent at least two days prior to construction commencement.
<i>State</i>		
Access Permit	NMDOT	LES and/or Lea County would coordinate to obtain approval, if necessary, for upgrading the current gravel access road and adding a second entry point from New Mexico Highway 234. The permit, if issued, would stipulate any safety enhancements necessary to the highway.
Air Construction Permit	NMED/AQB	An air construction permit is not required because proposed NEF emissions would be below Federal and State regulatory limits.
Air Operation Permit	NMED/AQB	An air operation permit is not required because proposed NEF emissions would be below Federal and State regulatory limits.
NESHAP Permit	NMED/AQB	A NESHAP permit is not required because proposed NEF emissions would be below Federal and State regulatory limits.
Groundwater Discharge Permit/Plan	NMED/WQB	LES has submitted a Groundwater Discharge Permit/Plan application to the NMED/WQB. The NMED/WQB has deemed the application administratively complete and assigned it number DP#1481. The application is undergoing WQB review. <sup>b</sup>
NPDES Industrial Stormwater	NMED/WQB <sup>a</sup>	LES has the option of claiming “No Exposure” exclusion or filing for coverage under the Multi-Sector General Permit. A decision regarding the option is pending.



<b>Requirement</b>	<b>Agency</b>	<b>Comments/Status</b>
NPDES Construction Stormwater Permit	NMED/WQB <sup>a</sup>	LES will file for coverage under the General Construction Permit for all construction activities onsite. LES will develop a Stormwater Pollution Prevention Plan and file a Notice of Intent at least two days prior to construction commencement.
Hazardous Waste Permit	NMED/HWB	LES would be classified as a small quantity generator; therefore, no hazardous waste permit would be required.
EPA Waste Activity EPA ID Number	NMED/HWB	This number is required for the storage and use of hazardous chemicals. The proposed NEF would be a small quantity generator and the number is currently in the process of being assigned.
Machine-Produced Radiation Registration (X-Ray Inspection)	NMED/RCB	Registration is required for security nondestructive inspection (x-ray) machines. The RCB has been notified that equipment would be registered, but the registration would be deferred until equipment specifications are available.
Rare, Threatened, & Endangered Species Survey Permit	NMDFG	This permit would only be required for conducting surveys of U.S. Bureau of Land Management (BLM) lands. The proposed NEF does not include BLM lands.
Right-of-Entry Permit	NMSLO	LES has obtained this permit for entry onto Section 32.
State Land Swap Arrangement	NMSLO	This arrangement requires that an environmental assessment and a cultural resources survey be conducted on lands offered for exchange. LES has evaluated different candidate properties. LES identified properties to be offered for exchange, purchased these properties, and conveyed them to Lea County for reconveyance to the NMSLO.
Class III Cultural Survey Permit	NMSHPO	LES has obtained this permit to conduct surveys on Section 32.

NPDES - National Pollutant Discharge Elimination System; EPA - U.S. Environmental Protection Agency; NESHAP - National Emission Standards for Hazardous Air Pollutants; NMDOT - New Mexico Department of Transportation; NMED/AQB - New Mexico Environment Department/Air Quality Bureau; NMED/HWB - New Mexico Environment Department/Hazardous Waste Bureau; NMED/RCB - New Mexico Environment Department/Radiological Control Bureau; NMED/WQB - New Mexico Environment Department/ Water Quality Bureau; NMDGF - New Mexico Department of Game and Fish; NMSLO - New Mexico State Land Office; NMSHPO - New Mexico State Historic Preservation Office.

<sup>a</sup> NMED could assume NPDES permitting authority from EPA Region 6 by early 2007 (NMED, 2005).

<sup>b</sup> LES would consult with the Office of the State Engineer prior to installation of future site groundwater monitoring wells and obtain any required permits (LES, 2005b).

Sources: LES, 2005a; LES, 2005b.

### **1.5.5 Cooperating Agencies**

During the scoping process, no Federal, State, or local agencies were identified as potential cooperating agencies in the preparation of this EIS.

### **1.5.6 Consultations**

As a Federal agency, the NRC is required to comply with the consultations requirements in the *Endangered Species Act of 1973*, as amended, and the *National Historic Preservation Act of 1966*, as amended.

#### **1.5.6.1 *Endangered Species Act of 1973 Consultation***

The NRC staff consulted with the U.S. Fish and Wildlife Service (FWS) to comply with the requirements of Section 7 of the *Endangered Species Act of 1973* (see Appendix B). On March 2, 2004, the NRC staff sent a letter to the FWS New Mexico Ecological Services Field Office describing the proposed action and requesting a list of threatened and endangered species and critical habitats that could potentially be affected by the proposed action. By letter dated March 26, 2004, the FWS New Mexico Field Office provided a list of threatened and endangered species, candidate species, and species of concern. The NRC staff reviewed the list, as well as the results of field surveys (see section 4.2.7), and determined that no threatened or endangered species would be affected by the proposed NEF. On August 9, 2004, the NRC notified the FWS of its conclusion of “no effect” on endangered or threatened species or critical habitat. The NRC staff has completed the consultation process.

Additionally, by letter dated February 23, 2004, the State of New Mexico Department of Game and Fish, submitted scoping comments regarding the sand dune lizard and lesser prairie chicken, both of which are candidate species under the *Endangered Species Act*. The NRC discussed the potential impacts of the proposed NEF on these species in section 4.2.7 of Chapter 4 of the EIS. The New Mexico Department of Game and Fish submitted comments on the EIS in a letter to the NRC on November 1, 2004. In this letter, the New Mexico Department of Game and Fish concurred that no significant adverse effects on the sand dune lizard or lesser prairie chicken would be expected.

#### **1.5.6.2 *National Historic Preservation Act of 1966 Section 106 Consultation***

The NRC staff has offered State agencies, Federally recognized Indian tribes, and other organizations that may be concerned with the possible effects of the proposed action on historic properties an opportunity to participate in the consultation process required by Section 106 of the *National Historic Preservation Act* (see Appendix B). The following is a list of agencies, tribes, and organizations contacted during the consultation process and a summary of the consultation performed:

##### New Mexico State Historic Preservation Office

By letter dated February 17, 2004, the NRC staff initiated the Section 106 consultation process with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO). This letter described the potentially affected area and requested the views of the SHPO on further actions required to identify historic properties that may be affected. The NRC staff submitted a copy of the Cultural Resource Inventory for the proposed NEF to the SHPO, by letter dated March 29, 2004. The Cultural Resource Inventory is required by the NHPA and 36 CFR Part 800 to locate and identify all potential prehistoric and historic properties that could be adversely affected by an undertaking. On April 7, 2004, the NRC staff met with representatives from the SHPO and the New

Mexico State Land Office to discuss the proposed NEF and the Section 106 consultation process. The SHPO responded by letter dated April 26, 2004, summarizing the meeting and providing the following suggestions:

- Enter into a Memorandum of Agreement (Agreement) that outlines agreed-upon measures that LES would undertake to mitigate the potential adverse effects of the proposed action on the historic properties located in the potentially affected area.
- Notify the Advisory Council on Historic Preservation that there would be adverse effects to cultural resources and notify and invite the Council to be a signatory to the Agreement.
- Contact Indian tribes and forward them a copy of the Cultural Resource Inventory.
- Consider several options for mitigating the adverse effects of the proposed action (see Appendix B).

By letter dated November 2, 2004, the NRC staff provided a draft Agreement and accompanying Treatment Plan to the SHPO for review and comment. The SHPO submitted comments on the Treatment Plan by letter dated November 29, 2004. Based on these comments and those received from other parties, the NRC staff provided, by letter dated February 25, 2005, a final Agreement and Treatment Plan for signature by the SHPO.

#### Federally Recognized Indian Tribes

By letter dated February 17, 2004, the NRC staff initiated the Section 106 consultation process with regional Federally recognized Indian tribes, soliciting their interest in being consulting parties in the Section 106 consultation process for the proposed project. In response to the SHPO's letter dated April 26, 2004, the NRC staff provided the Indian tribes with copies of the Cultural Resource Inventory and requested information regarding historic properties in the area of potential effects that could have cultural or religious significance to them. In addition, during the month of June, the NRC staff contacted the Indian tribes via telephone to discuss the requested information and to invite the Indian tribes to be concurring parties to the Agreement. The Mescalero Apache Tribe, by letter dated June 10, 2004, indicated the proposed NEF would not affect any sites or locations important to the tribe culture or religion. The Kiowa Tribe of Oklahoma, Comanche Tribe of Oklahoma, Mescalero Apache Tribe, and Ysleta del Sur Pueblo indicated they would like to be concurring parties to the Agreement. Subsequently, by letters dated July 6, 2004, the NRC staff provided a followup letter confirming the information provided in the above-mentioned telephone conversation or documenting attempts to contact the Mescalero Apache Tribe and the Apache Tribe of Oklahoma. As recommended by the SHPO, the NRC staff contacted Sam Cata, a Governor-appointed tribal liaison to discuss the project and determine which tribes should be contacted to comment on a treatment/mitigation plan. Project information was provided to Mr. Cata on June 4, 2004.

By letter dated November 2, 2004, the NRC staff provided a draft Agreement and accompanying Treatment Plan to the affected Indian tribes for review and comment. No comments were received from the tribes. Based on comments received from other parties, the NRC staff provided, by letter dated February 25, 2005, a final Agreement and Treatment Plan for signature by each of these Federally-recognized Indian tribes.

## Other Organizations

Additionally, in accordance with 36 CFR § 800.3(f), the NRC staff contacted a local organization, the Lea County Archaeological Society, by letter dated March 18, 2004, to solicit information on the proposed project.

## Advisory Council on Historic Preservation

By letter dated June 24, 2004, the NRC staff notified the Advisory Council on Historic Preservation that the proposed action would result in an adverse effect on cultural resources and that an Agreement would be prepared. By letter dated November 2, 2004, the NRC staff provided a draft Agreement and accompanying Treatment Plan to the Advisory Council on Historic Preservation for review and comment. By letter dated November 8, 2004, the Advisory Council on Historic Preservation notified the NRC staff that the Advisory Council on Historic Preservation did not believe that its participation in consultation to resolve adverse effects was needed. The Advisory Council on Historic Preservation also reminded the NRC staff that it needed to submit to the Advisory Council on Historic Preservation the final Agreement and related documentation at the close of the consultation process. By letter dated April 1, 2005, the NRC staff provided the Advisory Council on Historic Preservation with a copy of the final Agreement signed by representatives from each of the signatory parties.

### **1.6 Organizations Involved in the Proposed Action**

Four organizations have specific roles in the implementation of the proposed action:

- LES is the NRC license applicant. If the license is granted, LES would be the holder of an NRC license for the construction, operation, and decommissioning of the proposed NEF. LES would own the operation and be responsible for operating the proposed facility in compliance with applicable NRC regulations. LES is a Delaware limited partnership that was formed solely to provide uranium enrichment services for commercial nuclear power plants. LES has one, 100-percent-owned subsidiary operating as a limited liability company (LLC) that was formed for the purpose of purchasing industrial revenue bonds and has no organizational divisions. The LES general partners are Urenco Investments, Inc.<sup>2</sup>, and Westinghouse Enrichment Company LLC<sup>3</sup>. The limited partners<sup>4</sup>

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<sup>2</sup> Urenco Investments, Inc., is a Delaware corporation and wholly owned subsidiary of Urenco Limited (Urenco), a corporation formed under the laws of the United Kingdom. Urenco is owned in equal shares by BNFL Enrichment Limited (BNFL-EL), Ultra-Centrifuge Nederland NV (UCN), and Uranit GmbH (Uranit) companies formed under English, Dutch, and German law, respectively. BNFL-EL is wholly owned by British Nuclear Fuels plc (BNFL), which is wholly owned by the Government of the United Kingdom. UCN is 99-percent owned by the Government of the Netherlands with the remaining one percent owned collectively by the Royal Dutch Shell Group, Koninklijke Philips Electronics N.V., and Stork N.V. Uranit is owned by Eon Kernkraft GmbH (50 percent) and RWE Power AG (50 percent), which are corporations formed under laws of the Federal Republic of Germany.

<sup>3</sup> Westinghouse Enrichment Company LLC is a Delaware limited liability company and wholly owned subsidiary of Westinghouse Electric Company (Westinghouse) LLC, a Delaware limited liability company whose ultimate parent (through two intermediary Delaware corporations and one corporation formed under the laws of the United Kingdom) is BNFL.

<sup>4</sup> Urenco Deelnemingen B.V. is a Netherlands corporation and wholly owned subsidiary of Urenco Nederlands B.V. (UNL); Westinghouse Enrichment Company LLC is a Delaware limited liability company, wholly owned by Westinghouse, that also is acting as a General Partner; Entergy Louisiana, Inc., is a Louisiana corporation and wholly owned subsidiary of Entergy Corporation, a publicly held Delaware corporation and a public utility holding company; Claiborne Energy Services, Inc., is a Louisiana corporation and wholly owned subsidiary of Duke Energy Corporation, a publicly held North Carolina corporation; Cenesco Company LLC is a Delaware limited liability company and wholly owned subsidiary of Exelon Generation Company

are Urenco Deelnemingen B.V.; Westinghouse Enrichment Company LLC; Entergy Louisiana, Inc.; Claiborne Energy Services, Inc.; Cenesco Company LLC; and Penesco Company LLC. Urenco owns 70.5 percent of the partnership, while Westinghouse owns 19.5 percent of LES. The remaining 10 percent is owned by companies representing three U.S. electric utilities: Entergy Corporation, Duke Energy Corporation, and Exelon Generation Company LLC (LES, 2005a).

LES has indicated that the principal business location is in Albuquerque, New Mexico. Furthermore, LES has stated that no other companies would be present or operating on the proposed NEF site other than services specifically contracted by LES (LES, 2005a). The NRC intends to examine any foreign relationship to determine whether it is inimical to the common defense and security of the United States. The foreign ownership, control, and influence issue will be addressed as part of the NRC SER, and this issue is beyond the scope of this EIS.

- The NRC is the licensing agency. The NRC has the responsibility to evaluate the license application for compliance with the NRC regulations associated with uranium enrichment facilities. These include standards for protection against radiation in 10 CFR Part 20 and requirements in 10 CFR Parts 30, 40, and 70 that would authorize LES to possess and use special nuclear material, source material, and byproduct material at the proposed NEF. The NRC is responsible for regulating activities performed within the proposed NEF through its licensing review process and subsequent inspection program. To fulfill the NRC responsibilities under NEPA, the environmental impacts of the proposed action are evaluated in accordance with the requirements of 10 CFR Part 51 and documented in this EIS.
- The State of New Mexico would play a role in regulating nonradiological aspects of the proposed NEF. The State is comprised of several entities that include State-level regulatory agencies (such as the New Mexico Environment Department), which issue permits and authorizations associated with the construction or operation of industrial facilities. Areas over which the State has jurisdiction include, among others, air quality, surface and groundwater discharges, conservation of wildlife, and the protection of endangered species.
- Lea County would serve as the lessor-owner of the facility during the 30-year term of the Industrial Revenue Bonds. In this capacity, Lea County will hold the legal title to the uranium enrichment facility, including all related buildings, storage, infrastructure, and equipment, and will hold legal title or a possessory interest in the site on which the facility is located during the term of the Industrial Revenue Bonds.

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## 2 ALTERNATIVES

This chapter describes the Louisiana Energy Services (LES) proposed action and reasonable alternatives including the no-action alternative. Related to the proposed action, the U.S. Nuclear Regulatory Commission (NRC) staff also examined alternatives for the disposition of the depleted uranium hexafluoride ( $DUF_6$ ) material resulting from the enrichment operation over the lifetime of the proposed National Enrichment Facility (NEF). Under the no-action alternative, LES would not construct, operate, or decommission the proposed NEF. This alternative is included to comply with National Environmental Policy Act (NEPA) requirements. The no-action alternative provides a basis for comparing and evaluating the potential impacts of constructing, operating, and decommissioning the proposed NEF.

This chapter also addresses the site-selection process and reviews alternative enrichment technologies (other than the proposed centrifuge technology) and alternative sources for enriched product.

### 2.1 Proposed Action

The LES proposed action is the construction, operation, and decommissioning of the proposed NEF in southeastern New Mexico. Figure 2-1 shows the location of the proposed NEF.

The proposed action can be divided into three major activities: (1) site preparation and construction, (2) operation, and (3) decontamination and decommissioning.

The NRC license, if granted, would be for a 30-year period from the date of issuance.

Table 2-1 presents the current schedule for the proposed NEF project.

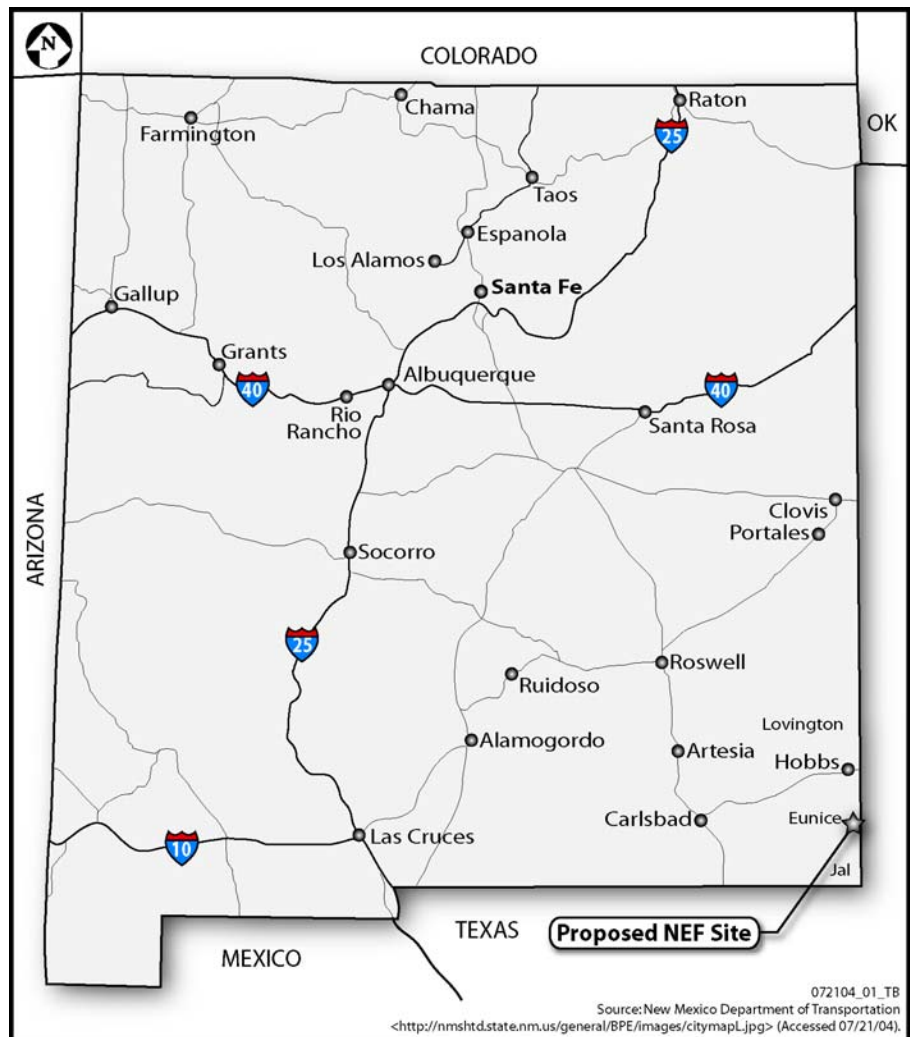


Figure 2-1 Location of Proposed NEF Site (NMDOT, 2004a)

**Table 2-1 Proposed National Enrichment Facility Operation Schedule**

<b>Task</b>	<b>Start Date</b>
Submit License Application to NRC	December 2003
Begin Construction of Facility	August 2006
Begin Operation of First Cascade	October 2008
Achieve Full Production Output	October 2013
Operate Facility at Full Capacity	October 2013 to October 2027
Submit Decommissioning Plan to NRC	April 2025
Complete Construction of Decontamination and Decommissioning Facility	April 2027
Cease All Operations of Cascades	April 2033
Complete Decommissioning of Facility	April 2036

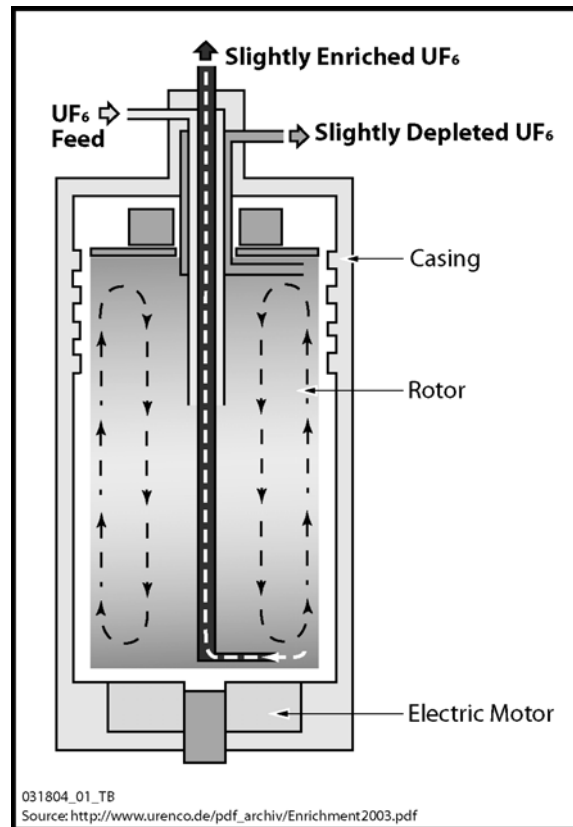
Source: LES, 2005a.

**2.1.1 Location and Description of Proposed Site**

The proposed NEF site consists of about 220 hectares (543 acres) located 8 kilometers (5 miles) east of the city of Eunice, New Mexico. The U.S. Bureau of Land Management (BLM) identifies the proposed site as Section 32 of range 38E in Township 21S of the New Mexico Meridian. Lea County currently owns the property; however, on December 8, 2004, LES began a lease for 30 years after which LES would purchase the land from Lea County. The entire site is undeveloped, with the exception of an underground carbon dioxide (CO<sub>2</sub>) pipeline and a gravel road, and is used for cattle grazing. There is no permanent surface water on the site, and appreciable groundwater reserves are deeper than 340 meters (1,115 feet). The nearest permanent resident is 4.3 kilometers (2.6 miles) west of the proposed site near the junction of New Mexico Highway 234 and New Mexico Highway 18.

**2.1.2 Gas Centrifuge Enrichment Process**

The proposed NEF would employ a proven gas centrifuge technology for enriching natural uranium. Figure 2-2 shows the basic construction of a gas centrifuge. The technology uses a rotating cylinder (rotor) spinning at a high circumferential rate of speed inside a protective casing. The casing maintains a vacuum around the rotor and provides physical containment of the rotor in the event of a catastrophic rotor failure.

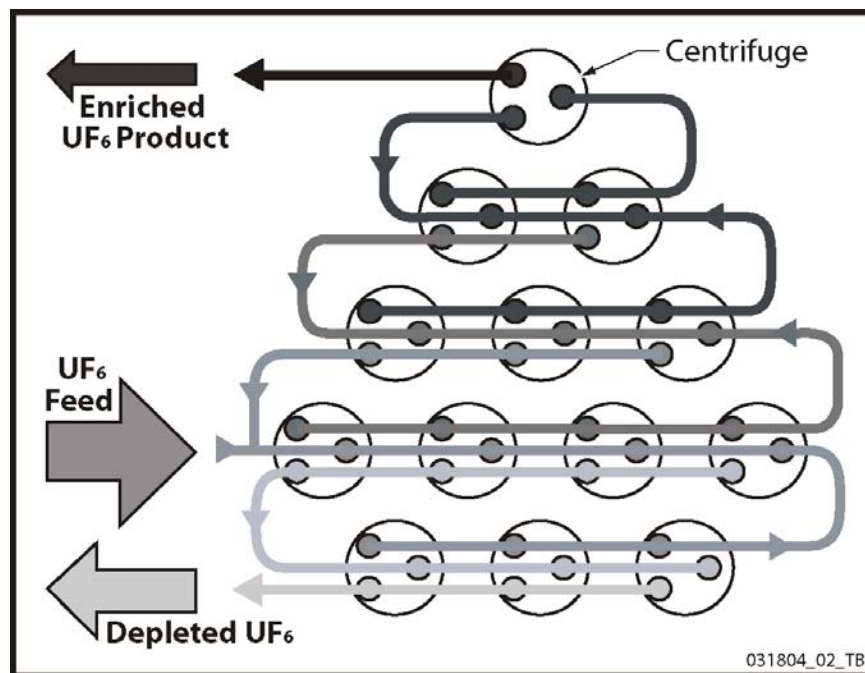


**Figure 2-2 Schematic of a Gas Centrifuge (Ureenco, 2003)**

The uranium hexafluoride ( $\text{UF}_6$ ) gas is fed through a fixed pipe into the middle of the rotor, where it is accelerated and spins at almost the same speed as the rotor. The centrifugal force produced by the spinning rotor causes the heavier uranium-238 hexafluoride ( $^{238}\text{UF}_6$ ) molecules to concentrate close to the rotor wall and the lighter uranium-235 hexafluoride ( $^{235}\text{UF}_6$ ) molecules collect closer to the axis of the rotor. This separation effect, which initially occurs only in a radial direction, increases when the rotation is supplemented by a convection current produced by a temperature difference along the rotor axis (thermoconvection). A centrifuge with this kind of gas circulation (i.e., from top to bottom near to the rotor axis and from bottom to top by the rotor wall) is called a counter-current centrifuge.

The inner and outer streams become more enriched/depleted in  $^{235}\text{U}$  in their respective directions of movement. The biggest difference in concentration in a counter-current centrifuge does not occur between the axis and the wall of the rotor, but rather between the two ends of the centrifuge rotor. In the flow pattern shown in Figure 2-2, the enriched  $\text{UF}_6$  is removed from the lower end of the rotor and the  $\text{DUF}_6$  at the upper end through take-off pipes that run from the axis close to the wall of the rotor.

The enrichment level achieved by a single centrifuge is not sufficient to obtain the desired concentration of 3 to 5 percent by weight of  $^{235}\text{U}$  in a single step; therefore, a number of centrifuges are connected in series to increase the concentration of the  $^{235}\text{U}$  isotope. Additionally, a single centrifuge cannot process a sufficient volume for commercial production, which makes it necessary to connect multiple centrifuges in parallel to increase the volume flow rate. The arrangement of centrifuges connected in series to achieve higher enrichment and parallel for increased volume is called a “cascade.” A full cascade contains hundreds of centrifuges connected in series and parallel. Figure 2-3 is a diagram of a segment of a uranium enrichment cascade showing the flow path of the  $\text{UF}_6$  feed, enriched  $\text{UF}_6$  product, and  $\text{DUF}_6$  gas. In the proposed NEF, eight cascades would be grouped in a Cascade Hall, and each separation building would house two cascade halls. There would be three separations buildings in the full-capacity plant.



**Figure 2-3 Diagram of Enrichment Cascade for Proposed NEF (Urenco, 2003)**

### **What is enriched uranium?**

*Uranium is a naturally occurring radioactive element. In its natural state, uranium contains approximately 0.72 percent by weight of the uranium-235 isotope ( $^{235}\text{U}$ ), which is the fissile isotope of uranium. There is a very small (0.0055 percent) quantity of the uranium-234 ( $^{234}\text{U}$ ) isotope, and most of the remaining mass (99.27 percent) is the uranium-238 ( $^{238}\text{U}$ ) isotope. All three isotopes are chemically identical and only differ slightly in their physical properties. The most important difference between the isotopes is their mass. This small mass difference allows the isotopes to be separated and makes it possible to increase (i.e., “enrich”) the percentage of  $^{235}\text{U}$  in the uranium to levels suitable for nuclear power plants or, at very high enrichment, nuclear weapons.*

*Most civilian nuclear power reactors use low-enriched uranium fuel containing 3 to 5 percent by weight of  $^{235}\text{U}$ . Uranium for most nuclear weapons is enriched to greater than 90 percent.*

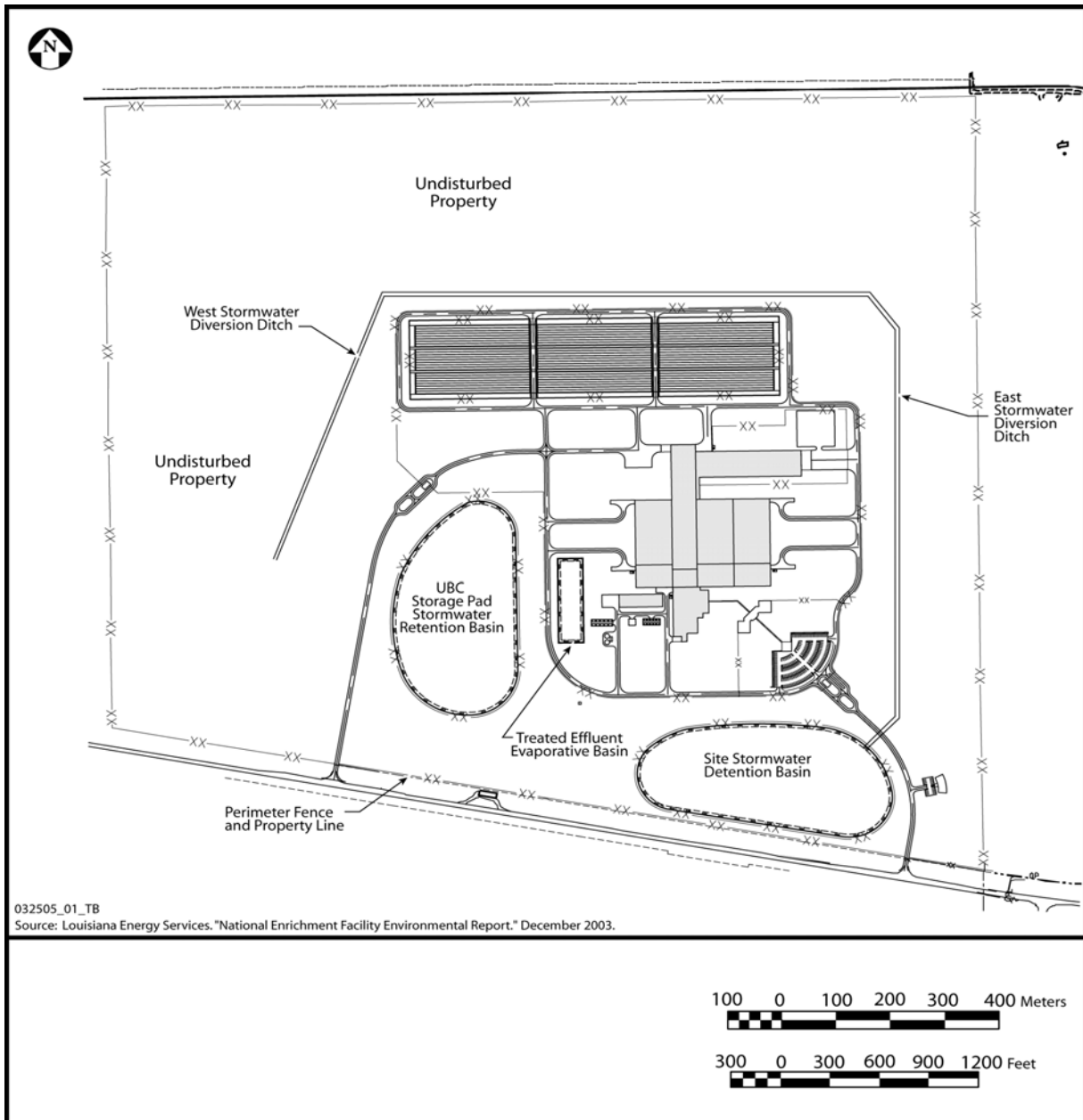
*Uranium would arrive at the proposed NEF as natural  $\text{UF}_6$  in solid form in a Type 48X or 48Y transport cylinder from existing conversion facilities in Port Hope, Ontario, Canada or Metropolis, Illinois. To start the enrichment process, the cylinder of  $\text{UF}_6$  is heated, which causes the material to sublime (change directly from a solid to a gas). The  $\text{UF}_6$  gas is fed into the enrichment cascade where it is processed to increase the concentration of the  $^{235}\text{U}$  isotope. The  $\text{UF}_6$  gas with an increased concentration of  $^{235}\text{U}$  is known as “enriched” or “product.” Gas with a reduced concentration of  $^{235}\text{U}$  is referred to as “depleted”  $\text{UF}_6$  (DUF<sub>6</sub>) or “tails.”*

*Source: WNA, 2003.*

### **2.1.3 Description of Proposed National Enrichment Facility**

Figure 2-4 shows the general layout of the proposed NEF. Structures within the proposed NEF include the following:

- Uranium Byproduct Cylinder (UBC) Storage Pad.
- Centrifuge Assembly Building.
- Cascade Halls.
- Cylinder Receipt and Dispatch Building.
- Blending and Liquid Sampling Area.
- Technical Services Building.
- Administration Building.
- Visitor Center.
- Security Building.
- Central Utilities Building.



**Figure 2-4 Proposed NEF Site Layout (LES, 2005a)**

Uranium Byproduct Cylinders (UBC) Storage Pad

The UBC Storage Pad would be constructed on the north side of the controlled area to store transportation cylinders and UBCs. The UBCs are Type 48Y cylinders. The large concrete pad would initially be sized to store the first 5 years' worth of cylinders (about 1,600 cylinders) stacked two high in concrete saddles that would elevate them approximately 20 centimeters (8 inches) above ground level. The pad would be expanded as additional storage is required. The maximum size of the UBC Storage Pad would be 9 hectares (23 acres), and it would be able to store 15,727 cylinders (LES, 2005a).

### Centrifuge Assembly Building

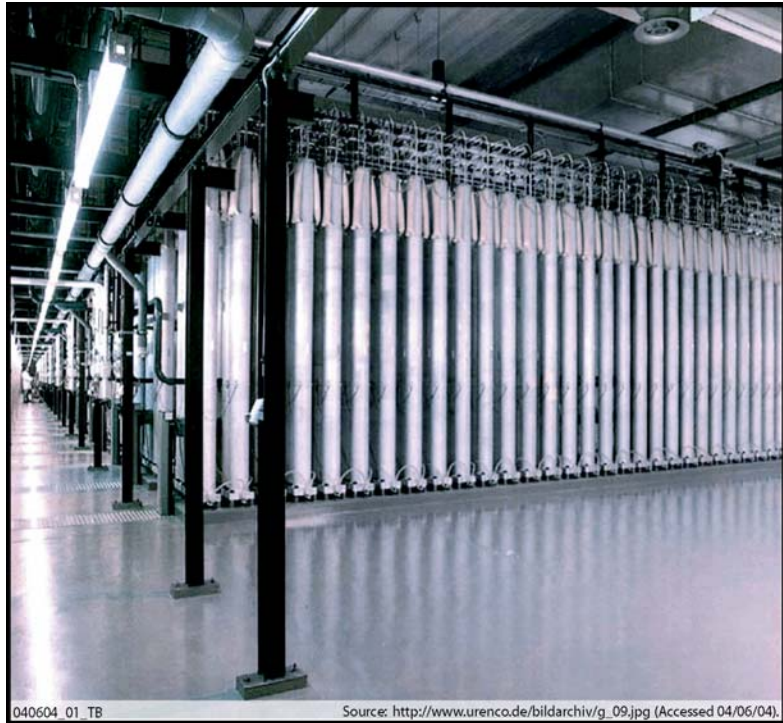
The Centrifuge Assembly Building would be used for the assembly, inspection, and mechanical testing of the centrifuges prior to installation in the Cascade Halls. This building would also contain the Centrifuge Test and Postmortem Facilities that would be used to test the functional performance and operational problems of production centrifuges and ensure compliance with design parameters.

### Cascade Halls

The six proposed Cascade Halls would be contained in three Separations Buildings near the center of the proposed NEF. Figure 2-5 is a photograph of centrifuges inside a cascade hall at Urenco. Each of the six proposed Cascade Halls would house eight cascades, and each cascade would consist of hundreds of centrifuges connected in series and parallel to produce enriched  $UF_6$ . Each Cascade Hall would be capable of producing a maximum of 545,000 separative work units (SWU) per year.

The centrifuges would be mounted on precast concrete-floor-mounted stands (flomels). Each Cascade Hall would be enclosed by a structural steel frame supporting insulated sandwich panels (metal skins with a core of insulation) to maintain a constant temperature within the cascade enclosure.

In addition to the Cascade Halls, each Separations Building module would house a  $UF_6$  Handling Area and a Process Services Area. The  $UF_6$  Handling Area would contain the  $UF_6$  feed input system as well as the enriched  $UF_6$  product, and  $DUF_6$  takeoff systems. The Process Services Area would contain the gas transport piping and equipment, which would connect the cascades with each other and with the product and depleted materials takeoff systems. The Process Services Area would also contain key electrical and cooling water systems.



**Figure 2-5 Inside a Cascade Hall (Urenco, 2003)**

### Cylinder Receipt and Dispatch Building

All  $UF_6$  cylinders (feed, product, and UBCs) would enter and leave the proposed NEF through the Cylinder Receipt and Dispatch Building.

### Blending and Liquid Sampling Area

The primary function of the Blending and Liquid Sampling Area would be filling and sampling the Type 30B product cylinders with UF<sub>6</sub> enriched to the customer specifications and verifying the purity of the enriched product.

### Technical Services Building

The Technical Services Building would contain support areas for the facility and acts as the secure point of entry to the Separations Building Modules and the Cylinder Receipt and Dispatch Building. This building would contain the following functional areas:

- The *Control Room* would be the main monitoring point for the entire plant and provide all of the facilities for the control of the plant.
- The *Security Alarm Center* would be the primary security monitoring station for the facility. All electronic security systems would be controlled and monitored from this center.
- The *Cylinder Preparation Room* would provide a set-aside area for testing and inspecting Type 30B, 48X, and 48Y cylinders for use in the proposed NEF. It would be maintained under negative pressure and would require entry and exit through an airlock.
- The *Radiation Monitoring Control Room* would separate the non-contaminated areas from the potentially contaminated areas of the proposed plant. It would include personnel radiation monitoring equipment, hand-washing facilities and safety showers.
- The *Decontamination Workshop* would provide a facility for the removal of radioactive contamination from contaminated materials and equipment.
- The *Solid Waste Collection Room* would be used for processing wet and dry low-level solid waste.
- The *Liquid Effluent Collection and Treatment Room* would be used to collect, monitor, and treat potentially contaminated liquid effluents produced onsite.
- The *Gaseous Effluent Vent System Room* would be used to remove uranium and other radioactive particles and hydrogen fluoride from the potentially contaminated process gas streams.
- The *Laboratory Area* would provide space for laboratories where the purity and enrichment percentage of the enriched UF<sub>6</sub> would be measured and the impact of the proposed NEF on the environment would be monitored.

### Administration Building

The Administration Building would contain office areas and a security station. All personnel access to the proposed NEF would occur through the Administration Building.

### Visitor Center

The Visitor Center would be located outside the security fence close to New Mexico State Highway 234.

### Security Building

The main Security Building would be located to monitor all traffic entering and leaving the proposed NEF.

### Central Utilities Building

The Central Utilities Building would house two diesel generators, which would provide standby and emergency power for the proposed facility as well as the electrical switchgear and heating, ventilation, and air-conditioning systems for the proposed facility.

#### **2.1.4 Site Preparation and Construction**

Site preparation for the construction of the proposed NEF would require the clearing of approximately 81 hectares (200 acres) of undisturbed pasture land within the 220-hectares (543-acre) site. The permanent plant structures, support buildings, and the UBC Storage Pad would occupy about 73 hectares (180 acres) of the 81 hectares (200 acres) if the UBC Storage Pad is expanded to its fullest capacity. Contractor parking and a lay-down area would occupy the remaining 8 hectares (20 acres). The contractor parking and lay-down area and areas around the building exteriors would be graded and restored after completion of the proposed construction (LES, 2005a).

Most of the disturbed area would be graded and would form the owner-controlled area. The disturbed area would comprise about one-third of the total site area. The undisturbed onsite areas (139 hectares [343 acres]) would be left in a natural state with no designated use for the life of the proposed NEF. Figure 2-6 shows the areas that would be cleared for construction activities.

### Site Preparation

If licensed, groundbreaking at the proposed NEF site would begin in 2006, with construction continuing for 8 years until 2013. The proposed site terrain currently ranges in elevation from 1,033 to 1,045 meters (3,390 to 3,430 feet) above mean sea level. Because the proposed NEF requires an area of flat terrain, about 36 hectares (90 acres) would be graded to bring the site to a proposed final grade of 1,041 meters (3,415 feet) above mean sea level. All material excavated onsite would be used for onsite fill.

Site preparation would include the cutting and filling of approximately 611,000 cubic meters (797,000 cubic yards) of soil and caliche with the deepest cut being 4 meters (13 feet) and the deepest fill being 3.3 meters (11 feet) (LES, 2005a). In this phase, conventional earthmoving and grading equipment would be used. The removal of very dense soil or caliche could require the use of heavy equipment with ripping tools. Control of soil-removal work for foundations would follow to reduce over excavation and minimize construction costs. In addition, loose soil and/or damaged caliche would be removed prior to installation of foundations for seismically designed structures.

Subsurface geologic materials at the proposed NEF site generally consist of red clay beds, a part of the Chinle Formation of the Triassic-aged Dockum Group. Bedrock is covered with up to 17 meters (55 feet) of silty sand, sand, sand and gravel, and an alluvium that is part of the Antlers and/or Gatuña Formations.



Foundation conditions at the site are generally good, and no potential for mineral development has been found at the site.

A high-pressure CO<sub>2</sub> pipeline would be relocated during the site preparation for safety considerations. The relocation would be performed in accordance with applicable regulations to minimize any direct or indirect impacts on the environment.

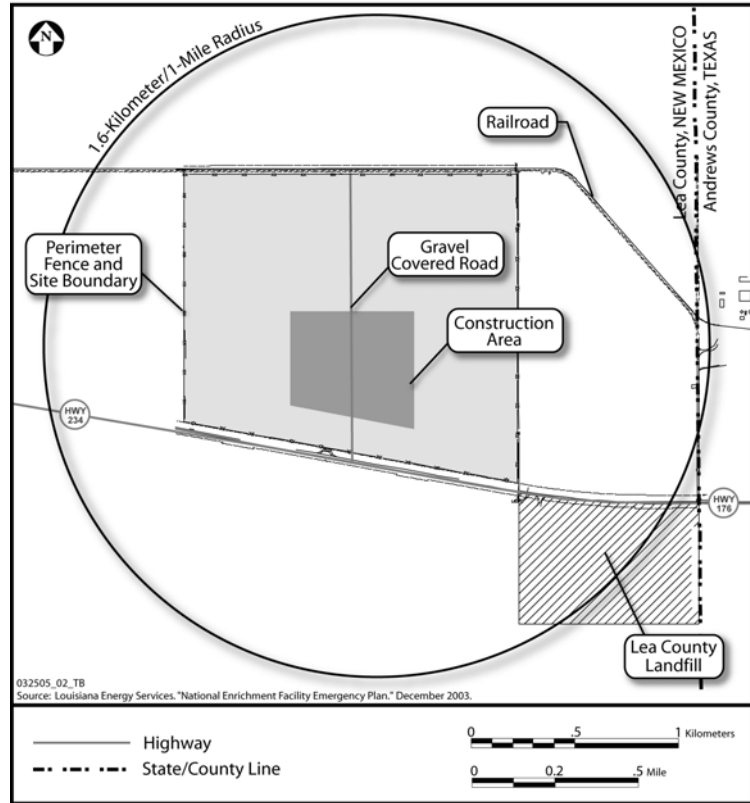
### Soil Stabilization

An engineered system would control surface stormwater runoff for the proposed NEF. Construction and erosion control management practices would mitigate erosional impacts due to site clearing and grading. Part of construction work would involve stabilizing disturbed soils. Earth berms, dikes, and sediment fences would be used as necessary during all phases of construction to limit runoff. Much of the excavated areas would be covered by structures or paved, limiting the creation of new dust sources. Additionally, two stormwater detention basins would be constructed prior to land clearing to be used as sedimentation collection basins during construction, and they would be converted to stormwater detention or retention basins once the site is re-vegetated and stabilized.

One of the construction stormwater detention basins would be converted to the Site Stormwater Detention Basin at the south side of the proposed site. The Site Stormwater Detention Basin would collect runoff from various developed parts of the site including roads, parking areas, and building roofs. It would be unlined and would have an outlet structure to control discharges above the design level. The normal discharge would be through evaporation to the air or infiltration into the ground. The basin's design would enable it to contain runoff for a rainfall of 15.2 centimeter (6.0 inch) in 24 hours, which is equal to the 100-year return frequency storm. In addition, the basin would have 60 centimeters (2 feet) of freeboard beyond design capacity.

The site is currently unimproved ground. Rainfall percolates into the soil or runs off into the roadside drainage ditch. After construction is completed part of the site would be covered with buildings and paved areas that would prevent rainfall from percolating into the soil. Runoff from the buildings and paved areas would be diverted to the Site Stormwater Detention Basin. The Basin would be equipped with an outfall that would be designed to limit the discharge flow rate to the same or less than the site's current runoff rate.

The Site Stormwater Detention Basin would have approximately 123,350 cubic meters (100 acre-feet) of storage capacity. The drainage area served would include about 39 hectares (96 acres), the majority of which would be the developed portion of the proposed NEF site. The water quality of the discharge



**Figure 2-6 Construction Area for the Proposed NEF Site**

would be typical of runoff from building roofs and paved areas from any industrial facility. Except for small amounts of oil and grease typically found in runoff from paved roadways and parking areas, the discharge would not be expected to contain contaminants.

The second stormwater detention basin built during construction would be converted to the UBC Storage Pad Stormwater Retention Basin for the operation phase. The UBC Storage Pad Stormwater Retention Basin would collect and contain water discharges from three sources: (1) stormwater runoff from the UBC Storage Pad, (2) cooling tower blowdown discharges, and (3) heating boiler blowdown discharges. This basin would be designed with a membrane lining to minimize ground infiltration of the water. Evaporation would be the primary method to eliminate the water from the UBC Storage Pad Stormwater Retention Basin. The basin would be designed to contain a volume equal to 30.4 centimeters (12 inches) of rainfall, which is double the 24-hour, 100-year return frequency storm plus an allowance for cooling tower and heating boiler blowdown water. The UBC Storage Pad Stormwater Retention Basin would be designed to contain a volume of approximately 77,700 cubic meters (63 acre-feet), which serves 9 hectares (23 acres), the maximum area of the proposed UBC Storage Pad.

Additional mitigation measures would be taken to minimize soil erosion and impacts during the construction phase. Mitigation measures proposed by LES during construction include:

- Watering the onsite construction roads periodically to control fugitive dust emissions, taking into account water conservation.
- Using adequate containment methods during excavation and other similar operations.
- Covering open-bodied trucks transporting materials likely to disperse when in motion.
- Promptly removing earthen materials dispensed on paved roads.
- Stabilizing or covering bare areas once earth-moving activities are completed.

After construction is complete, natural, low-water maintenance landscaping and pavement would be used to stabilize the site.

### Spill Prevention

All construction activities would comply with the National Pollutant Discharge Elimination System (NPDES) general construction permit obtained from U.S. Environmental Protection Agency Region 6 with an oversight review by the New Mexico Environment Department Water Quality Bureau. A Spill Prevention, Control, and Countermeasure Plan would also be implemented during construction to minimize environmental impacts from potential spills and to ensure prompt and appropriate remediation. Potential spills during construction would likely occur around vehicle maintenance and fueling locations, storage tanks, and painting operations. The Spill Prevention, Control, and Countermeasure Plan would identify sources, locations, and quantities of potential spills and response measures. The plan would also identify individuals and their responsibilities for implementation of the plan and provide for prompt notifications of State and local authorities, as required. Implementing best management practices for waste management would minimize solid waste and hazardous material generation during construction. These practices would 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. If external washing of construction vehicles would be necessary, no detergents would be used, and the runoff would be diverted to an onsite basin. Adequately maintained sanitary facilities would be available for construction crews.

## Air Emissions

Construction activity would generate some degree of dust during the various stages of construction activity. The amount of dust emissions would vary according to the types of activity. The first 5 months of construction would likely be the period of highest emissions because approximately one-third of the 220-hectare (543-acre) proposed NEF site would be involved along with the greatest number of construction vehicles operating on an unprepared surface. However, it would be expected that no more than 18 hectares (45 acres) would be involved in this type of work at any one time.

Table 2-2 lists the estimated peak emission rates during construction of the proposed NEF. Emission rates for fugitive dust were estimated for a 10-hour workday assuming peak construction activity levels were maintained throughout the year. The calculated total work-day average emissions result for fugitive emission particulate would be 8.6 kilograms per hour (19.1 pounds per hour). Fugitive dust would most likely be caused by vehicular traffic on unpaved surfaces, earth moving, excavating and bulldozing, and to a lesser extent wind erosion.

### Sanitary Waste

In lieu of connecting to the local sewer system, six onsite underground septic systems would be installed for the treatment of sanitary wastes. Each septic system would consist of a septic tank with one or more leachfields. Together, the six septic systems would be sized to process 40,125 liters per day (10,600 gallons per day), which is sufficient flow capacity for approximately 420 people. Assuming an average water use of 95 liters per day (25 gallons per day) per person, the planned staff of 210 full-time employees would use approximately 20,000 liters per day (5,283 gallons per day) which, if evenly distributed, means the planned septic systems would operate at about 50 percent of design capacity (LES, 2005a).

### Construction Work Force

Table 2-3 presents the estimated average annual number of construction employees who would work on the proposed NEF site during construction and their annual pay. The construction force is anticipated to peak at about 800 workers from 2008 to 2009. During early construction stages of the project, the work force would be expected to consist primarily of structural crafts workers, most of whom would be recruited from the local area. As construction progresses, there would be a transition to predominantly mechanical and electrical crafts. The bulk of this labor force would come from the surrounding 120-kilometer (75-mile) region, which is known as the region of influence.

**Table 2-2 Estimated Peak Emission Rates During Construction (Based on 10 hours per day, 5 days per week, and 50 weeks per year)**

<b>Pollutant</b>	<b>Average Emissions, kilograms per hour (pounds per hour)</b>
<i>Vehicle Emissions</i>	
Hydrocarbons	2.1 (4.6)
Carbon Monoxide	13.3 (29.4)
Nitrogen Oxides	7.53 (59.8)
Sulfur Oxides	2.7 (6.0)
Particulate	1.9 (4.3)
<i>Fugitive Emissions</i>	
Particulate	8.6 (19.1)

Source: LES, 2005b.

**Table 2-3 Estimated Number of Construction Workers by Annual Pay**

Year	Number of Workers by Salary Range				Total Number of Workers
	\$0 - 16,000	\$17,000 - 33,000	\$34,000 - 49,000	\$50,000 - 82,000	Average Number per Year
2006	100	100	50	5	255
2007	50	75	350	45	520
2008	50	100	500	50	700
2009	50	100	600	50	800
2010	50	25	300	50	425
2011	10	25	100	60	195
2012	10	15	75	40	140
2013	10	15	75	40	140

Source: LES, 2005b.

Construction Materials

Construction of the proposed NEF would require many different commodities. Table 2-4 lists materials that would be used during the construction phase, and most of these materials would be obtained locally.

**Table 2-4 Selected Commodities and Resources to be Used During Construction of Proposed NEF**

Description	Quantity
Water	7,570 cubic meters (2 million gallons) <sup>a</sup> annually
Asphalt Paving	72,940 cubic meters (95,400 cubic yards)
Chain Link Fencing	15.1 kilometers (9.3 miles)
Concrete	59,196 cubic meters (77,425 cubic yards)
Concrete Paving	1,614 cubic meters (2,111 cubic yards)
Copper & Aluminum Wiring	362 kilometers (225 miles)
Crushed Stone	287,544 square meters (343,900 square yards)
Electrical Conduit	121 kilometers (75 miles)
Piping (Carbon & Stainless Steel)	56 kilometers (34.6 miles)
Roofing Materials	52,074 square meters (560,500 square feet)
Stainless & Carbon Steel Ductwork	515 metric tons (568 tons)
Clay	55,813 cubic meters (73,000 cubic yards)

<sup>a</sup> Escalated from the formerly proposed Claiborne Enrichment Facility. The value from the Claiborne Enrichment Facility was doubled since the proposed NEF would have double the production capacity, and the total was then increased by 65 percent to account for the semi-arid climate of the proposed site (NRC, 1994).

Source: LES, 2005a.

### **2.1.5 Local Road Network**

New Mexico Highway 234 is a two-lane highway located on the southern border of the proposed NEF site with 3.6-meter (12-foot) wide driving lanes, 2.4-meter (8-foot) wide shoulders, and a 61-meter (200-foot) right-of-way easement on either side. The highway provides direct access to the site. A gravel-covered road currently runs north from the highway through the center of the site to the sand and gravel quarry to the north. Two access roads would be built from the highway to support construction. The materials delivery construction access road would run north from the highway along the west side of the proposed NEF. The personnel construction access road would run north from the highway along the east side of the proposed NEF. Both roadways would eventually be paved and converted to permanent access roads upon completion of construction.

Over-the-road trucks of various sizes and weights would deliver construction material to the proposed NEF. Delivery vehicles would range from heavy-duty 18-wheeled tractor trailers to commercial box and light-duty pick-up trucks. Delivery vehicles from the north and south would travel New Mexico Highway 18 or New Mexico Highway 207 to New Mexico Highway 234. The intersection of New Mexico Highway 18 and New Mexico Highway 234 is approximately 6.4 kilometers (4 miles) west of the site. While the intersection of New Mexico Highway 207 and New Mexico Highway 234 is further west, construction material would also travel from the east by way of Texas Highway 176, which becomes New Mexico Highway 234 at the New Mexico/Texas State line. Construction material from the west would come by way of New Mexico Highway 8, which becomes New Mexico Highway 234 near the city of Eunice west of the site. Due to the presence of a quarry directly north of the site, bulk aggregate trucks might also use the onsite gravel road that currently leads to the quarry.

Planned maintenance to New Mexico Highway 234 include the resurfacing, restoration, and rehabilitation of existing lanes to improve roadway quality, enhance safety, and further economic development. However, no time frame has been established for the maintenance activities (NMDOT, 2004b).

### **2.1.6 Proposed Facility Utilities and Other Services**

The proposed NEF would require the installation of water, natural gas, and electrical utility lines.

#### Water Supply

The proposed NEF water supply would be obtained from the municipalities of Eunice and Hobbs, New Mexico. This would be performed by running new potable water pipelines from the municipal water supply systems for Eunice and Hobbs to the proposed NEF site. The pipeline from Eunice would be about 8 kilometers (5 miles) long, and the pipeline from Hobbs would be about 32 kilometers (20 miles) long. Both pipelines would run inside the Lea County right-of-way easements along New Mexico Highways 18 and 234.

Current capacities for the Eunice and Hobbs municipal water supply systems are 16,350 cubic meters per day (4.32 million gallons per day) and 75,700 cubic meters per day (20 million gallons per day), respectively. Current Eunice and Hobbs usages are about 5,600 cubic meters per day (1.48 million gallons per day) and 23,450 cubic meters per day (6.2 million gallons per day), respectively. The average and peak water requirements for operation of the proposed NEF would be approximately 240 cubic meters per day (63,423 gallons per day) and 2,040 cubic meters per day (539,000 gallons per day), respectively (Abousleman, 2004; Woomey, 2004).

## Natural Gas

The natural gas line feeding the site will connect to an existing, nearby line along available county right-of-way easements.

## Electrical Power

The proposed NEF would require approximately 30 megawatts of electricity. This power would be supplied by two new synchronized 115-kilovolt overhead transmission lines on a large loop system. These lines would tie into a trunk line about 13 kilometers (8 miles) west of the proposed site. Currently, there are several power poles along the highway in front of the adjacent vacant parcel east of the proposed site, and a 61-meter (200-foot) right-of-way easement along both sides of New Mexico Highway 234 would allow installation of utility lines within the highway easement. Xcel Energy, the local electrical service company, would install two onsite transformers in conjunction with the new electrical lines serving the site. Associated power-support structures would be installed along New Mexico Highway 234. An application for highway easement modification would be submitted to the State. The average power requirement and the peak power requirement of the facility are approximately 30.3 million volt-amps and 32 million volt-amps, respectively (LES, 2005b).

### **2.1.7 Proposed Facility Operation**

At full production, the proposed NEF would receive 8,600 metric tons (9,480 tons) per year of UF<sub>6</sub> containing a concentration of 0.72 percent by weight of the <sup>235</sup>U isotope. The proposed NEF would enrich natural UF<sub>6</sub> feed material to between 3 and 5 percent by weight of the <sup>235</sup>U isotope. The enriched DUF<sub>6</sub> would be transferred to a Type 30B cylinder where the gas would be cooled to a solid within the cylinder. DUF<sub>6</sub> gas would be transferred to a Type 48Y cylinder where the gas would be cooled to a solid within the cylinder. LES would store the cylinder on the UBC Storage Pad until final dispositioning.

## Receiving UF<sub>6</sub> Feed Material

Figure 2-7 shows the unloading of a Type 48Y cylinder. The proposed 8,600 metric tons (9,480 tons) of natural UF<sub>6</sub> feed material would be processed by the cascades to generate up to 800 metric tons (882 tons) of enriched UF<sub>6</sub> product and 7,800 metric tons (8,600 tons) of DUF<sub>6</sub> material each year. The feed material would be shipped to the proposed NEF in standard Type 48X or 48Y cylinders. Both of these cylinders are U.S. Department of Transportation approved containers for transporting Type A material (DOE, 1999a). The radioactive materials transported in these containers are subject to Title 10, "Energy," of the *U.S. Code of Federal Regulations* (10 CFR) Part 71 and 49 CFR Parts 171-173 shipping regulations. These regulations include requirements for an internal pressure test without leakage, free drop test without loss or dispersal of UF<sub>6</sub>, and thermal test requirements without rupture of the containment system. In addition, shipments would be required to have fissile controls. A fully loaded Type 48Y



**Figure 2-7 Cylinder of UF<sub>6</sub> Being Unloaded (Urenco, 2004a)**

cylinder weighs 14.9 metric tons (16.4 tons) and is shipped one per truck (WNTI, 2004). Therefore, the site would receive an average of three shipments of natural UF<sub>6</sub> feed material every day (assuming only weekday shipments). After receipt and inspection, the cylinder could be stored until needed or connected to the gas centrifuge cascade at one of several feed stations. Once installed in the feed station, the transport cylinders would be heated to sublime the solid UF<sub>6</sub> into a gas that would be fed to the gas centrifuge enrichment cascade.

After the cylinder has been emptied, it would be inspected and processed for reuse. The proposed NEF currently has no plans for internal cleaning or decontamination of the cylinders (LES, 2005c). The Type 48X cylinders are smaller than the Type 48Y cylinders and would not be used for onsite storage of the DUF<sub>6</sub> material. They would be returned to the supplier for reuse or disposed of at a licensed facility. The Type 48Y cylinders would be used to store DUF<sub>6</sub> material on the UBC Storage Pad or returned to the supplier. A Type 48Y cylinder filled with DUF<sub>6</sub> would be designated as a UBC.

### Producing Enriched UF<sub>6</sub> Product

The proposed NEF would be constructed in stages to allow enrichment operations to begin while additional cascade halls are still under construction. The first set of enrichment cascades would begin operating as soon as practical. This ramped production schedule would allow the proposed facility to begin operation only 2 years after initial groundbreaking. Production of enriched UF<sub>6</sub> product would increase from approximately 77 metric tons (85 tons) in 2008 to a maximum of 800 metric tons (882 tons) by 2013 (LES, 2005a).

### Shipping Enriched Product

Enriched UF<sub>6</sub> product would be shipped in a Type 30B cylinder, which is 76 centimeters (30 inches) in diameter and 206 centimeters (81 inches) long and holds a maximum of 2.3 metric tons (2.5 tons) of 5-percent enriched <sup>235</sup>UF<sub>6</sub>. Figure 2-8 shows Type 30B enriched product cylinders and overpacks being loaded for transport. At full production, the proposed NEF would produce 800 metric tons (882 tons) of enriched product which, at 2.3 metric tons (2.5 tons) per cylinder and three cylinders per truck, would require approximately two trucks per week to be shipped to the fuel fabricators in Richland, Washington; Wilmington, North Carolina; or Columbia, South Carolina.



**Figure 2-8 Shipment of Enriched Product  
(Urenco, 2004a)**

### Storing DUF<sub>6</sub> Material

During operation of the proposed NEF, the production of DUF<sub>6</sub> material would increase from 825 metric tons (909 tons) to 7,800 metric tons (8,600 tons) per year. This material would fill between 66 and 627 cylinders per year. Table 2-5 shows the potential maximum and anticipated quantity of Type 48Y cylinders that would be filled with DUF<sub>6</sub> material each year during the anticipated life of the proposed NEF.

The “Maximum” production column shown in Table 2-5 provides a upper limit bounding guide for the operation of the proposed NEF. It does not consider a sequential shutdown or progressive decommissioning of the proposed NEF. The proposed NEF would undergo sequential decommissioning which would reduce the production capability of the proposed facility as the cascades are shut down in sequence and the proposed NEF undergoes sequential decommissioning. The “Anticipated” production column incorporates this sequential shutdown into the estimated production of DUF<sub>6</sub> material during the operational life of the proposed NEF.

**Table 2-5 Maximum and Anticipated Yearly Production of  
Cylinders of DUF<sub>6</sub> over 30-Year License**

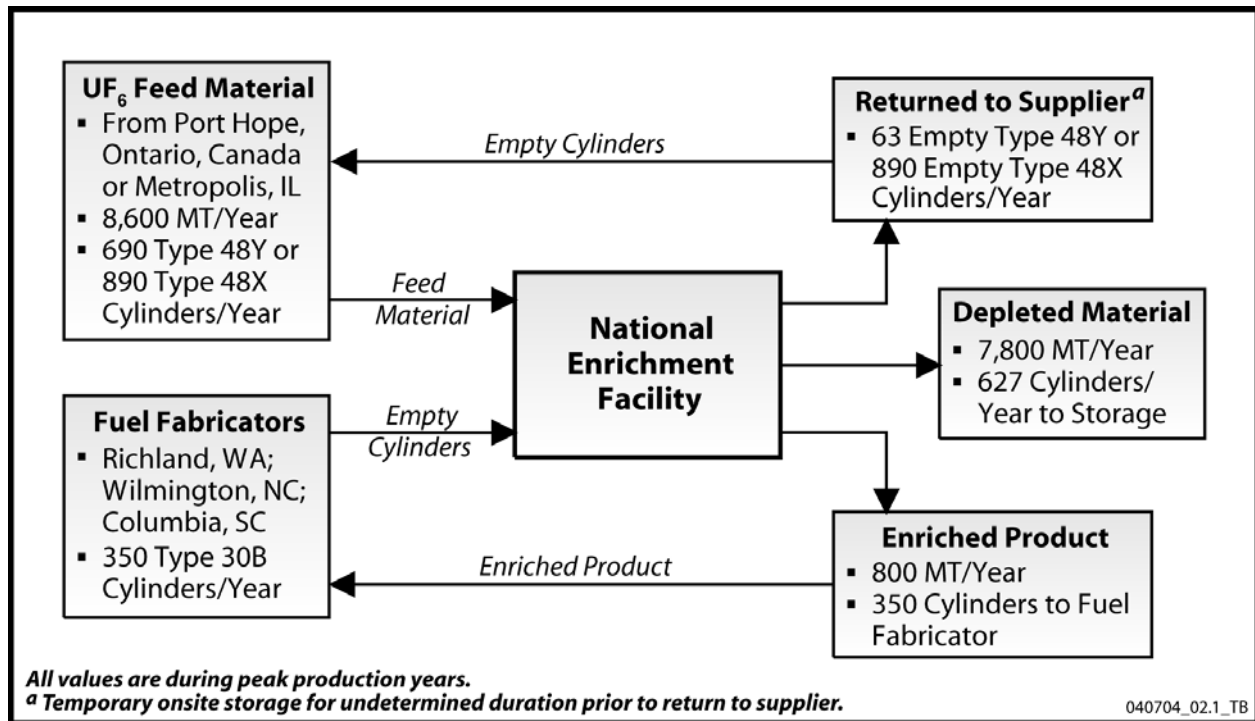
Year	Maximum		Anticipated	
	Yearly UBCs Filled	Cumulative UBCs Filled	Yearly UBCs Filled	Cumulative UBCs Filled
2008	66	66	66	66
2009	196	262	196	262
2010	313	575	313	575
2011	431	1,006	431	1,006
2012	548	1,554	548	1,554
2013	623	2,177	623	2,177
2014 to 2027	627	2,804 to 10,955	627	2,804 to 10,955
2028	627	11,582	561	11,516
2029	627	12,209	444	11,960
2030	627	12,836	326	12,286
2031	627	13,463	209	12,495
2032	627	14,090	92	12,587
2033	561	14,651	5	12,592
2034	444	15,095	0	12,592
2035	326	15,421	0	12,592
2036	209	15,630	0	12,592
2037	92	15,722	0	12,592
2038	5	15,727	0	12,592
2039	0	15,727	0	12,592

Source: LES, 2004.

The DUF<sub>6</sub> material would be stored in Type 48Y cylinders on the UBC Storage Pad until a final disposition option is identified. The UBC Storage Pad would be able to hold up to 15,727 cylinders, which is the maximum projected production of the DUF<sub>6</sub> material cylinders.



Figure 2-9 shows the material flow of feed, enriched, and DUF<sub>6</sub> material and cylinders during full operation of the proposed NEF.



**Figure 2-9 Flow from Feed, Enriched, and DUF<sub>6</sub> Material**

Operations Work Force

An estimated 210 full-time workers would be required during full operation of the proposed NEF, providing an average of 150 jobs per year over the life of the facility. The average total annual wages and benefits paid to these workers would be \$10.5 million per year. The annual number of production workers would increase as construction activities tapered off and, correspondingly, the production work force would reduce as decommissioning activities begin. Table 2-6 shows direct employment and average salaries during operations.

**Table 2-6 Direct Employment and Average Salaries During Operations**

Position	Number of Jobs	Percentage	Average Salary	Total Payroll
Management	21	10%	\$95,000	\$1,995,000
Professional	42	20%	\$62,000	\$2,604,000
Skilled	126	60%	\$42,000	\$5,292,000
Administrative	21	10%	\$30,000	\$630,000
Total	210	100%	\$50,100	\$10,521,000

Source: LES, 2005a.

### Containers Used for Transportation and Storage of UF<sub>6</sub>

*Type 48X or Type 48Y cylinders would be used to transport feed material (natural UF<sub>6</sub>) to the proposed NEF site. Only 48Y cylinders would be used for temporary storage of DUF<sub>6</sub> on the UBC Storage Pad. The difference between the Type 48X and 48Y cylinders is their capacity. Both containers are constructed of American Society for Testing and Materials (ASTM) type A-516 steel, and both can be used to transport UF<sub>6</sub> enriched up to 4.5 percent <sup>235</sup>U.*

*Type 30B containers would be used to transport enriched UF<sub>6</sub> to fuel fabrication facilities. Type 30B containers have additional design requirements as specified in 10 CFR § 71.51 to permit the safe transportation of higher enriched UF<sub>6</sub> than the Type 48X or 48Y containers.*

	<b>Type 48X</b>	<b>Type 48Y</b>	<b>Type 30B</b>
Diameter	1.2 meters (48 inches)	1.2 meters (48 inches)	0.76 meter (30 inches)
Length	3.0 meters (119 inches)	3.8 meters (150 inches)	2.06 meters (81 inches)
Wall Thickness	16 millimeters (0.625 inch)	16 millimeters (0.625 inch)	12.7 millimeters (0.5 inch)
Empty Weight	2,041 kilograms (4,500 pounds)	2,359 kilograms (5,200 pounds)	635 kilograms (1,400 pounds)
UF <sub>6</sub> Capacity	9,540 kilograms (21,000 pounds)	12,500 kilograms (27,560 pounds)	2,277 kilograms (5,020 pounds)

Sources: DOE, 1999a; LES, 2005a; USEC, 1995.

### Production Process Systems

The primary product of the proposed NEF would be enriched UF<sub>6</sub> product. Production of enriched UF<sub>6</sub> would require the safe operation of multiple plant support systems to ensure the safe operation of the facility. The principal process systems required for the safe and efficient production of enriched UF<sub>6</sub> product would include the following:

- Decontamination System.
- Fomblin® Oil Recovery System.
- Liquid Effluent Collection and Treatment System.
- Stormwater Detention/Retention Basins.
- Solid Waste Collection System.
- Gaseous Effluent Vent Systems.
- Centrifuge Test and Postmortem Exhaust Filtration System.

### *Decontamination System*

The Decontamination System would be designed to remove radioactive contamination from centrifuges, pipes, instruments, and other potentially contaminated equipment. The system would contain equipment and processes to disassemble, clean and degrease, decontaminate, and inspect plant equipment. Scrap and

waste material from the decontamination process would be sent to the solid or liquid waste processing system for segregation and treatment prior to offsite disposal at a licensed facility. Exhaust air from the decontamination system area would pass through the gaseous effluent vent systems before discharge to the atmosphere.

#### *Fomblin® Oil Recovery System*

Vacuum pumps would maintain the vacuum between the rotor and casing of the centrifuge. The pumps would use a perfluorinated polyether oil, such as Fomblin® oil, which is a highly fluorinated, nonflammable, chemically inert, thermally stable oil for vacuum pump lubrication and seal maintenance. The Fomblin® oil would provide long service life and would not react with UF<sub>6</sub> gas. Disposal and replacement of the oil is very expensive, which makes recovery and reuse the preferred practice. The Fomblin® Oil Recovery System would reclaim spent oil from the UF<sub>6</sub> processing system, and filter and recondition it for reuse by the proposed NEF. The recovery would employ anhydrous sodium carbonate (soda ash) in a laboratory-scale precipitation process to remove the primary impurities and activated carbon to remove trace amounts of hydrocarbons.

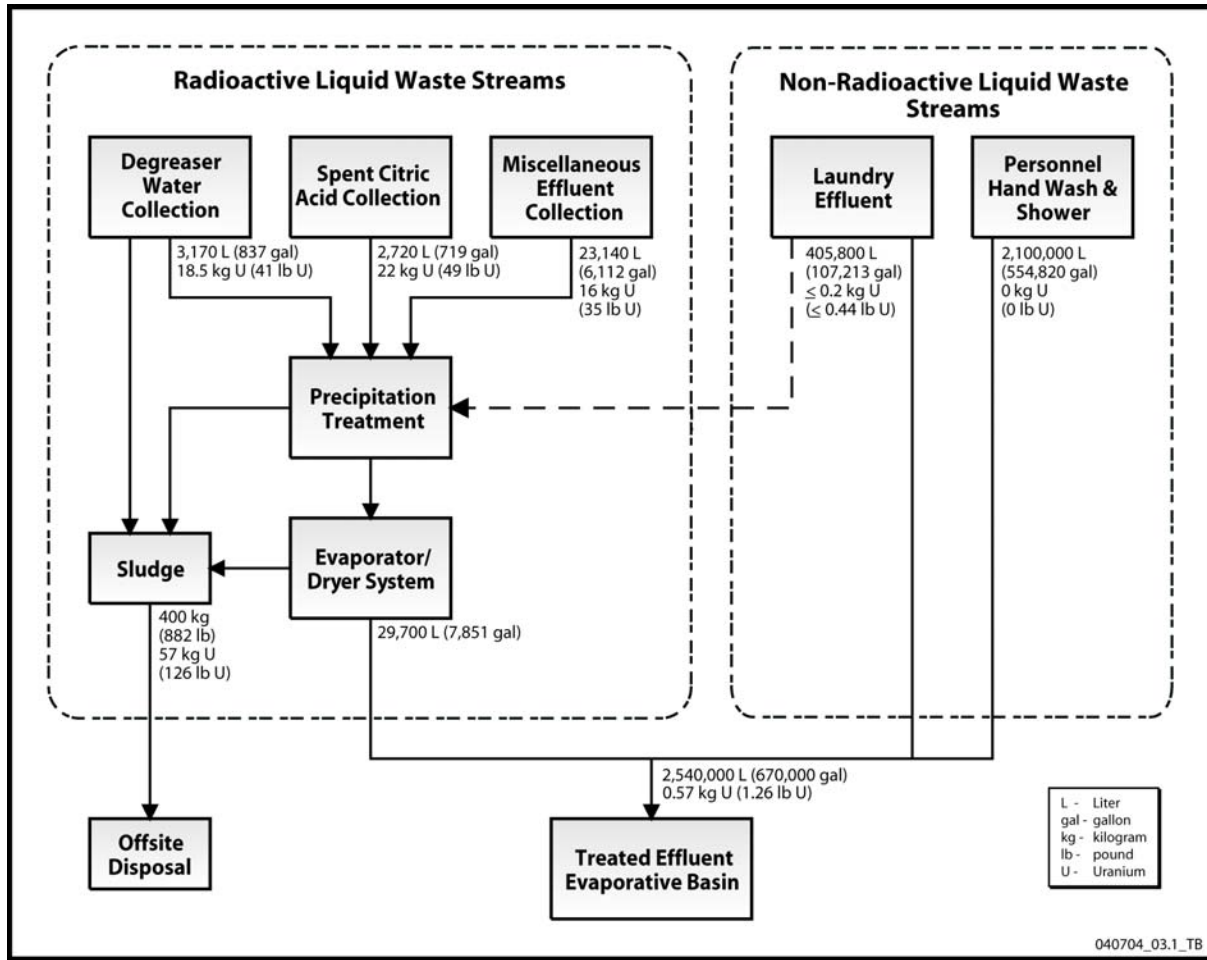
#### *Liquid Effluent Systems*

The Liquid Effluent Collection and Treatment System would collect potentially contaminated liquid effluents generated in a variety of plant operations and processes. These liquid effluents would be collected in holding tanks and then transferred to bulk storage tanks prior to disposal. Significant and slightly contaminated liquids would be processed for uranium recovery while noncontaminated liquids would be rerouted to the Treated Effluent Evaporative Basin. Figure 2-10 shows the annual effluent input streams, which include hydrolyzed UF<sub>6</sub>, degreaser water, citric acid, laundry water, floor-wash water, hand-wash/shower water, and miscellaneous effluent.

The Treated Effluent Evaporative Basin would receive liquid discharged from the Liquid Effluent Collection and Treatment System. This liquid could contain low concentrations of uranium compounds and uranium decay products. This uranium-bearing material would settle to the bottom of the Treated Effluent Evaporative Basin and collect in the sludge on the bottom of the basin during the operation of the proposed NEF. The sludge would be disposed of as low-level radioactive waste during the decommissioning of the facility.

The Treated Effluent Evaporative Basin would be a double-lined basin built in accordance with New Mexico Environment Department Guidelines for Liner Material and Site Preparation for Synthetically-Lined Lagoons. The basin foundation would be about 60-centimeter (2-foot) thick clay layer, compacted in place and covered with a high-strength geosynthetic liner. A leak-collection piping system and drainage mat would be installed on top of the liner. A sump system would collect any liquid from the collection piping and pump it back into the Treated Effluent Evaporative Basin. A second geosynthetic liner would cover the collection piping, mat, and sump system. The top liner would be covered with a 30-centimeter (1-foot) thick layer of compacted clay.

Animal-friendly fencing would surround the Treated Effluent Evaporative Basin to prevent access by animals and unauthorized personnel. The surface of the basin would be covered with surface netting or other suitable material to exclude waterfowl.



**Figure 2-10 Liquid Effluent Collection and Treatment**

*Stormwater Detention/Retention Basins and Septic Systems*

All normal stormwater and runoff waters would be routed from the buildings, parking lot, and roadways to a Site Stormwater Detention Basin and allowed to infiltrate the soil or evaporate. Runoff and stormwaters from the UBC Storage Pad would be routed to the lined UBC Storage Pad Stormwater Retention Basin for evaporation. This would allow the water from the UBC Storage Pad to be monitored and minimize the potential for contaminants entering the soil.

Six separate septic systems throughout the proposed NEF would collect and process all sanitary waste from the facility in accordance with applicable regulations.

Neither the Treated Effluent Evaporative Basin nor the two stormwater basins would meet the definition of “surface water” in the State of New Mexico Standards for Interstate and Intrastate Surface Waters. According to these standards, “Waste treatment systems, including treatment ponds or lagoons designed to meet requirements of the Clean Water Act (other than cooling ponds as defined in 40 CFR § 423.11(m) which also meet the criteria of this definition), are not surface waters of the State, unless they were originally created in surface waters of the State or resulted in the impoundment of surface waters of the State” (NMWQCC, 2002). However, under the *New Mexico Water Quality Act*, the State regulates water-

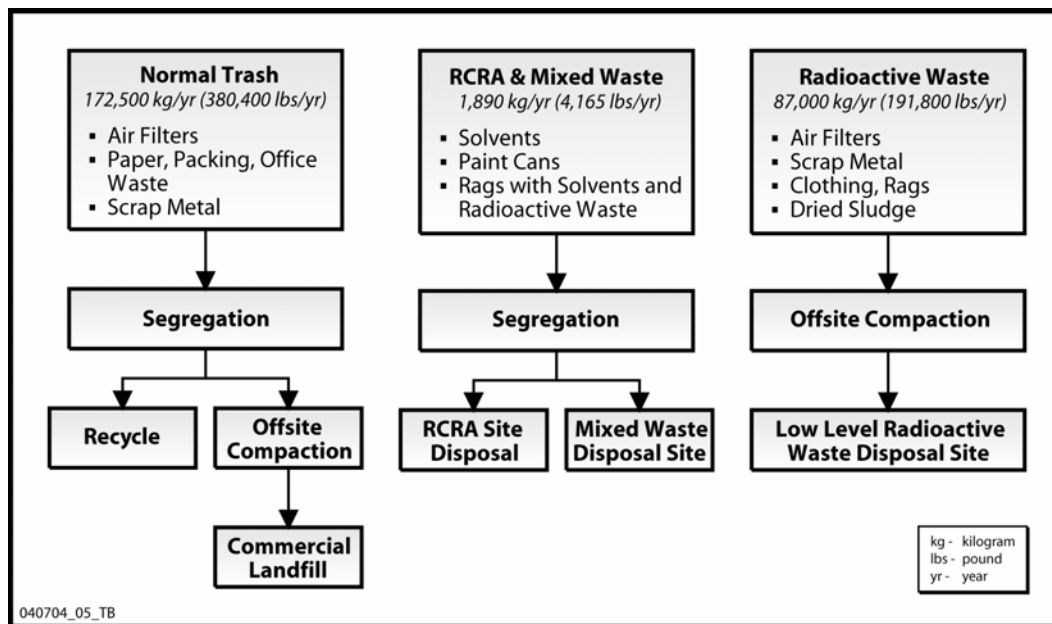
discharge sources. LES has submitted a Groundwater Discharge Permit/Plan application to the w as presented in Table 1-3. The application is undergoing New Mexico Environment Department Water Quality Bureau review.

### Solid Waste Collection System

In addition to the DUF<sub>6</sub>, operation of the proposed NEF would generate other radioactive and nonradioactive solid wastes. Solid waste would be segregated and processed based on its classification as wet solid or dry solid wastes and segregated into radioactive, hazardous, or mixed-waste categories. Wet solid waste would include wet trash (waste paper, packing material, rags, wipes, etc.), oil-recovery sludge, oil filters, miscellaneous oils (such as cutting machine oils), solvent recovery sludge, and uranic waste precipitate. Dry solid waste would include trash (combustible and non-metallic items), activated carbon, activated alumina, activated sodium fluoride, high efficiency particulate air (HEPA) filters, scrap metal, laboratory waste, and dryer concentrate.

Radioactive solid waste would be sent to a licensed low-level radioactive waste disposal facility. Material that would be classified as mixed waste or *Resource Conservation and Recovery Act* (RCRA) material would be disposed of in accordance with the State of New Mexico regulations (EPA, 2003). Nonradioactive wastes—including office and warehouse trash such as wood, paper, and packing materials; scrap metal and cutting oil containers; and building ventilation filters—would be sent to a commercial landfill for disposal.

Figure 2-11 shows the disposal pathways and anticipated volumes for the miscellaneous solid waste that would be generated by the proposed NEF.



**Figure 2-11 Disposal Pathways and Anticipated Volumes for Solid Waste**

### *Gaseous Effluent Vent Systems*

Gaseous effluent vent systems would be designed to collect the potentially contaminated gaseous streams in the plant and treat them before discharge to the atmosphere. The system would route these streams through a filter system prior to exhausting out a vent stack which would contain a continuous monitor to measure radioactivity levels. There are two gaseous effluent vent systems for the plant: (1) the Technical Services Building gaseous effluent vent system and (2) the Separations Building gaseous effluent vent system.

The Technical Services Building heating, ventilation, and air conditioning system performs a confinement ventilation function for potentially contaminated areas in the Technical Services Building. Potentially contaminated areas in the Technical Services Building would include ventilation air from the Ventilation Room, Decontamination Workshop, Laundry, Fomblin® Oil Recovery System, Decontamination System, Chemical Laboratory, and Vacuum Pump Rebuild Workshop. The total airflow would be handled by a central gaseous effluent distribution system that would maintain the areas under negative pressure. The treatment system would include a single train of three air filters (a pre-filter, a HEPA filter, and an activated carbon filter impregnated with potassium carbonate); centrifugal fan; automatically operated inlet-outlet isolation dampers; monitoring system; and differential pressure transducers.

The Separations Building gaseous effluent vent system sub-atmospheric duct system transports potentially contaminated gases to a set of redundant filters (a pre-filter, a HEPA filter, and an activated carbon filter impregnated with potassium carbonate) and fans. The cleaned gases would be discharged via rooftop stacks to the atmosphere. The fan would maintain an almost constant sub-atmospheric pressure in front of the filter section by means of a differential pressure controller.

The Technical Services Building gaseous effluent vent system would be the same as the Separations Building gaseous effluent vent system except that it would have one set of filters and a single fan. The gaseous effluent vent system and Technical Services Building heating, ventilation, and air conditioning exhaust points would be on the roof of the Technical Services Building.

Urenco's experience in Europe shows uranium discharges from gaseous effluent vent systems are less than 10 grams (0.35 ounces) per year (LES, 2005a; LES, 2005b).

Nonradioactive gaseous effluents would include argon, helium, nitrogen, hydrogen fluoride, and methylene chloride (LES, 2005a). Approximately 440 cubic meters (15,540 cubic feet) of helium, 190 cubic meters (6,709 cubic feet) of argon, 53 cubic meters (1,872 cubic feet) of nitrogen, and 1.0 kilogram (2.2 pounds) of hydrogen fluoride gaseous effluent would be released each year. The hydrogen fluoride gaseous effluent would be from the chemical reaction of  $UF_6$  with water vapor. In addition, 610 liters (161 gallons) of methylene chloride and 40 liters (11 gallons) of ethanol would be vented each year.

Two natural gas-fired boilers (one in operation and one spare) would be used to provide hot water for the plant heating system. At 100-percent power, each boiler would emit approximately 0.8 metric tons (0.88 tons) per year of volatile organic compounds; 0.5 metric tons (0.55 tons) per year of carbon monoxide; and 5.0 metric tons (5.5 tons) per year of nitrogen dioxide (LES, 2005a). The boilers would not require an air quality permit from the State of New Mexico (LES, 2005a). Specifically, by letter dated May 27, 2004, the New Mexico Environment Department Air Quality Bureau acknowledged receipt of the Notice of Intent application and notified LES that the application will serve as the Notice of Intent in accordance with 20.2.73 NMAC. The New Mexico Environment Department Air Quality Bureau also notified LES of its determination that an air quality permit under 20.2.72 NMAC is not required and that New Source

Performance Standards and National Emission Standards for Hazardous Air Pollutants (NESHAP) do not apply to the proposed NEF (LES, 2005d).

In addition, there would be two diesel generators onsite for use as emergency electrical power sources. Because the diesel generators would have the potential to emit more than 90,700 kilograms (100 tons) per year of a regulated air pollutant, they would only run a limited number of hours per year in order not to be subject to NESHAP. The New Mexico Environment Department Air Quality Bureau stated, along with the specifics mentioned in the previous paragraph, that operation of the two emergency diesel generators and surface-coating activities are exempt from permitting requirements provided all requirements are met, as specified in 20.2.72.202 B (3) and 20.2.72.202 B (6) NMAC (LES, 2005d).

#### *Centrifuge Test and Postmortem Facilities Exhaust Filtration System*

The Centrifuge Test and Postmortem Facilities Exhaust Filtration System would exhaust potentially hazardous contaminants from the Centrifuge Test and Postmortem Facilities. The system would also ensure the Centrifuge Postmortem Facility is maintained at a negative pressure with respect to adjacent areas.

The ductwork would be connected to a single-filter station and exhaust through either of two 100-percent fans. The filter station and either of the two fans would be able to handle 100 percent of the effluent exhaust. One of the fans would normally be on standby status. Activities that require the Centrifuge Test and Postmortem Facilities Exhaust Filtration System to be operational would be manually stopped if the system fails or shuts down. After filtration, the clean gases would be discharged through the monitored exhaust stack on the Centrifuge Assembly Building. The Centrifuge Assembly Building exhaust stack would be monitored for hydrogen fluoride and alpha radiation.

### **2.1.8 Proposed Facility Decontamination and Decommissioning**

The proposed NEF would be licensed for 30 years. Before license termination, the proposed NEF would be decontaminated and decommissioned to levels suitable for unrestricted use. All proprietary equipment and radiologically contaminated components would be removed, decontaminated, and shipped to a licensed disposal facility. The buildings, structures, and selected support systems would be cleaned and released for unrestricted use. Before the start of the decontamination and decommissioning activities, LES would prepare a Decommissioning Plan in accordance with the requirements of 10 CFR § 70.38 and submit it to the NRC for approval.

Decontamination and dismantling of the equipment would be conducted in the three Separations Building modules sequentially (in three phases) over a nine-year time frame. Decommissioning of the remaining plant systems and buildings would begin after operations in the final Separations Building module were terminated. The sequential construction of the three Cascade Halls would allow each hall to be isolated during the decommissioning activities. This isolation would help prevent re-contamination of an area once it has been fully decontaminated.

At the end of the useful life of each Separations Building module, the enrichment-process equipment would be shut down and UF<sub>6</sub> removed to the fullest extent possible by normal process operation. This would be followed by evacuation and purging with nitrogen. The shutdown and purging portion of the decommissioning process would take approximately three months for each cascade.

Prompt decontamination or removal of all materials from the site that would prevent release of the facility for unrestricted use would be performed. This approach would avoid long-term storage and monitoring

of radiological and hazardous wastes onsite. All of the enrichment equipment would be removed, and only the building shells and site infrastructure would remain. All remaining facilities would be decontaminated to levels that would allow for unrestricted use. DUF<sub>6</sub>, if not already sold or otherwise disposed of prior to decommissioning, would be disposed of in accordance with regulatory requirements. Other miscellaneous radioactive and hazardous wastes would be packaged and shipped to a licensed facility for disposal.

Following decommissioning, the entire site would be available for unrestricted use. Decommissioning would generally include the following activities:

- Installation of decontamination facilities.
- Purging of process systems.
- Dismantling and removal of equipment.
- Decontamination and destruction of confidential and secret, restricted-data material.
- Sales of salvaged materials.
- Disposal of wastes.
- Completion of a final radiation survey and spot decontamination.

Decommissioning would require residual radioactivity to be reduced below regulatory limits so the facilities could be released for unrestricted use. The intent of decommissioning would be to release the site for unrestricted use.

As shown in Table 2-1, the decontamination and decommissioning effort would start in 2027 and end by 2036. Specific details of the planned decommissioning of the proposed NEF would be formally proposed in the Decommissioning Plan submitted to the NRC in 2025. Optimization of the decontamination and decommissioning process would occur near the end of the proposed facility's life to take advantage of advances in technology that are likely to occur in between now and the start of the decontamination and decommissioning activities. The timeframe to accomplish both dismantling and decontamination is estimated to be approximately 3 years for each Separations Building module.

### Decontamination of Facilities

Decontamination would deal primarily with radiological contamination from <sup>238</sup>U, <sup>235</sup>U, <sup>234</sup>U, and their daughter products. The primary contaminant throughout the plant would be in the form of small amounts of uranium oxide and uranium fluoride compounds.

At the end of the plant's life, some of the equipment, most of the buildings, and all of the outdoor areas should already be acceptable for release for unrestricted use. All basins would be sampled, tested, and disposed of, if required, at the appropriate disposal facility in accordance with pertinent regulations (LES, 2005d). Excavations and berms would be leveled to restore the land to a natural contour (LES, 2005a). If accidentally contaminated during normal operation, they would be cleaned and decontaminated when the contamination was discovered. This would limit the scope of decontamination necessary at the time of decommissioning.

Contaminated plant components would be cut up or dismantled, and then processed through the decontamination facilities. Contamination of site structures would be limited to areas in the Separations Building modules and Technical Services Building, and would be maintained at low levels throughout plant operation by regular surveys and cleaning. The use of special sealing and protective coatings on porous and other surfaces that might become radioactively contaminated during operation would simplify the decontamination process and the use of standard good-housekeeping practices during operation of the



proposed facility would ensure that final decontamination of these areas would require minimal removal of surface concrete or other structural material.

### *Decontamination of Centrifuges*

The centrifuges would be processed through a specialized decontamination facility. The following operations would be performed:

- Removal of external fittings.
- Removal of bottom flange, motor and bearings, and collection of contaminated oil.
- Removal of top flange, and withdrawal and disassembly of internals.
- Degreasing of items as required.
- Decontamination of all recoverable items for smelting.
- Destruction of other classified portions by shredding, crushing, smelting, etc.

### Dismantling the Facility

Dismantling would require cutting and disconnecting all components requiring removal. The activities would be simple but very labor-intensive and generally require the use of protective clothing. The work process would be optimized through consideration of the following measures:

- Minimizing the spread of contamination and the need for protective clothing.
- Balancing the number of cutting and removal operations with the resultant decontamination and disposal requirements.
- Optimizing the rate of dismantling with the rate of decontamination facility throughput.
- Providing storage and laydown space as required for effective workflow, criticality, safety, security, etc.

To avoid laydown space and contamination problems, dismantling would proceed generally no faster than the downstream decontamination process.

Items to be removed from the facilities would be categorized as potentially re-usable equipment, recoverable scrap, and wastes. However, operating equipment would not be assumed to have reuse value. Wastes would also have no salvage value.

A significant amount of scrap aluminum, steel, copper, and other metals would be recovered during the disassembly of the enrichment equipment. For security and convenience, the uncontaminated materials would likely be shredded or smelted to standard ingots and, if possible, sold at market price. The contaminated materials would be disposed of as low-level radioactive waste.

### Disposal

All wastes produced during decommissioning would be collected, handled, and disposed of in a manner similar to that described for those wastes produced during normal operation. Wastes would consist of normal industrial trash, nonhazardous chemicals and fluids, small amounts of hazardous materials, and radioactive wastes. Radioactive wastes would consist primarily of crushed centrifuge rotors, trash, and citric cake. Citric cake consists of uranium and metallic compounds precipitated from citric acid

decontamination solutions. Approximately 5,153 cubic meters (6,740 cubic yards) of radioactive waste would be generated over the 9-year decommissioning period. This waste would be subject to further volume-reduction processes prior to disposal. Table 2-7 provides estimates for the amounts and types of radioactive wastes expected to be disposed.

Radioactive wastes would ultimately be disposed of in licensed low-level radioactive waste disposal facilities. Hazardous wastes would be disposed of in licensed hazardous waste disposal facilities. Nonhazardous and nonradioactive wastes would be disposed of in a manner consistent with good industrial practice and in accordance with applicable regulations. A complete estimate of the wastes and effluent to be produced during decommissioning would be provided in the Decommissioning Plan that LES would submit prior to the start of the decommissioning.

**Table 2-7 Radioactive Waste Disposal Volume from Dismantling Activities**

<b>Low-Level Radioactive Waste Type</b>	<b>Disposal Volume cubic meters (cubic yards)</b>	<b>Maximum Number of Drums<sup>a</sup></b>
Separation Modules:		
Solidified Liquid Wastes	432 (565)	2,159
Centrifuge Components, Piping, and Other Parts	1,036 (1,355)	5,180
Aluminum	3,602 (4,711)	Not Supplied
Other Buildings:		
Miscellaneous Low-Level Waste	83 (2,930)	400
<b>Total</b>	<b>5,153 (6,740)</b>	<b>7,739</b>

<sup>a</sup> 55-gallon (208-liter) drums.  
Source: LES, 2005b.

### Final Radiation Survey

A final radiation survey would verify complete decontamination of the proposed NEF prior to allowing the site to be released for unrestricted use. The evaluation of the final radiation survey would be based in part on an initial radiation survey performed prior to initial operation. The initial site radiation survey would determine the natural background radiation levels in the area of the proposed NEF, thereby providing a benchmark for identifying any increase in radioactivity levels in the area. The final survey would measure radioactivity over the entire site and compare it to the original benchmark survey. The intensity of the survey would vary depending on the location (i.e., the buildings, the immediate area around the buildings, and the remainder of the site). A final radiation survey report would document the survey procedures and results, and would include, among other things, a map of the survey of the proposed site, measurement results, and a comparison of the proposed NEF site's radiation levels to the surrounding area. The results would be analyzed to show that they were below allowable residual radioactivity limits; otherwise, further decontamination would be performed.

## 2.1.9 DUF<sub>6</sub> Disposition Options

At full production, the proposed NEF would generate 7,800 metric tons per year (8,600 tons per year) of DUF<sub>6</sub>. Initially, the DUF<sub>6</sub> would be stored in Type 48Y cylinders (UBC) on the UBC Storage Pad (LES, 2005a). Each Type 48Y cylinder would hold approximately 12.5 metric tons (13.8 tons), which means that the site, at full production, would generate approximately 627 cylinders of DUF<sub>6</sub> every year. During the operation of the facility, the plant could generate and store up to 15,727 cylinders of DUF<sub>6</sub>. LES would own the DUF<sub>6</sub> and maintain the UBC's while they are in storage. Maintenance activities would include periodic inspections for corrosion, valve leakage, or distortion of the cylinder shape, and touch-up painting as required. Problem cylinders would be removed from storage and the material transferred to another storage cylinder. The proposed storage area would be kept neat and free of debris, and all stormwater or other runoff would be routed to the UBC Storage Pad Stormwater Retention Basin for monitoring and evaporation.

### Classification of DUF<sub>6</sub>

The U.S. Department of Energy (DOE) has evaluated a number of alternative and potential beneficial uses for DUF<sub>6</sub> (DOE, 1999b; Brown et al, 1997). However, the current DUF<sub>6</sub> consumption rate is low compared to the existing DUF<sub>6</sub> inventory (DOE, 1999b), and the potential for a significant commercial market for the DUF<sub>6</sub> to be generated by the proposed NEF is considered to be low. The NRC has assumed that the excess DOE and commercial inventory of DUF<sub>6</sub> would be disposed of as waste (NRC, 1995).

In Memorandum and Order CLI-05-05, the Commission concluded that depleted uranium is appropriately categorized as a low-level radioactive waste (NRC, 2005). Therefore, for the purpose of this EIS, the DUF<sub>6</sub> generated by the proposed NEF will be treated as a Class A low-level waste.

All DUF<sub>6</sub> would be removed from the proposed NEF for disposition outside the State of New Mexico before decommissioning is completed (LES, 2005a). This EIS evaluates in detail two DUF<sub>6</sub> disposition options. These options are described in the following subsections, and Chapter 4 discusses their potential environmental impacts. Section 2.2 discusses additional DUF<sub>6</sub> disposition options but, for the reasons discussed in that section, these options are not evaluated in detail.

### *Waste Classification of Depleted Uranium*

*Depleted uranium is different from most low-level radioactive waste in that it consists mostly of long-lived isotopes of uranium, with small quantities of thorium-234 and protactinium-234. Additionally, in accordance with 10 CFR Parts 40 and 61, depleted uranium is a source material and, if treated as a waste, it would fall under the definition of a low-level radioactive waste per 10 CFR § 61.55(a). The Commission reaffirmed this waste classification in the CLI-05-05 Memorandum and Order dated January 18, 2005. This means that it could be disposed of in a licensed low-level radioactive waste facility if it is in a suitably stable form and meets the performance requirements of 10 CFR Part 61. Therefore, under 10 CFR § 61.55(a), depleted uranium is a low-level radioactive waste.*

*Sources: NRC, 1991; NRC, 2005.*

The Defense Nuclear Facilities Safety Board has reported that long-term storage of DUF<sub>6</sub> in the UF<sub>6</sub> form represents a potential chemical hazard if not properly managed (DNFSB, 1995). For this reason, alternatives for the strategic management of depleted uranium include the conversion of DUF<sub>6</sub> stock to a more stable uranium oxide (e.g., triuranium octaoxide [U<sub>3</sub>O<sub>8</sub>]) form for long-term management (OECD, 2001). DOE also evaluated multiple disposition options for DUF<sub>6</sub> and agreed that conversion to U<sub>3</sub>O<sub>8</sub> was preferable for long-term storage and disposal of the depleted uranium due to its chemical stability (DOE, 2000a). Therefore, all the options evaluated in the EIS include conversion of the DUF<sub>6</sub> to U<sub>3</sub>O<sub>8</sub>.

Two options are proposed for disposition of DUF<sub>6</sub>. The first option would be to ship the material to a private conversion facility prior to disposal (Option 1). An alternative available under the provisions of the United States Enrichment Corporation (USEC) Privatization Act of 1996 would be to ship the material to a DOE conversion facility, either at Portsmouth, Ohio, or at Paducah, Kentucky, for temporary storage and eventual processing by the DOE conversion facility prior to disposal by DOE (Option 2). DOE has issued two final EISs to construct and operate conversion facilities at Paducah, Kentucky, and Portsmouth, Ohio (DOE, 2004a; DOE, 2004b). Additionally, DOE has issued two Records of Decision and construction of the conversion facilities began in July 2004 (DOE, 2004c; DOE, 2004d). Figure 2-12 shows the disposal flow paths for DUF<sub>6</sub> evaluated in this EIS.

In this EIS, it is assumed that the proposed private conversion facility would be using the same technology adapted for use by DOE in its conversion facilities. This technology would apply a continuous dry-conversion process based on the commercial process used by Framatome Advanced Nuclear Power, Inc., fuel fabrication facility in Richland, Washington (DOE, 2004a; DOE, 2004b; LES, 2005a).

Conversion of UF<sub>6</sub> to U<sub>3</sub>O<sub>8</sub> generates hydrogen fluoride gas. This gas is dissolved in water to form aqueous hydrofluoric acid which is easier to store and handle than the hydrogen fluoride gas. The aqueous hydrofluoric acid could be sold to a commercial hydrofluoric acid supplier for reuse if the radioactive content is below free release limits, or it could be converted to calcium fluoride (CaF<sub>2</sub>) for sale or disposal. Because conversion of the large quantities of DUF<sub>6</sub> at the DOE Portsmouth and Paducah Gaseous Diffusion Plant sites would be occurring at the same time the proposed NEF would be in operation, it is not certain that the market for aqueous hydrofluoric

### ***What is Class A Low-level Radioactive Waste?***

*Low-level radioactive waste is defined by what it is not; that is, material classified as low-level radioactive waste does not meet the criteria of high-level radioactive waste, transuranic waste, or mill tailings. Low-level radioactive waste represents about 90 percent of all radioactive wastes, by volume. It includes ordinary items such as cloth, bottles, plastic, wipes, etc. that become contaminated with some radioactive material. These wastes can be generated anywhere radioisotopes are produced or used -- in nuclear power stations, local hospitals, university research laboratories, etc.*

*For regulatory purposes, there are three classes of low-level radioactive wastes. The NRC classifies low-level radioactive waste as Class A, Class B, or Class C based on the concentration of certain long-lived radionuclides as shown in Tables 1 and 2 of 10 CFR § 61.55 and the physical form and stability requirements set forth in 10 CFR § 61.56. Waste that contains the smallest concentration of the identified radionuclides and meets the stability requirement is considered Class A waste and could be considered for near-surface disposal. Classes B and C wastes contain greater concentrations of radionuclides with longer half-lives, and have stricter disposal requirements than Class A.*

*Sources: 10 CFR § 61.55 and 61.56.*

acid<sup>1</sup> and calcium fluoride would allow for the economic reuse of the material generated by the proposed NEF (DOE, 2000a; DOE, 2000b). Therefore, only immediate neutralization of the hydrofluoric acid by conversion to calcium fluoride with disposal at a licensed low-level radioactive waste disposal facility is considered in this analysis. Descriptions of the options are set forth below.

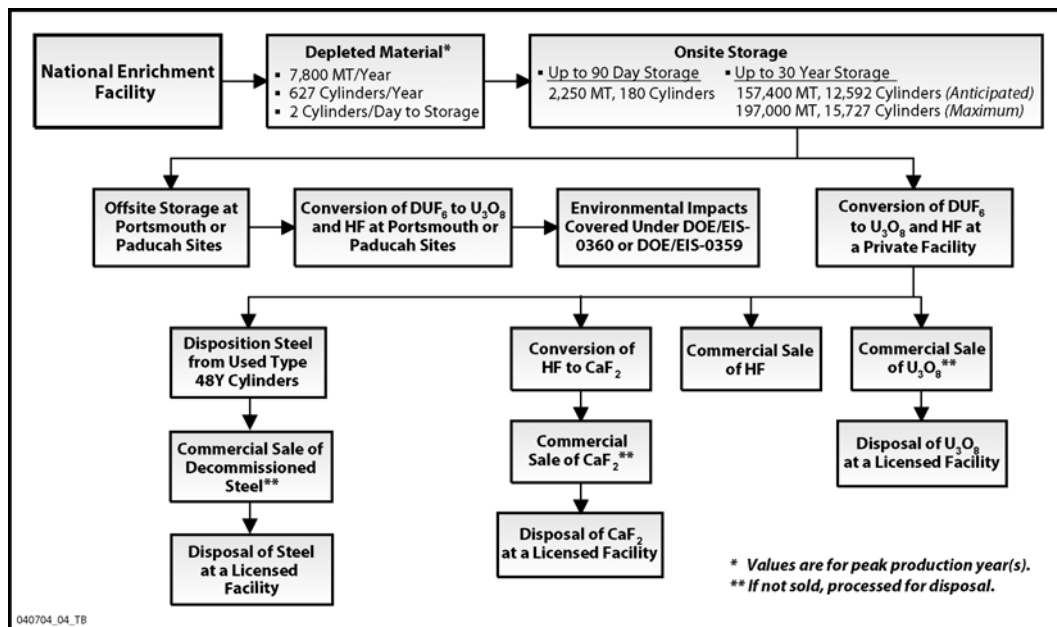


Figure 2-12 Disposal Flow Paths for DUF<sub>6</sub>

#### Option 1: Private Sector Conversion and Disposal

This disposition option is private sector conversion of the depleted uranium hexafluoride into uranium oxide and hydrofluoric acid. The conversion could occur within the region of influence of the proposed NEF or at some other site within the United States. On February 3, 2005, LES and AREVA announced the signing of a memorandum of understanding that could lead to the construction of a privately owned uranium hexafluoride conversion plant to support the operation of the proposed NEF. The memorandum of understanding is only the first step in licensing, building, and operating the conversion facility. No final location has been identified for this private conversion facility. This EIS considers that the private conversion facility could be located beyond the region of influence of the proposed NEF site (this is known as Option 1a).

One potential location for a private conversion facility would be near the ConverDyn UF<sub>6</sub> generation facility in Metropolis, Illinois (LES, 2005a; LES, 2005b). The existing ConverDyn plant converts natural U<sub>3</sub>O<sub>8</sub> (yellowcake) from mining and milling operations into UF<sub>6</sub> for feed to enrichment facilities such as the proposed NEF (ConverDyn, 2004). Construction of a private DUF<sub>6</sub> to U<sub>3</sub>O<sub>8</sub> conversion facility near the ConverDyn plant in Metropolis, Illinois, could allow for the possible reuse of the hydrogen fluoride produced during the DUF<sub>6</sub> to U<sub>3</sub>O<sub>8</sub> conversion process to generate more UF<sub>6</sub> feed material while the depleted U<sub>3</sub>O<sub>8</sub> would be shipped for final dispositioning.

<sup>1</sup>For the purposes of this EIS, when discussing the conversion of DUF<sub>6</sub> to U<sub>3</sub>O<sub>8</sub>, the wording of hydrofluoric acid refers to aqueous hydrofluoric acid. Releases of hydrofluoric acid refers to the vapor that forms from the reaction of UF<sub>6</sub> to the moisture in the atmosphere.

The NRC staff has determined that construction of a private  $\text{DUF}_6$  to  $\text{U}_3\text{O}_8$  conversion plant near Metropolis, Illinois, would have similar environmental impacts as construction of an equivalent facility anywhere in the United States. The advantage of selecting the Metropolis, Illinois, location is the proximity of the ConverDyn natural  $\text{U}_3\text{O}_8$  (yellowcake) to  $\text{UF}_6$  conversion facility and, for the purposes of assessing impacts, the DOE conversion facility in nearby Paducah, Kentucky, for converting DOE-owned  $\text{DUF}_6$  to  $\text{U}_3\text{O}_8$ . Because the proposed private plant would be similar in size and the effective area would be the same as the Paducah conversion plant, the environmental impacts would be similar. DOE has completed an EIS for the Paducah conversion facility which defines the impacts of the proposed DOE conversion facility (DOE, 2004a).

The  $\text{DUF}_6$  would be shipped from the proposed NEF site to the new conversion facility. The hydrofluoric acid produced by the conversion process could be re-used by ConverDyn in its existing hydrofluorination process to convert natural  $\text{U}_3\text{O}_8$  (yellowcake) to  $\text{UF}_6$  (ConverDyn, 2004). Once converted,  $\text{U}_3\text{O}_8$  and the associated waste streams would be transported to a licensed low-level radioactive waste disposal facility for final disposition, as discussed below.

This EIS also considers that the private conversion facility could be located near the proposed NEF, (this is known as Option 1b). This would involve a private sector company constructing and operating a new conversion facility close (within 6.4 kilometers [4 miles]) to the proposed NEF. By constructing and operating a private conversion facility in close proximity to the proposed NEF, the environmental impacts from the private conversion facility would affect the same area as the proposed NEF. Additionally, shipping and conversion of the depleted uranium could be accomplished within days of the filling of the Type 48Y cylinders, which would minimize the amount of  $\text{DUF}_6$  stored onsite. The nearby conversion facility would be proportionally sized to meet the annual generation of 7,800 metric tons (8,600 tons) of  $\text{DUF}_6$  per year. It is further assumed that the hydrofluoric acid generated at the adjacent conversion facility would not be marketable for reuse due to the large amount that would be available from the DOE conversion plants. The hydrofluoric acid would be converted to calcium fluoride for disposal at a licensed low-level radioactive waste disposal site.

#### Option 2: DOE Conversion and Disposal

DOE is constructing two conversion plants to convert the  $\text{DUF}_6$  now in storage at Portsmouth, Ohio; Paducah, Kentucky; and Oak Ridge, Tennessee, to  $\text{U}_3\text{O}_8$  and hydrofluoric acid. LES proposes to transport the  $\text{DUF}_6$  generated by the proposed NEF to either of these new facilities and paying DOE to convert and dispose of the material. This plan is based on Section 3113 of the 1996 *USEC Privatization Act* that states the DOE “shall accept for disposal low-level radioactive waste, including depleted uranium if it were ultimately determined to be low-level radioactive waste, generated by [...] any person licensed by the Nuclear Regulatory Commission to operate a uranium enrichment facility under Sections 53, 63, and 193 of the *Atomic Energy Act of 1954* (42 U.S.C. 2073, 2093, and 2243).” On January 18, 2005, the

Commission issued its ruling that depleted uranium is considered a form of low-level radioactive waste (NRC, 2005). The Commission also stated that “pursuant to Section 3113 of the USEC Privatization Act, disposal of the LES depleted uranium tails at a DOE facility represents a “plausible strategy” for the disposition of depleted uranium tails” (NRC, 2005).

### Disposal Options

Converted DUF<sub>6</sub> in the form of U<sub>3</sub>O<sub>8</sub> can be considered a Class A low-level radioactive waste (NRC, 1991). Following conversion, the only currently available viable disposal option would be disposal of the depleted U<sub>3</sub>O<sub>8</sub>, based on its waste classification and site-specific evaluation, in a near-surface emplacement at a licensed low-level radioactive waste disposal facility within the borders of the United States. LES proposed disposal of the U<sub>3</sub>O<sub>8</sub> in an abandoned mine as its preferred option but no existing mine is currently licensed to receive or dispose of low-level radioactive waste nor has any application been made to license such a facility.

DOE recognizes that there could be commercial applications for the U<sub>3</sub>O<sub>8</sub>, and the possibility exists that other disposal options could become available in the future (after the satisfactory completion of appropriate NEPA or environmental review and licensing processes). If the U<sub>3</sub>O<sub>8</sub> could be applied in a commercial application (e.g., as radiation shielding), then it would reduce the disposition impacts in proportion to the amount of U<sub>3</sub>O<sub>8</sub> diverted to commercial applications. At this time, no viable commercial application for the material generated by the proposed NEF has been identified.

There are currently three active, licensed commercial low-level radioactive waste disposal facilities, all of which are located in Agreement States (licensing of the use and disposal of radioactive material is regulated by the State in accordance with agreements established with the NRC [NRC, 2003]). Additionally, DOE operates its own low-level radioactive waste disposal facility within the Nevada Test Site that is restricted to DOE-generated waste. Another company, Waste Control Specialists (WCS) is a commercial RCRA waste disposal facility located less than 3.2 kilometers (2 miles) east of the proposed NEF. WCS recently submitted an application to the State of Texas to license the company to dispose of low-level radioactive waste (WCS, 2004). The following summarizes the disposal sites and the regions of the United States that can ship low-level radioactive waste to each site (NRC, 2003):

- Barnwell, located in Barnwell, South Carolina. Currently, Barnwell accepts waste from most U.S. generators, as permitted by Atlantic Compact law. Beginning in 2008, Barnwell would only accept

### *DUF<sub>6</sub> Conversion Process*

*DUF<sub>6</sub> conversion is a continuous process in which DUF<sub>6</sub> is vaporized and converted to U<sub>3</sub>O<sub>8</sub> by reaction with steam and hydrogen in a fluidized-bed conversion unit. The hydrogen is generated using anhydrous ammonia, although an option of using natural gas is being investigated. Nitrogen is also used as an inert purging gas and is released to the atmosphere through the building stack as part of the clean off-gas stream. The depleted U<sub>3</sub>O<sub>8</sub> powder is collected and packaged for disposition. The process equipment would be arranged in parallel lines. Each line would consist of two autoclaves, two conversion units, a hydrofluoric acid recovery system, and process off-gas scrubbers. The Paducah facility would have four parallel conversion lines. Equipment would also be installed to collect the hydrofluoric acid co-product and process it into any combination of several marketable products. A backup hydrofluoric acid neutralization system would be provided to convert up to 100 percent of the hydrofluoric acid to calcium fluoride for storage and/or sale in the future, if necessary.*

*Sources: DOE, 2004a; DOE 2004b.*

waste from the Atlantic Compact States (Connecticut, New Jersey, and South Carolina). Barnwell is licensed by the State of South Carolina to receive Class A, B, and C wastes.

- Hanford, located in Hanford, Washington. Hanford accepts waste from the Northwest and Rocky Mountain compacts. Hanford is licensed by the State of Washington to receive Class A, B, and C wastes, but not mixed waste (*i.e.*, radioactive and hazardous waste). As New Mexico is a member of the Rocky Mountain Compact, the proposed NEF would be able to ship low-level radioactive waste to Hanford for disposal provided that the waste meets the Waste Acceptance Criteria for the facility.
- Envirocare, located in Clive, Utah. Envirocare accepts waste from all regions of the United States. Envirocare is licensed by the State of Utah to accept for disposal Class A waste only. Therefore, Envirocare is a disposal option for radioactive wastes generated at the proposed NEF.
- Nevada Test Site, located in southern Nye County, Nevada. The Nevada Test Site is a DOE disposal site for low-level radioactive waste from the various DOE sites and facilities across the United States. The Nevada Test Site was selected as the secondary disposal site for converted DUF<sub>6</sub> material generated at the Paducah, Kentucky, and Portsmouth, Ohio, DUF<sub>6</sub> conversion facilities (DOE, 2004a; DOE, 2004b). Because the Nevada Test Site is a DOE disposal site, it could receive low-level radioactive wastes generated by the proposed NEF only if ownership of these wastes is first transferred to the DOE.
- Waste Control Specialists (WCS) disposal facility, located in Andrews County, Texas. The WCS disposal facility is less than 3.2 kilometers (2 miles) east of the proposed NEF site. This facility is currently permitted to dispose of RCRA hazardous waste and licensed to temporarily store, but not dispose of, radioactive material under its current State of Texas Bureau of Radiation Control license L04971 (BRC, 2003). WCS recently submitted an application to the State of Texas to allow them to dispose of Class A, B, and C low-level radioactive waste (WCS, 2004). The application is for two separate facilities, a low-level radioactive waste disposal facility for the Texas Compact and a low-level radioactive waste and mixed low-level radioactive and hazardous waste Federal Waste Disposal Facility. Both the Compact Facility and Federal Waste Disposal Facility would be located within the boundaries of the WCS site in Andrews County, Texas.

In 1980, Congress passed the “Low-Level Radioactive Waste Policy Act” which requires States to provide for disposal of low-level radioactive waste generated within their own borders. The States of Texas and Vermont have joined together to form the Texas Compact for disposal of low-level radioactive waste generated by these member States. If its August 2, 2004 application is approved, WCS would become the low-level radioactive waste disposal site for the Texas Compact. As previously stated, a disposal site within the Texas Compact can only accept waste generated by the compact member States, unless the Compact specifically approves the disposal of out-of-compact waste. Approval of the other Compact (in this case, the Rocky Mountain Compact, in which the proposed NEF would be located) also would be required.

The WCS application includes a request for a separate Federal Waste Disposal Facility to dispose of both low-level radioactive waste and mixed low-level radioactive and hazardous wastes from federal facilities such as the DOE. If the license application is approved, the WCS facility would be able to dispose of Class A, B, and C low-level radioactive and mixed wastes (WCS, 2004).

Before the depleted uranium generated by the proposed NEF could be disposed at the proposed WCS Compact Facility, a series of legal procedures and approval processes would have to be successfully addressed. These procedures and processes include:



1. Approval by the State of Texas of WCS's application, including authorization by the State for the WCS Compact Facility to accept for disposal depleted uranium oxides of the type and quantities expected to be generated as a result of the proposed NEF's operations;
2. Approval by the Rocky Mountain Compact (in which the proposed NEF would be located) for the export of the depleted uranium oxides from the Compact; and
3. Approval by the Texas Compact for the import and disposal of the depleted uranium oxides generated as a result of the proposed NEF's operations.

The disposition of the depleted  $U_3O_8$  generated from the DOE conversion facilities at Paducah and Portsmouth would be either at the Envirocare site (DOE's proposed disposition site) or at the Nevada Test Site (DOE's optional disposal site) (DOE, 2004a; DOE, 2004b). Due to the need for separate regulatory actions prior to disposal at WCS, it is assumed that the depleted  $U_3O_8$  generated from the adjacent or offsite private conversion process would be disposed at another disposal site licensed to accept this material. For example, under its Radioactive Materials License issued by the State of Utah, Envirocare is authorized to accept for disposal the quantities of depleted uranium oxides expected to be generated by the conversion of the proposed NEF's  $DUF_6$  (Envirocare, 2004).

## **2.2 Alternatives to the Proposed Action**

This section examines the alternatives considered for the proposed action described in section 2.1. The range of alternatives was determined by considering the underlying need and purpose for the proposed action. From this analysis, a set of reasonable alternatives was developed and the impacts of the proposed action were compared with the impacts that would result if a given alternative was implemented. These alternatives include:

- A no-action alternative under which the proposed NEF would not be constructed.
- An evaluation of alternative sites for the proposed NEF.
- A discussion of alternative conversion and disposition methods for  $DUF_6$ .
- A review of alternative technologies available for uranium enrichment.
- An evaluation of potential alternative sources of low-enriched uranium.

### **2.2.1 No-Action Alternative**

The no-action alternative would be to not construct, operate, or decommission the proposed NEF in Lea County, New Mexico. The NRC would not approve the license application for the proposed NEF. Under the no-action alternative, the fuel-fabrication facilities in the United States would continue to obtain low-enriched uranium from the currently available sources. Currently, the only domestic source of low-enriched uranium available to fuel fabricators is from production of the Paducah Gaseous Diffusion Plant, the only operating uranium enrichment facility in the United States, and the downblending of highly enriched uranium under the "Megatons to Megawatts" program (USEC, 2003a). Foreign enrichment sources are currently supplying more than 85 percent of the U.S. nuclear power plants demand (EIA, 2004).

Currently, the "Megatons to Megawatts" program will expire by 2013, potentially eliminating downblending as a source of low-enriched uranium. Opened in 1952, the Paducah Gaseous Diffusion Plant utilizes gaseous diffusion technology (as described in section 2.2.2.3), which is more energy intensive and requires higher energy consumption than a comparable gaseous centrifuge facility. These issues and factors such as new and more efficient enrichment technology (e.g., gas centrifuge) could lead to the eventual closure of the Paducah Gaseous Diffusion Plant. On the other hand, USEC could continue operation of the Paducah Gaseous Diffusion Plant to supply the needed low-enriched uranium.

Additional domestic enrichment facilities utilizing these more efficient technologies could be constructed in the future. In this regard, USEC has announced its intention to construct and operate a gaseous centrifuge uranium enrichment facility (i.e., proposed American Centrifuge Plant to be located near the Portsmouth Gaseous Diffusion Plant) which could supplement domestic and international demands (USEC, 2004). The proposed American Centrifuge plant would have an initial annual production level of 3.5 million SWU by 2010. If the proposed American Centrifuge Plant begins operations, this would represent a more efficient and less costly means of producing low-enriched uranium as compared to a gaseous diffusion plant.

At the same time, nuclear-generating capacity within the United States is expected to increase, causing an increase in demand for low-enriched uranium (see section 1.3.2). Given the expected increase in demand and the possible elimination of low-enriched uranium from downblending, along with the uncertainty that any additional domestic supplies will be available, the no-action alternative could generate uncertainty regarding the availability of adequate, reliable domestic supplies of low-enriched uranium in the future.

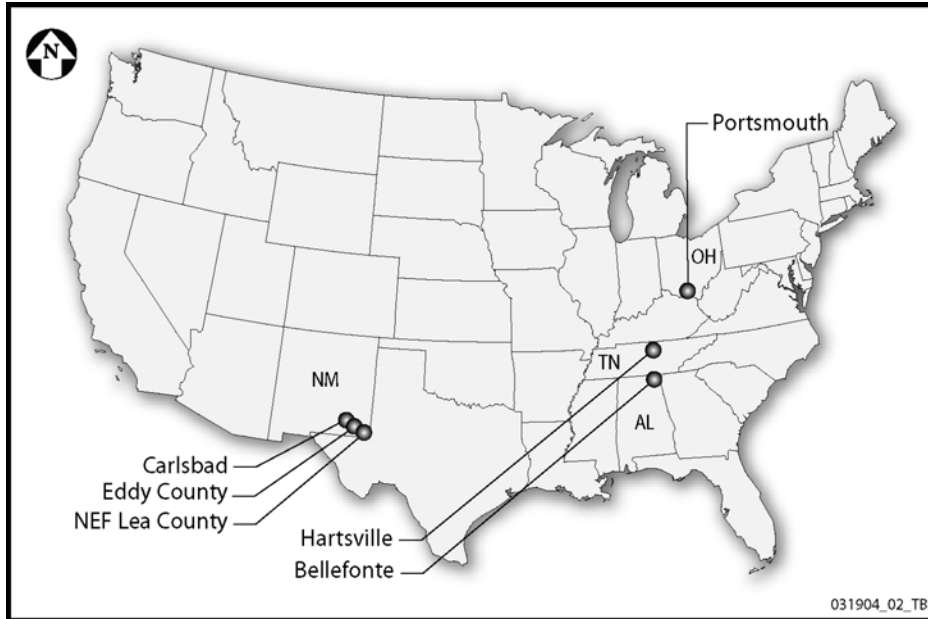
## **2.2.2 Alternatives Considered but Eliminated**

As required by NRC regulations, the NRC staff has considered other alternatives to the construction, operation, and decommissioning of the proposed NEF. These alternatives were considered but eliminated from further analysis due to economical, environmental, national security, or maturity reasons. This section discusses these alternatives and the reasons the NRC staff eliminated them from further consideration. These alternatives can be categorized as (1) an evaluation of alternative sites for the proposed NEF, (2) a discussion of alternative conversion and disposition methods for DUF<sub>6</sub>, (3) a review of alternative technologies available for uranium enrichment, and (4) a review of potential alternative sources of low-enriched uranium.

### **2.2.2.1 Alternative Sites**

The alternative sites considered in this EIS are the result of the LES site-selection process. This section discusses the site-selection process and identifies the candidate sites for the proposed NEF and the criteria used in the selection process. LES undertook a site-selection process to identify viable locations for the proposed NEF (LES, 2005a). This evaluation process yielded six finalist sites which are reviewed below. Figure 2-13 shows the six finalist sites for the proposed NEF.

Because many environmental impacts can be avoided or significantly reduced through proper site selection, the NRC staff evaluated the LES site-selection process to determine if a site considered by LES was obviously superior to the proposed NEF (NRC, 2002)



**Figure 2-13 Six Final Potential NEF Sites**

LES Site-Selection Process

LES evaluated 44 sites throughout the United States. The site-selection process used to locate a suitable site for construction and operation of the proposed NEF was based on various technical, safety, economic, and environmental factors. A multi-attribute-utility-analysis methodology was used for site selection that incorporated all of these factors to assess the relative benefits of a site with multiple, often competing, objectives or criteria. Figure 2-14 is a schematic of the LES site-selection process.

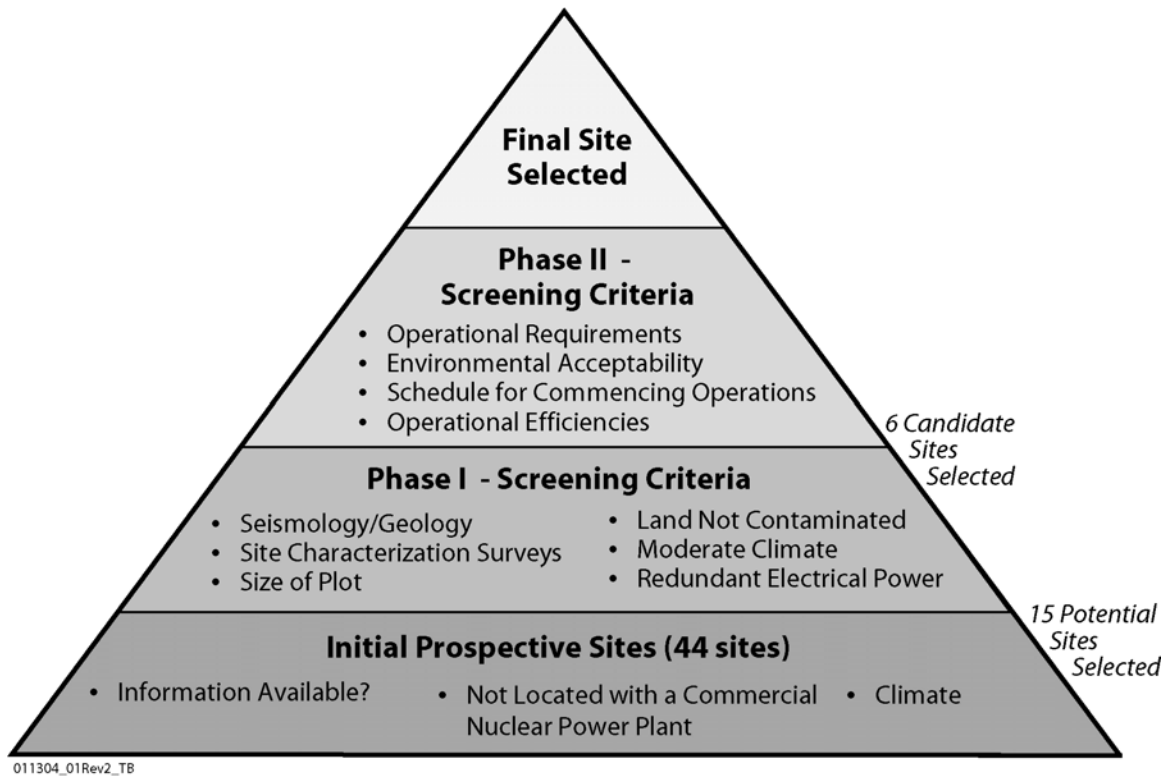
Forty-four potential sites were reviewed for possible analysis in the initial screening phase of the process. Twenty-nine sites were eliminated due to a lack of available environmental information or because they were located next to an operating commercial nuclear power plant. Sites in proximity to operating nuclear power plants would require enhanced security measures (LES, 2005a). The initial screening included the following criteria:

- Availability of adequate site information.
- Location of proposed site for ease of access and security.
- Acceptability of regional climate.

The outcome of the initial screening yielded 15 sites that met the first screening criteria. A second screening program was used to evaluate each of these 15 sites. This second screening program consisted of a “Go/No Go” analysis approach that compared the 15 semifinalist sites using the following criteria:

- Seismology/geology.
- Site characterization surveys.
- Size of plot.
- Land not contaminated.
- Moderate climate.

- Redundant electrical power.



**Figure 2-14 LES Site Selection Process (LES, 2005a)**

The sites that met all these first-phase screening criteria were further evaluated in the second-phase screening. The second-phase approach in the LES site-selection process involved more detailed analysis using weighted criteria as well as more specific subcriteria for the first-phase criteria. The second-phase screening criteria were placed into the following four site-evaluation categories or objectives:





- |                                       |                    |   |
|---------------------------------------|--------------------|---|
| 1. Operational Requirements           | weighting factor = |  |
| 2. Environmental Acceptability        | weighting factor = |  |
| 3. Schedule for Commencing Operations | weighting factor = |  |
| 4. Operational Efficiencies           | weighting factor = |  |

Table 2-8 presents the 15 potential sites formally evaluated against the first-phase screening criteria and the results of the evaluation for each site.

**Table 2-8 Summary of First-Phase Evaluation**

Potential Site	Reasons for Elimination	Results of Screening
Ambrosia Lake, New Mexico	Earthquake risk.	<b>W</b>
Barnwell, South Carolina	Earthquake risk.	<b>W</b>
Bellefonte, Alabama	Met all phase I screening criteria.	<b>U</b>
Carlsbad, New Mexico	Met all phase I screening criteria.	<b>U</b>
Clinch River Industrial Site, Tennessee	Earthquake risk. Site not large enough.	<b>W</b>
Columbia, South Carolina	Earthquake risk. Site impacted by a 500-year flood plain.	<b>W</b>
Eddy County, New Mexico	Met all phase I screening criteria.	<b>U</b>
Erwin, Tennessee	Site not large enough.	<b>W</b>
Hartsville, Tennessee	Met all phase I screening criteria.	<b>U</b>
Lea County, New Mexico	Met all phase I screening criteria.	<b>U</b>
Metropolis, Illinois	Earthquake risk. Site not large enough.	<b>W</b>
Paducah, Kentucky	Earthquake risk.	<b>W</b>
Portsmouth, Ohio	Met all phase I screening criteria.	<b>U</b>
Richland, Washington	Earthquake risk.	<b>W</b>
Wilmington, North Carolina	Site not large enough.	<b>W</b>

**U** Denotes candidate site status.

Source: LES, 2005a.

Six of the sites met all of the first-phase criteria and were considered in the second-phase screening. These six candidate sites, shown in Figure 2-13, were Bellefonte, Alabama; Carlsbad, New Mexico; Eddy County, New Mexico; Hartsville, Tennessee; Lea County, New Mexico; and Portsmouth, Ohio.

Each of the final six locations underwent a detailed evaluation to identify the best location for the proposed NEF. The results of this evaluation are summarized below.

A sensitivity analysis was conducted after the initial analysis to ensure that the site selection was not sensitive to small changes in the relative weights of objectives or criteria. The sensitivity analysis also helped demonstrate how sites compare to each other. In the sensitivity analysis, the weighting factor for each criterion was adjusted to the minimum and maximum extreme of the weighting scale while the raw score was kept the same. The final score of the site was then reviewed to determine how much it changed (LES, 2005a).

## Description of Alternative Sites

### *Eddy County, New Mexico, Site*

The Eddy County site scored highest in the multi-attribute-utility-analysis ranking but, due to potential problems with transferring ownership of the site from the BLM to LES, the site is not the preferred location for the proposed NEF. Federal regulations (43 CFR § 2711.1.3) require that any BLM land currently leased or permitted cannot be sold until the lease or permit holder is given 2 years' prior notification (Sorensen, 2004). Because the Eddy County site is currently leased for cattle grazing, it cannot be transferred to LES for at least 2 years. This two-year period can be waived by the leaseholder or it may run concurrently with preparation of the EIS. However, this could delay the start of construction of the facility and lowered the multi-attribute-utility-analysis ranking of the site (LES, 2005a).

### *Lea County, New Mexico, Site*

Lea County ranked second in the multi-attribute-utility-analysis assessment. It is the preferred LES site for the proposed NEF. Two adjacent sites in Lea County were considered, and the evaluation is applicable to both. The preferred Lea County site consists of 220 hectares (543 acres) in Section 32 of range 38E in Township 21S of the New Mexico Meridian. The alternative Lea County site is 182 hectares (452 acres) in Section 33 of range 38E in Township 21S, which is east of and adjacent to Section 32. The area is in an air-quality attainment zone, and no air-permitting constraints are identified. Because the Lea County site is the preferred site for construction of the proposed NEF, Chapter 3 presents a complete description of the site (LES, 2005a).

### *Bellefonte, Alabama, Site*

The Bellefonte site scored third in the multi-attribute-utility-analysis assessment and is considered an acceptable location for installation of the proposed NEF. However, part of the site is within the historic boundaries of a Cherokee Indian Reservation which may necessitate a historical preservation assessment. Additionally, high-voltage transmission lines cross the site and would have to be relocated before beginning construction. The historical preservation assessment and costly relocation of transmission lines lowered Bellefonte's ranking (LES, 2005a).

### *Hartsville, Tennessee, Site*

The Hartsville site ranked fourth in the multi-attribute-utility-analysis assessment. The major drawback was the business climate in the State of Tennessee and the requirement to rezone the site. The site scored well in environment, labor, and transportation issues. On September 9, 2002, LES identified the Hartsville, Tennessee, site as a location for a uranium enrichment plant. However, because LES was unable to obtain local approval to rezone the site (LES, 2005a), the overall site score was reduced.

### *Portsmouth, Ohio, Site*

The Portsmouth site ranked fifth of the six sites in the multi-attribute-utility-analysis assessment. Contamination on an existing firing range would have to be remediated, and existing waterways and ponds would have to be filled or relocated to make the site useable. Due to the proposed construction of the American Centrifuge Plant by USEC in the same immediate area, the finalization of an agreement between DOE, USEC, and LES would be difficult and would delay construction of the facility, thus lowering the overall score.

### *Carlsbad, New Mexico, Site*

The Carlsbad site ranked sixth in the evaluation. The area around the proposed Carlsbad site contains both active and abandoned facilities including potash mining and oil-field welding services. This creates the possibility that the site soil is contaminated with oils, solvents, and industrial waste products. This potential contamination requires further investigations and surveys prior to selecting the Carlsbad site for the facility. No detailed geological surveys have been completed for the site. However, the general area is geologically and seismically stable and acceptable for construction of the proposed NEF. While no wetlands exist on the site, a dry arroyo, Lone Tree Draw, runs through the site which could require obtaining additional environmental approvals.

An Xcel Energy transmission line passes near the northwest corner of the proposed site. LES would have to pay for a new substation on the main line and new secondary feeder lines from alternate transmission lines to provide a redundant power supply for the site. The potential for soil contamination would make site decommissioning and decontamination more difficult, and the potential for environmental justice issues lowered Carlsbad's overall score.

### Conclusion

Based on the above assessment, the NRC staff has determined that the LES site selection process has a rational, objective structure and appears reasonable. 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.

#### **2.2.2.2 Alternative Sources of Low-Enriched Uranium**

The NRC staff examined two alternatives to fulfill the domestic enrichment needs. These alternatives, as shown below, were eliminated from further consideration.

#### Re-Activate Portsmouth Gaseous Diffusion Facility

USEC closed the Portsmouth Gaseous Diffusion Plant in May 2001 to reduce operating costs (DOE, 2003). USEC cited long-term financial benefits, more attractive power price arrangements, operational flexibility for power adjustments and a history of reliable operations as reasons for choosing to continue operations at the Paducah Gaseous Diffusion Plant. In its June 2000 press release, USEC explained that they "...clearly could not continue to operate two production facilities." Key business factors in USEC's decision to reduce operations to a single production plant included long-term and short-term power costs, operational performance and reliability, design and material condition of the plants, risks associated with meeting customer orders on time, and other factors relating to assay levels, financial results, and new technology issues (USEC, 2000).

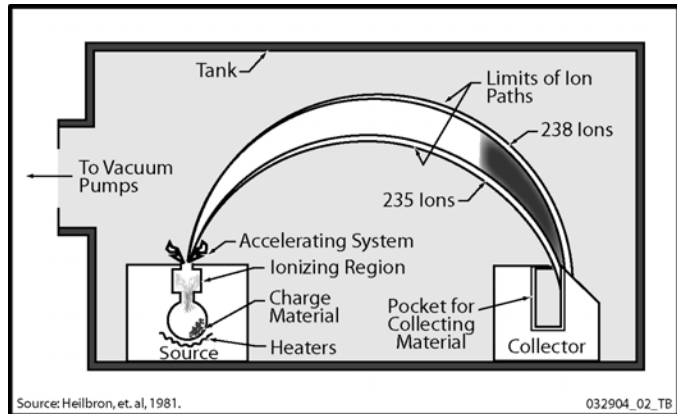
The NRC staff does not believe that there has been any significant change in the factors that were considered by USEC in its decision to cease uranium enrichment at Portsmouth. Furthermore, the gaseous diffusion technology (as described in section 2.2.2.3) is more energy intensive than gas centrifuge. The higher energy consumption results in larger indirect impacts, especially those impacts which are attributable to significantly higher electricity usage (e.g., air emissions from coal-fired electricity generation plants) (DOE, 1995). Finally, DOE's FY2006 congressional budget request reflects DOE's intention to cease cold standby activities for the Portsmouth facility, transition to final shutdown, and begin preliminary decontamination and decommissioning activities at the facility (DOE, 2005). Therefore, this proposed alternative was eliminated from further consideration.

## Purchase Low-Enriched Uranium From Foreign Sources

There are several potential sources of enrichment services worldwide. However, U.S. reliance on foreign sources of enrichment services, as an alternative to the proposed action, would not meet the U.S. national energy policy objective of a "...viable, competitive, domestic uranium enrichment industry for the foreseeable future" (DOE, 2000b). For this reason, the NRC staff does not consider this alternative action to meet the purpose and need for the proposed action, and this alternative was eliminated from further studies.

### **2.2.2.3 Alternative Technologies for Enrichment**

A number of different processes have been invented for enriching uranium but only two have been proven suitable for commercial and economic use. Only the gaseous diffusion process and the gas centrifuge technology have reached the maturity needed for industrial use. Other technologies—namely the Electromagnetic Isotope Separation Process, Liquid Thermal Diffusion, and a laser enrichment process—have proven too costly to operate or remain at the research and laboratory developmental scale and have yet to prove themselves to be economically viable.



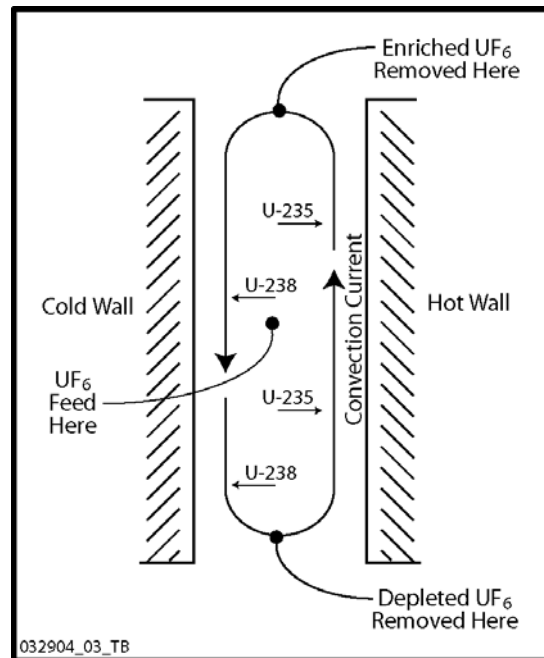
**Figure 2-15 Sketch of Electromagnetic Isotopic Separation Process (Heilbron et al., 1981)**

### Electromagnetic Isotope Separation Process

Figure 2-15 shows a sketch of the electromagnetic isotopic separation process. In the Electromagnetic Isotope Separation Process, or calutron, a monoenergetic beam of ions of normal uranium travels between the poles of a magnet. The magnetic field causes the beam to split into several streams according to the mass of the isotope. Each isotope has a different radius of curvature and follows a slightly different path. Collection cups at the ends of the semicircular trajectories catch the homogenous streams. Because the energy requirements for the calutrons proved very high—in excess of 3,000 kilowatt hour per SWU—and the production was very slow (Heilbron et al., 1981), this process was removed from further consideration.

### Liquid Thermal Diffusion

Liquid thermal diffusion process was investigated in the 1940's. Figure 2-16 is a diagram of the liquid thermal diffusion process. It is based on the concept that a temperature gradient across a thin layer of liquid or gas causes thermal diffusion that separates isotopes of differing masses. When a thin, vertical column is cooled on one side and heated on the other, thermal



**Figure 2-16 Liquid Thermal Diffusion Process**

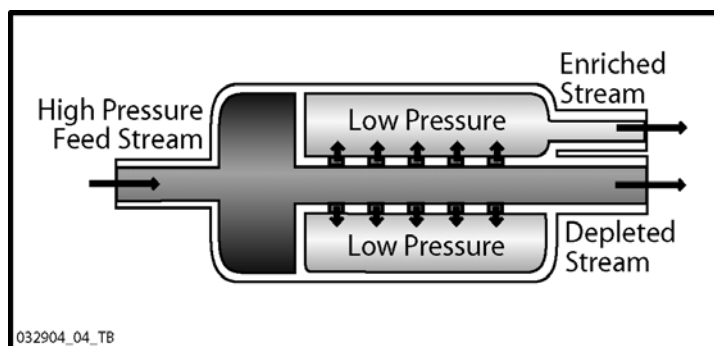


convection currents are generated and the material flows upward along the heated side and downward along the cooled side. Under these conditions, the lighter  $^{235}\text{UF}_6$  molecules diffuse toward the warmer surface, and heavier  $^{238}\text{UF}_6$  molecules concentrate near the cooler side. The combination of this thermal diffusion and the thermal convection currents causes the lighter  $^{235}\text{U}$  molecules to concentrate on top of the thin column while the heavier  $^{238}\text{U}$  goes to the bottom. Taller columns produce better separation. Eventually, a facility was designed and constructed at Oak Ridge, Tennessee, but it was closed after about a year of operation due to cost and maintenance (Settle, 2004). Based on high operating costs and high maintenance requirements, the liquid thermal diffusion process has been eliminated from further consideration.

### Gaseous Diffusion Process

The gaseous diffusion process is based on molecular effusion, a process that occurs whenever a gas is separated from a vacuum by a porous barrier. The gas passes through the holes because there are more “collisions” with holes on the high-pressure side than on the low-pressure side (i.e., the gas flows from the high-pressure side to the low-pressure side). The rate of effusion of a gas through a porous barrier is inversely proportional to the square root of its mass. Thus, lighter molecules pass through the barrier faster than heavier ones. Figure 2-17 is a diagram of a single gas diffusion stage.

The gaseous diffusion process consists of thousands of individual stages connected in series to multiply the separation factor. The gaseous diffusion plant in Paducah, Kentucky, contains 1,760 enrichment stages and is designed to produce  $\text{UF}_6$  enriched up to 5.5 percent  $^{235}\text{U}$ . The design capacity of the Paducah Gaseous Diffusion Plant is approximately 8 million SWU per year, but it has never operated at greater than 5.5 million SWU. Paducah consumes approximately 2,200 kilowatt hours SWU, which is less than the electromagnetic isotopic separation process or liquid thermal diffusion process but still higher than the 40 kilowatt hours per kilogram of SWU possible in modern gas centrifuge plants (DOE, 2000b; Urenco, 2004b). The gaseous diffusion process is 50-year-old technology that is energy intensive and therefore has been eliminated from further consideration.



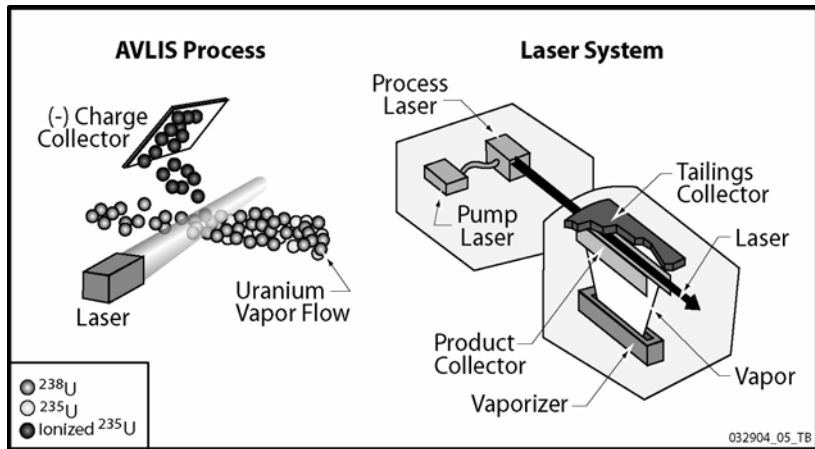
**Figure 2-17 Gaseous Diffusion Stage (Urenco, 2003)**

### Laser Separation Technology

Laser separation technology encompasses two known developmental technologies that have yet to reach the maturity stage for industrial use. These are the Atomic Vapor Laser Isotope Separation and the Separation of Isotopes by Laser Excitation processes.

The Atomic Vapor Laser Isotope Separation process is based on different isotopes of the same element, while chemically identical, having different electronic energies and therefore absorbing different colors of laser light. The isotopes of most elements can be separated by a laser-based process if they can be efficiently vaporized into individual atoms. In Atomic Vapor Laser Isotope Separation enrichment, uranium metal is vaporized and the vapor stream is illuminated with a laser light of a specific wavelength that is absorbed only by  $^{235}\text{U}$ . The laser selectively adds enough energy to ionize or remove an electron from  $^{235}\text{U}$  atoms while leaving the other isotopes unaffected. The ionized  $^{235}\text{U}$  atoms are then collected on negatively charged surfaces inside the separator unit. The collected material (enriched product) is condensed as liquid on the charged surfaces and then drains to a caster where it solidifies as metal nuggets. Figure 2-18 is a diagram of the Atomic Vapor Laser Isotope Separation process (LLNL, 2004). In June 1999, citing budget constraints, USEC stopped further development of the Atomic Vapor Laser Isotope Separation program (USEC, 1999).

The Separation of Isotopes by Laser Excitation technology, developed by the Australian Silex Systems Ltd., uses a similar process to the Atomic Vapor Isotope Separation process. The Separation of Isotopes by Laser Excitation process uses  $\text{UF}_6$  vapor that passes through a tuned laser and an electromagnetic field to separate the  $^{235}\text{UF}_6$  from the  $^{238}\text{UF}_6$ . The process is still under development and will not be ready for field trials for several years. USEC ended its support of the Separation of Isotopes by Laser Excitation program on April 30, 2003, in favor of the proposed American Centrifuge Plant (USEC, 2003b).



**Figure 2-18 AVLIS Process (LLNL, 2004)**

Because neither the Atomic Vapor Laser Isotope Separation process nor the Separation of Isotopes by Laser Excitation process is ready for commercial production of low-enriched uranium, these processes have been eliminated from further consideration.

### Conclusion

The NRC considered the feasibility of utilizing alternative methods for producing low-enriched uranium. Gas diffusion and liquid thermal diffusion technology would be far more costly than the centrifuge technology proposed. The other technologies reviewed—electromagnetic isotope separation process and laser separation technology—have not been sufficiently developed for commercial application. Accordingly, these technologies were not considered reasonable alternatives.

#### 2.2.2.4 Alternatives for DUF<sub>6</sub> Disposition

In addition to the DUF<sub>6</sub> disposition options discussed in section 2.1.9, other alternatives for dispositioning the DUF<sub>6</sub> include (1) storage of the DUF<sub>6</sub> onsite in anticipation of future use as a resource and (2) continuous conversion of the DUF<sub>6</sub> to U<sub>3</sub>O<sub>8</sub> and storage of the oxide as a potential resource. In addition, DOE has evaluated the potential impacts of various disposition options in its “Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride” (DOE, 1999b). These include (1) storage as DUF<sub>6</sub> for up to 40 years, (2) long-term storage as depleted U<sub>3</sub>O<sub>8</sub>, (3) use of depleted U<sub>3</sub>O<sub>8</sub>, and (4) use of uranium metal.

LES proposed three additional alternatives for DUF<sub>6</sub> disposition that include Russian re-enrichment, French conversion or re-enrichment, and Kazakhstan conversion. Due to the costs for disposition in Russia, France, or Kazakhstan, the NRC staff does not consider these alternatives to be viable; therefore, they are not discussed further in this EIS. Figure 2-12 shows the disposition flow paths considered by the NRC staff in this EIS.

The following subsections discuss the other DUF<sub>6</sub> disposition alternatives in two broad categories—use of DUF<sub>6</sub> and conversion at existing fuel fabrication facilities—and the reasons these alternatives are not evaluated in detail in this EIS.

##### Use of DUF<sub>6</sub>

As discussed above, the NRC staff views DUF<sub>6</sub> as a potential resource with very limited use. If storage of DUF<sub>6</sub> beyond 30 years occurs, then the impacts described in Chapter 4 of this EIS would be extended for that storage period. If a viable use for DUF<sub>6</sub> is found, it could reduce the environmental impacts associated with its disposition. However, the likelihood of a significant commercial market for the DUF<sub>6</sub> generated by the proposed NEF site is considered to be low.

DOE has evaluated a number of alternatives and potentially beneficial uses for DUF<sub>6</sub>, and some of these applications have the potential to use a portion of the existing DUF<sub>6</sub> inventory (DOE, 1999b; Brown et

#### ***Beneficial Uses of Depleted Uranium***

*Some historical beneficial uses for depleted uranium:*

- *Further enrichment – DOE originally undertook the long-term storage of DUF<sub>6</sub> because it can be used in the future as feed for further enrichment. The low cost of uranium ore and postponed deployment of advanced enrichment technology have indefinitely delayed this application.*
- *Nuclear reactor fuel – depleted uranium oxide can be mixed with plutonium oxide from nuclear weapons to make mixed oxide fuel (typically about 6 percent plutonium oxide and 94 percent depleted uranium oxide) for commercial power reactors.*
- *Down-blending high-enriched uranium – Nuclear disarmament allows the down-blending of some weapons-grade highly enriched uranium with depleted uranium to make commercial reactor fuel.*
- *Munitions – depleted uranium metal can be used for tank armor and armor-piercing projectiles. This demand is decreasing as environmental regulations become more complex.*
- *Biological shielding – depleted uranium metal has a high density, which makes it suitable for shielding from x-rays or gamma rays for radiation protection.*
- *Counterweights – Because of its high density, depleted uranium has been used to make small but heavy counterweights such as in the aircraft industry.*

*Sources: DOE 1999b; Brown et al., 1997.*

al., 1997). However, the current  $\text{DUF}_6$  consumption rate is low compared to the  $\text{DUF}_6$  inventory (DOE, 1999b), and the NRC has assumed that excess DOE and commercial inventory of  $\text{DUF}_6$  would be disposed of as a waste product (NRC, 1995).

The NRC staff has determined that unless LES can demonstrate a viable use, the  $\text{DUF}_6$  generated by the proposed NEF should be considered a waste product. Because the current available inventory of depleted uranium in the form of metal ( $\text{UF}_6$  and  $\text{U}_3\text{O}_8$ ) is in excess of the current and projected future demand for the material, this EIS will not further evaluate  $\text{DUF}_6$  disposition alternatives involving its use as a resource, including continued storage at the proposed NEF site for more than 30 years in order to be used in the future.

#### Conversion at Existing Fuel Fabrication Facilities

Another potential alternative disposition strategy would be to perform the conversion of  $\text{DUF}_6$  to  $\text{U}_3\text{O}_8$  at an existing fuel-fabrication facility. The existing fuel-fabrication facilities are Global Nuclear Fuel-Americas, LLC, in Wilmington, North Carolina; Westinghouse Electric Company, LLC, in Columbia, South Carolina; and Framatome ANP, Inc., in Richland, Washington. These facilities have existing processes and conversion capacities. They also use Type 30B cylinders. Therefore, the existing fuel-fabrication facilities would need to install new equipment to handle the larger Type 48Y cylinders. The facilities would probably need to install separate capacity to process the  $\text{DUF}_6$  to avoid quality control issues related to processing enriched  $\text{UF}_6$ . The facilities would also need to manage and dispose of the hydrofluoric acid that would be generated from the conversion process. Furthermore, these existing facilities have not expressed an interest in performing these services, and the cost for the services would be difficult to estimate. For these reasons, this alternative is eliminated from further consideration in this EIS.

#### Conclusion

Although  $\text{DUF}_6$  does have alternative and beneficial uses, the current U.S. inventory is estimated to be approximately 480,000 metric tons of uranium (OECD, 2001), which far exceeds the existing and projected demand for the material. Consequently, the NRC staff has assumed that all of the  $\text{DUF}_6$  to be generated by the proposed NEF would be converted to  $\text{U}_3\text{O}_8$  and disposed of in a licensed disposal facility.

#### **2.2.2.5 Anhydrous Hydrofluoric Acid Option**

As discussed in section 2.1.9, a byproduct of the conversion from  $\text{DUF}_6$  to  $\text{U}_3\text{O}_8$  is hydrofluoric acid. The hydrofluoric acid can be processed in two forms, aqueous (dissolved in water) or anhydrous (without water; especially without water of crystallization). In a Programmatic EIS (DOE, 1999b) addressing the potential impacts of alternative management strategies for  $\text{DUF}_6$  stored at various DOE facilities, DOE proposed and discussed the potential environmental impacts from further processing of the aqueous hydrofluoric acid with a yet to be determined distillation process to generate anhydrous hydrofluoric acid. This process was proposed by DOE, because anhydrous hydrofluoric acid has a greater commercial value than does aqueous hydrofluoric acid. DOE assessed the impacts of two conversion options for the  $\text{DUF}_6$ . The two conversion options considered were (1) a distillation process for anhydrous hydrofluoric acid; and (2) the neutralization of the aqueous hydrofluoric acid with lime to generate calcium fluoride ( $\text{CaF}_2$ ).

Based on its Programmatic EIS, DOE published a request for proposals for the construction and operation of two  $\text{DUF}_6$  conversion facilities, one each at DOE's Paducah, Kentucky, and Portsmouth, Ohio, gaseous diffusion plant sites, to process its large inventory of  $\text{DUF}_6$ . In the request for proposals, DOE allowed

for a range of potential conversion product forms and process technologies; however, DOE required that any of the proposed conversion forms must have an assured, environmentally acceptable path for final disposition (DOE, 2004a; DOE, 2004b).

In response to the request for proposals, DOE received five proposals, three of which were deemed to be in the competitive range. Of the three, two proposals would either sell or neutralize aqueous hydrofluoric acid and the other proposal would sell anhydrous hydrofluoric acid. DOE selected a proposal that did not involve the distillation to anhydrous hydrofluoric acid, but rather the sale of aqueous hydrofluoric acid with neutralization to form  $\text{CaF}_2$  if the aqueous hydrofluoric acid could not be sold. Therefore, the possibility of distilling the aqueous hydrofluoric acid was not presented as a conversion process in either of DOE's site specific Final EISs prepared for  $\text{DUF}_6$  conversion facilities at the Paducah and Portsmouth sites.

Cogema has experience with efforts to generate anhydrous hydrofluoric acid from aqueous hydrofluoric acid. At its  $\text{DUF}_6$  conversion facility in Pierrelatte, France, Cogema attempted to generate anhydrous hydrofluoric acid using a process similar to that proposed in the DOE Programmatic EIS (Hartmann, 2001). However, technical issues proved difficult and so Cogema canceled further efforts to generate anhydrous hydrofluoric acid from aqueous hydrofluoric acid.

LES has reviewed the issue of the generation of anhydrous hydrofluoric acid from aqueous hydrofluoric acid. In Revision 4 of its Environmental Report, LES states that "LES will not use a deconversion facility that employs a process that results in the production of anhydrous [hydrofluoric acid]" (LES, 2005a).

In summary, the option of generating anhydrous hydrofluoric acid has not been analyzed because:

- A proven commercially viable technology is not available to distill the aqueous hydrofluoric acid. Cogema was unable to develop a conversion technology to effectively generate anhydrous hydrofluoric acid from the aqueous form.
- DOE selected sale of aqueous hydrofluoric acid followed by sale or by neutralization with lime to generate  $\text{CaF}_2$ , rather than distillation of aqueous hydrofluoric acid to anhydrous hydrofluoric acid, for its conversion facilities being built at Paducah and Portsmouth.
- LES has committed to not pursuing a private conversion process that employs a process that results in the production of anhydrous hydrofluoric acid. In a letter dated March 29, 2005, LES formally requested a license condition be issued stating that "For the disposition of depleted  $\text{UF}_6$ , LES shall not use a depleted  $\text{UF}_6$  deconversion facility that employs a process that results in the production of anhydrous [hydrofluoric acid]" (LES, 2005e). The NRC staff is proposing the following license condition:

For the disposition of depleted  $\text{UF}_6$ , the licensee shall not use a depleted  $\text{UF}_6$  deconversion facility that employs a process that results in the production of anhydrous hydrofluoric acid.

For these reasons, distillation to anhydrous hydrofluoric acid was eliminated from further consideration in this EIS.

### **2.3 Comparison of Predicted Environmental Impacts**

Chapter 4 of this EIS presents a more detailed evaluation of the environmental impacts of the proposed action and the no-action alternative. Table 2-9 summarizes the environmental impacts for the proposed NEF and the no-action alternative.

### **2.4 Staff Recommendation Regarding the Proposed Action**

After weighing the impacts of the proposed action and comparing alternatives, the NRC staff, in accordance with 10 CFR § 51.71(e), sets forth its NEPA recommendation regarding the proposed action. The NRC staff recommends that, unless safety issues mandate otherwise, the proposed license be issued to LES. In this regard, the NRC staff has concluded that the applicable environmental monitoring program described in Chapter 6 and the proposed mitigation measures discussed in Chapter 5 would eliminate or substantially lessen any potential adverse environmental impacts associated with the proposed action.

The NRC staff has concluded the overall benefits of the proposed NEF outweigh the environmental disadvantages and costs based on consideration of the following:

- The need for an additional, reliable, economical, domestic source of enrichment services.
- The beneficial economic impacts of the proposed NEF on the local communities which have been determined to be MODERATE.
- The remaining impacts on the physical environment and human communities would be small with the exception of short-term impacts associated with construction traffic, accidents, and waste management, which would be SMALL to MODERATE.

**Table 2-9 Summary of Environmental Impacts for the Proposed NEF and the No-Action Alternative**

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Land Use	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
	SMALL. Construction activities would occur on about 81 hectares (200 acres) of a 220-hectare (543-acre) site that would be fenced. While the land is currently undisturbed except for an access road, CO <sub>2</sub> pipeline, and cattle grazing, there are sufficient lands surrounding the proposed NEF for relocation of the cattle grazing and the CO <sub>2</sub> pipeline. Impacts from installation of municipal water supply piping, natural gas supply piping, and electrical transmission lines would also be SMALL.	SMALL. Under the no-action alternative, no local impact would occur because the proposed NEF would not be constructed or operated. The land use of cattle grazing would continue and the property would be available for alternative use. There would also be no land disturbances. Impacts to local land use would be expected to be SMALL.  The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.  Additional domestic enrichment facilities could be constructed in the future and would have land use impacts that would be similar to those of the proposed action, depending on site conditions either at a new location or an existing industrial site. Impacts to land use would be expected to be SMALL.

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
Historical and Cultural Resources	SMALL. Seven archaeological sites were recorded on the proposed site. All of these sites are considered potentially 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, a historic properties treatment plan would be fully implemented prior to construction of the proposed NEF. Once measures from the treatment plan are implemented, adverse impacts would be mitigated.	<p>SMALL to MODERATE. Under the no-action alternative, the land would continue to be used for cattle grazing and historical and cultural resources would remain in place unaffected by the proposed action. Without the proposed treatment plan and its mitigation measures, historical sites identified at the proposed NEF site could be exposed to the possibility of human intrusion and continued weathering. Local impacts to historical and cultural resources would be expected to be SMALL, providing that requirements included in applicable Federal and State historic preservation laws and regulations are followed or could be MODERATE if not followed.</p> <p>The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.</p> <p>Additional domestic enrichment facilities could be constructed in the future and could have potential impacts to cultural resources if at a new location. The impacts would be expected to be SMALL if built and operated at an existing industrial site. The impacts could be SMALL to MODERATE if additional domestic enrichment facilities were located at a new site, depending on the specific site conditions.</p>



<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Visual and Scenic Resources	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
	SMALL. Impacts from construction activities would be limited to fugitive dust emissions that can be controlled using dust-suppression techniques. The proposed NEF cooling towers could contribute to the formation of local fog less than 0.5 percent of the total number of hours per year (44 hours per year). The proposed NEF site received the lowest scenic-quality rating using the BLM visual resource inventory process.	SMALL. Under the no-action alternative, the visual and scenic resources would remain the same as described in the affected environment section. Local impacts to visual and scenic resources would be expected to be SMALL.  The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.  Additional domestic enrichment facilities could be constructed in the future and would have visual and scenic resources impacts that would be similar to those of the proposed action, depending on site conditions either at a new location or an existing industrial site. Impacts to visual and scenic resources would be expected to be SMALL.

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Air Quality	<p><i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i></p> <p>SMALL. Air concentrations of the criteria pollutants predicted for vehicle emissions and PM<sub>10</sub> emissions for fugitive dust during construction would all be below the National Ambient Air Quality Standards, temporary, and highly localized. A NESHAP Title V permit would not be required for operations due to the low levels of estimated emissions.</p>	<p><i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i></p> <p>SMALL. Under the no-action alternative, air quality in the general area would remain at its current levels described in the affected environment section. Impacts to air quality would be expected to be SMALL.</p> <p>The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.</p> <p>Additional domestic enrichment facilities could be constructed in the future . Depending on the construction methods and design of these facilities, the likely impact on air quality would be similar to the proposed action. Impacts to air quality would be expected to be SMALL.</p>

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Geology and Soils	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
	SMALL. Construction-related impacts to 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 except for clay and gravel from a nearby quarry. No soil contamination would be expected during construction and operations although soil contamination could occur. A plan would be in place to address any spills that may occur during operations and any contaminated soil in excess of regulatory limits would be properly disposed of.	SMALL. Under the no-action alternative, the land would continue to be used for cattle grazing. The geology and soils on the proposed site would remain unaffected because no land disturbance would occur. Natural events such as wind and water erosion would remain as the most significant variable associated with the geology and soils of the site. Impacts to geology and soils would be expected to be SMALL.  The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.  Additional domestic enrichment facilities could be constructed in the future and would have geology and soils impacts that would be similar to those of the proposed action, depending on site conditions either at a new location or an existing industrial site. Impacts to geology and soils would be expected to be SMALL.

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Water Resources	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
	<p>SMALL. There are no existing surface water resources, and groundwater resources under the proposed NEF site are not considered potable or near the surface. NPDES general permits for construction and operations would be required to manage stormwater runoff. Construction-related impacts would be SMALL to both surface water and groundwater. Retention basins (i.e., the Treated Effluent Evaporative Basin and the 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 systems' leach fields could be expected to form a perched layer on top of the Chinle Formation, but there would be limited downgradient transport due to soil-storage capacity and upward flux to the root zone. Operations impacts would be SMALL. Impacts on water use would be SMALL due to the availability of excess capacity in the Hobbs and Eunice water systems. The proposed NEF's use of Ogallala waters indirectly through the Eunice and Hobbs water-supply systems would constitute a small portion of the aquifer reserves in New Mexico.</p>	<p>SMALL. Under the no-action alternative, water resources would remain the same as described in the affected environment section. Water supply demand would continue at the current rate. The natural surface flow of stormwater on the site would continue, and potential groundwater contamination could occur due to surrounding operations related to the oil industry. Impacts to water resources local to Lea County would be expected to be SMALL.</p> <p>The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.</p> <p>Additional domestic enrichment facilities could be constructed in the future. Depending on the design, location of these facilities and local water resources, the likely impact on water resources (including water usage) would be similar to the proposed action. Impacts to water resources would be expected to be SMALL</p>

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Ecological Resources	<p><i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i></p> <p>SMALL. There are no wetlands or unique habitats for threatened or endangered plant or animal species on the proposed NEF site. Impacts from use of stormwater detention/retention basins would be SMALL. Animal-friendly fencing and netting or other suitable material over the basins (where appropriate) would be used to minimize animal intrusion. Revegetation using native plant species would be conducted in any areas impacted by construction, operation, and decommissioning activities.</p>	<p><i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i></p> <p>SMALL. Under the no-action alternative, the land would continue to be used for cattle grazing and the ecological resources would remain the same as described in the affected environmental section. Local land disturbances would also be avoided. Impacts to ecological resources would be expected to be SMALL</p> <p>The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.</p> <p>Additional domestic enrichment facilities could be constructed in the future and would have ecological resources impacts that would be similar to those of the proposed action, depending on the site conditions either at a new location or an existing industrial site. Impacts to ecological resources would be expected to be SMALL.</p>
Socioeconomics	<p>MODERATE. 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. Construction would cost \$1.24 billion (2004 dollars). Spending on goods and services and wages would create 582 new jobs on average. About 15 percent of the construction work force would take up residency in the surrounding</p>	<p>SMALL to MODERATE. Under the no-action alternative, socioeconomics in the local area would continue as described in the affected environmental section. The socioeconomic impacts would be SMALL.</p> <p>The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA</p>

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
	<p>community, and about 15 percent of the local housing units are unoccupied. The impact to housing and the educational system would be SMALL. Gross receipts taxes paid by LES and local businesses could approach \$3.1 million during the 8-year construction period. Income taxes during construction are estimated to be about \$4.1 million annually. LES would employ 210 people annually during peak operations with an additional 173 indirect jobs with about \$20.8 million in annual operations spending. Increase in demand for public services would be SMALL. Decommissioning would have a SMALL impact. Approximately 300 direct and indirect jobs at Paducah, Kentucky, or Portsmouth, Ohio, would be extended for 11 to 15 years, respectively, if DUF<sub>6</sub> conversion takes place at either site. If a private conversion facility is constructed, approximately 180 total jobs would be created. The tax revenue impacts of the proposed NEF operations to Lea County and the city of Eunice would be MODERATE given the size of current property tax collection and gross receipts taxes received from the State of New Mexico.</p>	<p>documentation and historical environmental monitoring.</p> <p>Additional domestic enrichment facilities in the future could be constructed. Depending on the construction methods, design of these facilities and local demographics, the likely socioeconomic impact would be similar to the proposed action. Socioeconomic impacts would be expected to be SMALL to MODERATE.</p>

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Environmental Justice	<p><i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i></p> <hr/> <p>SMALL. The environmental justice study was chosen to encompass an 80-kilometer (50-mile) radius around the proposed NEF site. Demographic data from the 2000 census data were analyzed to characterize minority and low-income populations near the proposed NEF site. In addition, state and local governments and representatives of the minority community were contacted. The largest minority population within 80 kilometers (50 miles) of the proposed NEF site is the Hispanics/Latino population. Although the impacts to the general population were SMALL to MODERATE, examination of the various environmental pathways by which low-income and minority populations could be affected found no disproportionately high and adverse impacts from construction, operation or decommissioning would occur to minority and low-income populations living near the proposed NEF or along the transportation routes into and out of the proposed NEF.</p>	<p><i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i></p> <hr/> <p>SMALL. Under the no-action alternative, no changes to environmental justice issues other than those that may already exist in the community would occur. No disproportionately high or adverse impacts would be expected. Environmental justice impacts would be expected to be SMALL.</p> <p>The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.</p> <p>Additional domestic enrichment facilities in the future could be constructed, with site-specific impacts on environmental justice. The impacts could be similar to the proposed action if the location has a similar population distribution or at a site with a similar industrial process. Environmental justice impacts would be expected to be SMALL under most likely circumstances.</p>

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Noise	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
	SMALL. Noise levels would be predominately due to traffic noise. Construction and decommissioning activities could be limited to normal daytime working hours. The nearest residence would be 4.3 kilometers (2.6 miles) away from the proposed site, and noises at this distance from construction activities would be SMALL. Noise levels during operations would primarily be confined to inside buildings and would be within the U.S. Department of Housing and Urban Development guidelines.	SMALL. Under the no-action alternative, there would be no construction or operational activities or processes that would generate noise. Noise levels would remain as is currently observed at the site. Noise impacts would be expected to be SMALL.  The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.  Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods, design of these facilities, and surrounding land uses, the likely noise impact would be similar to the proposed action. Noise impacts would be expected to be SMALL.



<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Transportation	<p data-bbox="443 261 1115 326"><i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i></p> <p data-bbox="443 415 1115 756">SMALL to MODERATE during construction. Traffic on New Mexico Highway 234 would almost double during construction for a period of approximately two years, and three injuries and less than one fatality could occur during the peak construction employment year due to work force traffic. Peak truck traffic during construction could cause less than one injury and less than one fatality. New Mexico Highway 18 is a four-lane road; therefore impacts to it would be smaller than to New Mexico Highway 234.</p> <p data-bbox="443 797 1115 1305">SMALL during operations. Truck trips removing nonradioactive waste and delivering supplies would have a small impact on the traffic on New Mexico Highway 234. Work force traffic would also have a SMALL impact on New Mexico Highways 18 and 234 with less than one injury and less than one fatality annually due to traffic accidents. All truck shipments of feed, product, and waste materials would result in less than <math>3 \times 10^{-2}</math> latent cancer fatalities to the public and workers from direct radiation and two or less from vehicle emissions. All rail shipments of feed, product, waste materials, and empty cylinders would result in less than <math>1 \times 10^{-1}</math> latent cancer fatalities to the public and workers from direct radiation and less than <math>8 \times 10^{-2}</math> from vehicle emissions during the life of the facility.</p>	<p data-bbox="1146 261 1871 391"><i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i></p> <p data-bbox="1146 415 1871 618">SMALL to MODERATE. Under the no-action alternative, traffic volumes and patterns would remain the same as described in the affected environment section. The current volume of radioactive material and chemical shipments would not increase. Transportation impacts would be expected to be SMALL.</p> <p data-bbox="1146 659 1871 821">The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.</p> <p data-bbox="1146 862 1871 1065">Additional domestic enrichment facilities in the future could be constructed and would have transportation impacts that would be similar to those of the proposed action, depending on site conditions either at a new location or an existing industrial facility. Impacts to transportation would be expected to be SMALL to MODERATE.</p>

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Transportation (continued)	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
	SMALL to MODERATE during accidents. If a rail accident involving the shipment of DUF <sub>6</sub> 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 <sub>6</sub> in an urban area could cause temporary adverse chemical impacts to approximately 1,700 people.	
	SMALL during decommissioning if DUF <sub>6</sub> is temporarily stored at the proposed NEF for the duration of operations. Assuming that all material is shipped during the first 8 years (the final radiation survey and decontamination would occur during year 9), the proposed NEF would make about 1,966 truck shipments 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 <sub>6</sub> conversion facility.	

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
Public and Occupational Health	<p data-bbox="443 261 1115 326"><i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i></p> <p data-bbox="443 415 1115 1138">SMALL during construction and normal operations. During construction, there could be less than one fatality per year based on State statistics from the year 2002. Construction workers could receive up to 0.05 millisieverts (5 millirem) of radiation exposure per year once proposed NEF operations are initiated. Precautions would be taken to prevent injuries and fatalities. During operations, there would be approximately eight injuries per year and <math>4 \times 10^{-4}</math> fatalities per year due to nonradiological occurrences based on statistical probabilities. A typical operations or maintenance technician could receive 1 millisievert (100 mrem) of radiation exposure annually. A typical cylinder yard worker could receive 3 millisievert (300 mrem) of radiation exposure annually. All public radiological exposures are significantly below the 10 CFR Part 20 regulatory limit of 1 millisieverts (100 millirem) and 40 CFR Part 190 regulatory limit of 0.25 millisieverts (25 millirem) for uranium fuel-cycle facilities. The nearest resident would receive less than <math>1.3 \times 10^{-5}</math> millisievert (<math>1.3 \times 10^{-3}</math> millirem) due to proposed NEF operations.</p> <p data-bbox="443 1179 1115 1273">SMALL to MODERATE for accidents. Although highly unlikely, the most severe accident is estimated to be the release of UF<sub>6</sub> caused by rupturing an over-filled and/or</p>	<p data-bbox="1146 261 1881 391"><i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i></p> <p data-bbox="1146 415 1881 618">SMALL to MODERATE. Under the no-action alternative, the public health would remain the same as described in the affected environment section. No radiological exposures are estimated to the general public other than from background radiation levels. Local public and occupational health impacts would be expected to remain SMALL.</p> <p data-bbox="1146 659 1881 821">The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.</p> <p data-bbox="1146 862 1881 1101">Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods and design of these facilities, the likely public and occupational health impacts from normal operations and accidents would be similar to the proposed action. Public and occupational health impacts for additional domestic enrichment facilities would be expected to be SMALL to MODERATE.</p>

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
Public and Occupational Health <i>(continued)</i>	over-heated cylinder, which could incur a collective population dose of 120 person-sieverts (12,000 person-rem) and seven latent cancer fatalities. The proposed NEF design reduces the likelihood of this event by using redundant heater controller trips.	
Waste Management	<p>SMALL. 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 could be generated at the proposed NEF.</p> <p>SMALL to MODERATE impact for DUF<sub>6</sub> Waste Management. Public and occupational exposures would be monitored and controlled to meet NRC regulations for radiation protection. LES identified two potential pathways for the disposition of DUF<sub>6</sub>, either by private conversion and disposal facilities or by DOE through Section 3113 of the USEC Privatization Act. LES's preferred strategy is to have the DUF<sub>6</sub> byproduct converted and disposed of using private facilities outside of the State of New Mexico. No final location has yet been determined for a private conversion facility. Alternatively, DOE's processing of the DUF<sub>6</sub> would</p>	<p>SMALL to MODERATE. Under the no-action alternative, new wastes including sanitary, hazardous, low-level radioactive wastes, or mixed wastes would not be generated that would require disposition. Local impacts from waste management would be expected to remain SMALL.</p> <p>The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.</p> <p>Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods, design of these facilities, and the status of DUF<sub>6</sub> conversion facilities, the likely waste management impacts would be similar to the proposed action. For additional domestic enrichment facilities, impacts from waste management would be expected to be SMALL to MODERATE.</p>

<b>Affected Environment</b>	<b>Proposed Action:</b>	<b>No-Action Alternative:</b>
	<i>LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.</i>	<i>The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.</i>
<b>Waste Management (continued)</b>	extend operation of its conversion facilities. This would prolong their associated impacts as described in DOE's NEPA documentation. A private conversion facility would have comparable impacts to the planned DOE conversion facilities at Paducah, Kentucky, and Portsmouth, Ohio.	

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### 3 AFFECTED ENVIRONMENT

This Chapter describes the regional and local environmental characteristics at the proposed National Enrichment Facility (NEF) site. These data and information provide a starting point from which to assess impacts (Chapter 4) of the proposed action (Chapter 2) of this Environmental Impact Statement (EIS). This Chapter presents information on land use; water resources; historic and cultural resources; visual and scenic resources; climatology, meteorology, and air quality; geology, minerals and soils; ecology; noise; socioeconomic; public health; transportation; and waste disposal.

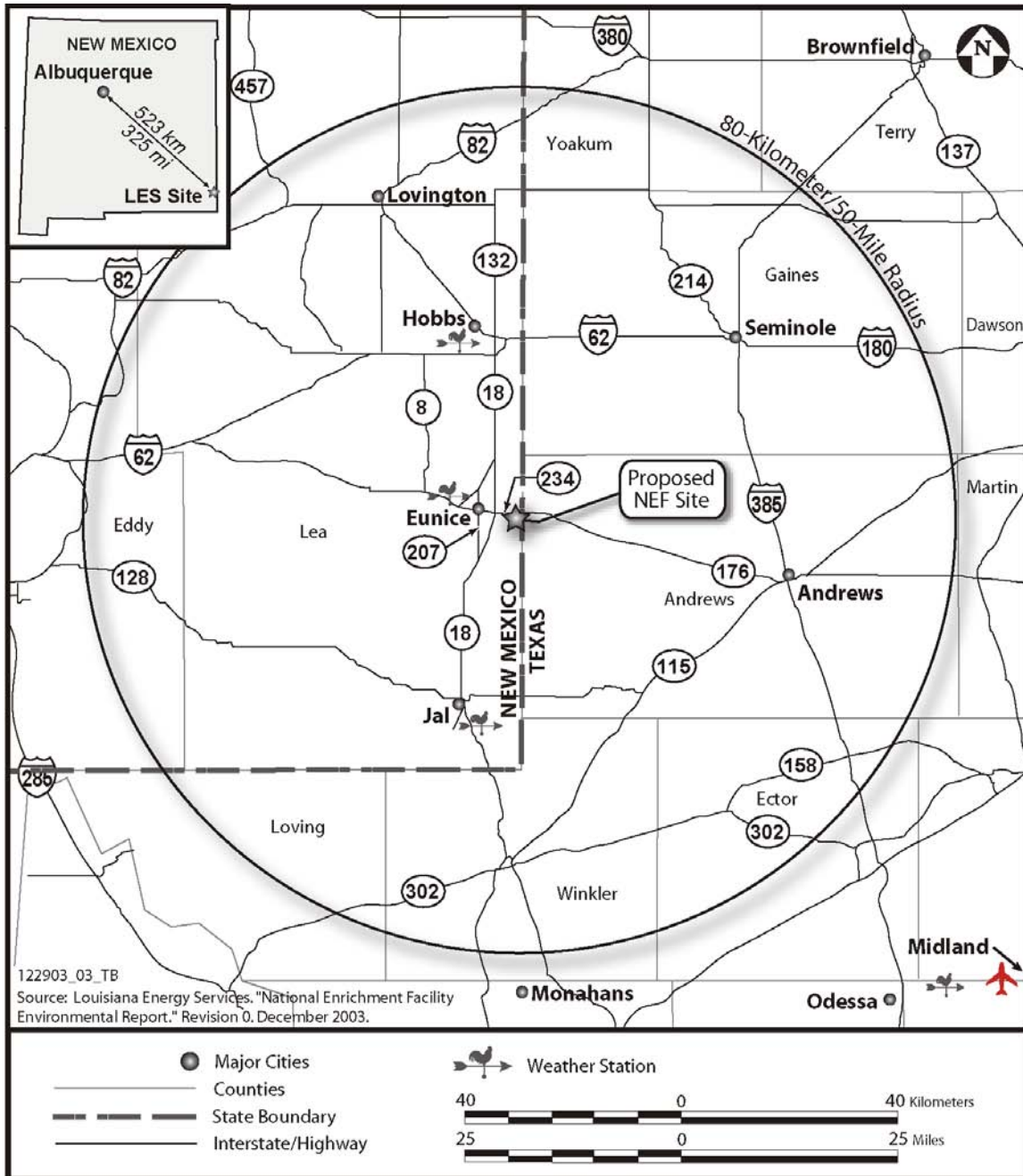


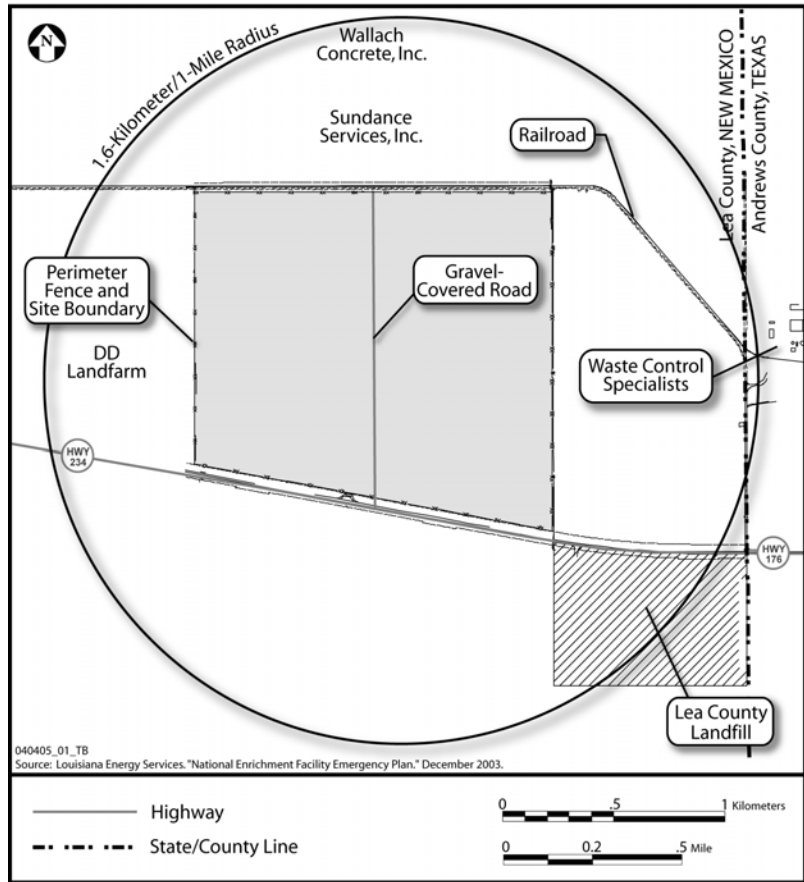
Figure 3-1 Proposed NEF Site and Surrounding Areas (LES, 2005a)

### 3.1 Site Location and Description

The proposed NEF site is located in southeastern New Mexico in Lea County, 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 (Figure 3-1). Eunice, the closest population center, is located at the cross-junction of New Mexico Highways 207 and 234. The site is about 51 kilometers (32 miles) northwest of Andrews, Texas, and 523 kilometers (325 miles) southeast of Albuquerque, New Mexico. The nearest population center with an international airport is Midland-Odessa, located 103 kilometers (64 miles) southeast of the proposed site.

As the result of a land exchange, ownership of the property was transferred from the State of New Mexico to Lea County. On December 8, 2004, Lea County leased the property to Louisiana Energy Services (LES). This lease would last for a period of 30 years, after which LES would purchase the land (LES, 2005a; LES, 2005b; LES, 2004).

The proposed NEF site consists of mostly undeveloped land that is used for cattle grazing. As shown in Figure 3-2, a gravel-covered road bisects the east and west halves of the site. In addition, the site is traversed by an underground carbon dioxide pipeline. An underground natural gas pipeline is located along the southern property line. A barbed-wire fence runs along the eastern, southern, and western property lines. The north fence has been dismantled.



### 3.2 Land Use

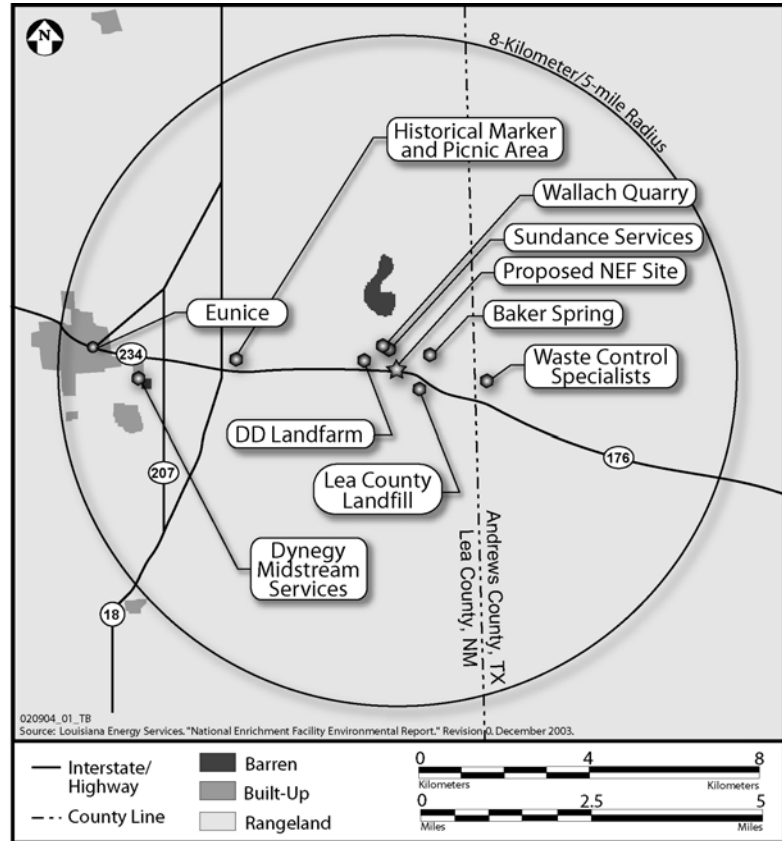
**Figure 3-2 Proposed NEF Site Area (LES, 2005b)**

This section includes a description of the land uses on and near the proposed NEF site as well as a discussion of offsite areas and the regional setting. Figure 3-3 shows a general land use map for the proposed site vicinity.

The area surrounding the proposed site consists of vacant land and industrial developments. The northern side of the site is bordered by a railroad spur, beyond which is a sand/aggregate quarry operated by Wallach Concrete, Inc. (Wallach, 2004) and an oil-reclamation operation owned by Sundance Services, Inc. The Sundance facility disposes of oil industry solid wastes in a disposal facility and treats soils contaminated with hydrocarbons via landfarming (NMCDE, 2004a; Sundance, 2004a; BLM, 1992).

Further east of the proposed site, a hazardous waste treatment facility operated by Waste Control Specialists (WCS) is situated within the State of Texas. The WCS facility owns buffer areas that border the immediate eastern boundary of the proposed NEF site. The WCS facility holds a renewable seven-year license to temporarily store low-level radioactive and mixed wastes. In addition, WCS holds:

- A *Resource Conservation and Recovery Act (RCRA) Part B* permit (Texas Natural Resources and Conservation Commission Permit No. HW-50358).
- A *Toxic Substances Control Act Land Disposal Authorization* (Environmental Protection Agency [EPA] Identification No. TXD988088464).
- A Texas Natural Resources and Conservation Commission Naturally Occurring Radioactive Material Disposal Authorization, and a Texas Department of Health, Bureau of Radiation Control, Radioactive Material License (Texas Department of Health License No. L04971) (WCS, 2004a; TDH, 2000).



**Figure 3-3 Land Use Within 8 Kilometers (5 Miles) of the Proposed NEF Site (LES, 2005a)**

Under these licenses, permits, and authorizations, WCS treats, processes, and/or temporarily stores low-level radioactive wastes (including greater-than-class-C, sealed sources, solids, and liquids), 11e(2) material, and mixed wastes (i.e., hazardous waste with radioactive contamination) in addition to the disposal of RCRA/*Toxic Substances Control Act* hazardous materials (WCS, 2004b). WCS is an Agreement State licensee with the State of Texas. On November 12, 2004, the U.S. Nuclear Regulatory Commission (NRC) published in the *Federal Register* (69 FR 65468 to 65470) the issuance of an order to modify WCS' exemption from the requirements of Title 10, "Energy," of the *U.S. Code of Federal Regulations* (10 CFR) Part 70.

The Lea County Landfill is located to the southeast and across New Mexico Highway 234 from the proposed NEF. This landfill disposes of municipal solid waste for the Lea County Solid Waste Authority under New Mexico Environment Department Permit Number SWM-130302. The landfill services Lea County and its municipalities, and other communities within a 160-kilometer (100-mile) radius (LCSWA, 2004).

Bordering the proposed site from the west is privately held land, beyond which is the DD Landfarm, a petroleum-contaminated-soil treatment facility (NMEMNRD, 2000). A historical marker and picnic area are also situated approximately 3.2 kilometers (2 miles) west of the proposed NEF at the intersection of

New Mexico Highway 18 and Highway 234. Also, Dynegy Midstream Services, a gathering and processing plant of natural gas, is located 6 kilometers (4 miles) west of the proposed NEF site. The nearest residences are situated approximately 4.3 kilometers (2.6 miles) west of the site (LES, 2005a).

The oil and gas industry has developed the land further to the north, south, and west of the proposed site with hundreds of operating oil pump jacks and associated rigs (Figure 3-4). The more than 33,700 oil wells in the southeastern region of New Mexico produced approximately 63.4 million barrels of oil and more than 16 million cubic meters (570 million cubic feet) of gas in 2003 (NMCDE, 2004b; NMEMNRD, 2004). There is no evidence of prior exploration or production oil wells at the proposed NEF site.



**Figure 3-4 Oil Pump Jack**

As shown in Figure 3-3, the area surrounding the proposed NEF is extensively dominated by open rangeland used for cattle grazing. Over 98 percent of the land within the 8-kilometer (5-mile) radius of the proposed NEF site is comprised of herbaceous rangeland, shrub and brush rangeland, and mixed rangeland. Rangeland encompasses 12,714 hectares (31,415 acres) within Lea County, New Mexico, and 7,213 hectares (17,823 acres) within Andrews County, Texas (USGS, 1986). Throughout the year, cattle grazing occurs on adjacent local lands including those owned by Wallach Concrete, Inc., and WCS (Wallach, 2004; Berry, 2004).

Built-up land and barren land constitute the other two land use classifications in the proposed site vicinity, but at considerably smaller percentages. Built-up land (i.e., land with residential and industrial developments) comprises approximately 243 hectares (601 acres) of Lea and Andrews Counties and makes up 1.2 percent of the land use. Barren land, consisting of bare exposed rock and transitional and sandy areas, make up the remaining 0.3 percent of land area. There are no special land use classifications (i.e., Indian tribe reservations, national parks, or prime farmland) within the proposed site vicinity. Also, there is only one known public recreational area, a historical marker and picnic area, located within 8 kilometers (5 miles) of the site. With the exception of cattle grazing, no agricultural activities have been identified in the proposed site vicinity (LES, 2005a). Cattle are the primary livestock for both Lea and Andrew Counties (USDA, 1998; USDA, 1999). The nearest dairy farms in Lea County (where milk cows make up a large portion of the cattle) are located near the city of Hobbs (Wallach, 2004). There are no milk cows in Andrews County (LES, 2005a).

The following nonindustrial water resources are located in the proposed NEF site vicinity:

- A manmade pond on the adjacent quarry property to the north that is stocked with fish for private catch-and-release use and is recharged using municipal water (Wallach, 2004).
- Baker Spring, an intermittent surface-water feature situated about 1.6 kilometers (1 mile) northeast of the site that contains water seasonally.

- Several cattle-watering holes where groundwater is pumped by windmill and stored in aboveground tanks.
- A well by an abandoned home about 4 kilometers (2.5 miles) to the west.
- Monument Draw, a natural shallow drainageway situated several kilometers southwest of the site. Local residents indicated that Monument Draw only contains water for a short period of time following a significant rainstorm (LES, 2005a).

Industrial water uses include “produced water” lagoons, a freshwater pond, evaporation ponds, and a settlement basin. The freshwater pond, a settlement basin, and several evaporation ponds are located on the adjacent quarry property to the north (Wallach, 2004). Five produced-water lagoons and an oil-reclamation pit are located on the Sundance Services, Inc., property (Sundance, 2004b). Produced water is salty wastewater that is brought to the surface during production of natural gas and is also a byproduct of the cleaning process of raw crude oil from a well head (ANL, 2004; Emerson, 2003).

In addition, three Superfund/*Comprehensive Environmental Response, Compensation, and Liability Act* sites are located in Lea County, and six are located in Eddy County, New Mexico (EPA, 2003a). These sites are not in close proximity to the proposed NEF site. There are no sites in Andrews County (EPA, 2003a).

Currently, other than the construction of the proposed NEF and the potential siting of a low-level radioactive waste disposal site at WCS, there are no other known future or proposed land use plans in the area. In addition, the proposed site is not subject to local or county zoning, land use planning, or associated review process requirements, and there are no known potential conflicts of land use plans, policies, or controls (LES, 2005a). However, the city of Eunice is working on a new zoning plan for expansion of the city limits (Consensus Planning, 2004). The city plan includes an eastward commercial and heavy industrial zoning area that follows New Mexico Highway 234 towards the proposed NEF site. Figure 3-5 presents details of the preferred land use for the city of Eunice.

### **3.3 Historic and Cultural Resources**

The region surrounding the proposed NEF site in southeastern New Mexico and western Texas is rich in prehistoric and historic American Indian and Euro-American history. However, the environmental setting in the immediate vicinity of the proposed site has greatly affected both prehistoric and historic occupation and use of the area. This local setting, which occurs well onto the Llano Estacado (see section 3.6, “Geology, Minerals, and Soils”), is a flat, treeless plain lacking nearby permanent or semipermanent surface water. As a result, the proposed NEF site was not conducive to extensive human use over the centuries. By comparison, both prehistoric and historic occupation and use were more extensive in all directions from the proposed site. In contrast to the proposed NEF site area, shelter and other resources were more readily available at selected locales elsewhere on the Llano Estacado where temporary and some permanent springs and lakes were found.

The cultural sequence in the region extends back approximately 11,000 years, and several chronological prehistoric and historic periods can be defined (Sebastian and Larralde, 1989). These periods include the Paleo-Indian period (9000 B.C.-7000 B.C.); the Archaic period (5000-6000 B.C.–A.D. 900-1000); the

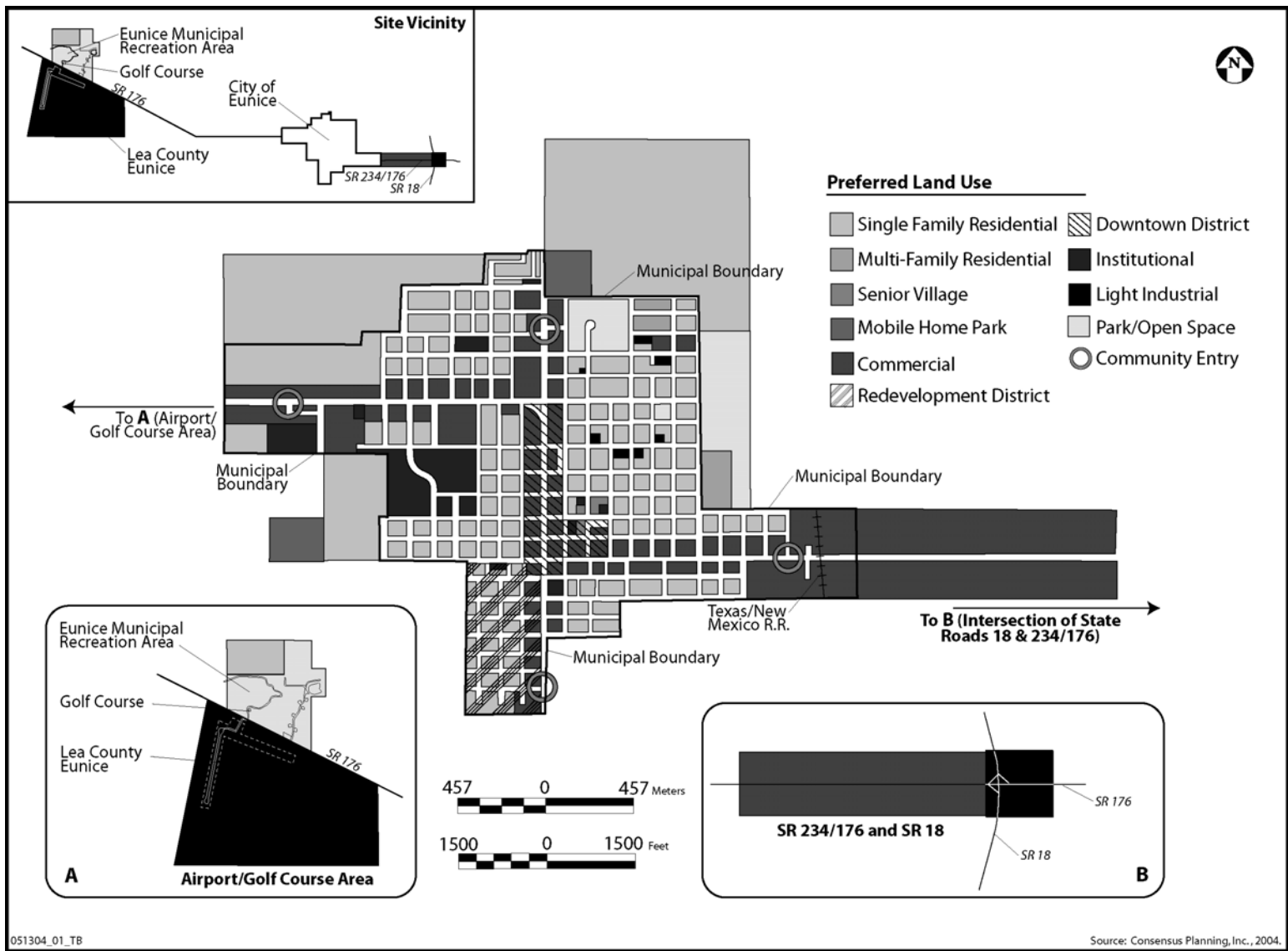


Figure 3-5 Preferred Land Use for the City of Eunice, New Mexico (Consensus Planning, 2004)



Ceramic period (A.D. 900-1500); the Protohistoric Native American and Spanish Colonial period (A.D. 1541-1800); and the Historic Hispanic, American Indian, and American period (A.D. 1800-present). The following subsections present brief background summaries of these eras.

### **3.3.1 Prehistoric**

According to the cultural resource overview for southeastern New Mexico (Sebastian and Larralde, 1989), the initial prehistoric period in the region was characterized by a big-game-hunting subsistence pattern with small groups of nomadic humans preying on now extinct animal species such as mammoths and large bison. Some of the classic Paleo-Indian archaeological hunting sites were discovered on the Llano Estacado and nearby areas, although none are located in close proximity to the project area. The subsequent Archaic period was also marked by nomadic groups relying on increased use of smaller game animals and plant foods. In general, the Ceramic period was characterized by a trend towards more sedentary villages and reliance on cultivated crops. However, the environment in the vicinity of the project area was not conducive to this lifestyle, and the presence of Ceramic period sites reflects more limited occupations than other areas such as the Pecos River Valley to the west. Reviews of existing archaeological site files (Sebastian and Larralde, 1989) and area overviews (Leslie, 1979; Runyon, 2000) reveal that archaeological materials associated with each of these prehistoric periods have been found in the vicinity of the project area. All previously recorded archaeological sites close to the proposed NEF site are designated as seasonally used temporary prehistoric campsites.

### **3.3.2 Protohistoric and Historic Indian Tribes**

Similar to the prehistoric era, protohistoric and historic period exploitation of the immediate vicinity of the proposed NEF project area by Indian tribes was also sparse, although occupation and use of the larger region was intensive. At the time of contact by Spanish expeditions, the area was occupied by groups that are nearly nonexistent today. These groups include the Suma and Tigua (Gerald, 1974) and the Jumano (Kelley, 1986; Hickerson, 1994), who were centered to the south in western present-day Texas and to the west along the Pecos River drainage. These groups were replaced in historic times by Plains immigrants from the north and east, including the Kiowa (Mayhall, 1971), Comanche (Fehrenbach, 1974; Kavanagh, 1996; Wallace and Hoebel, 1952), and the Mescalero Apaches who occupied the mountainous areas of south-central New Mexico (Opler, 1983; Sonnichsen, 1973). Each of these protohistoric- and historic-period groups frequented the vicinity of the project area over time, but their primary occupations and activities took place elsewhere in areas with better resources.

Based on various testimonies before the U.S. Indian Claims Commission, the area proximal to the project area was found to have been used and/or occupied by Federally recognized present-day tribes known as the Plains Apache, Comanche, and Kiowa. Today, these tribes occupy a reservation in southwestern Oklahoma (ICC, 1979). The U.S. Indian Claims Commission also noted that the historically occupied area of the Mescalero Apache Tribe lies just to the west of the project area, although Mescalero did at times extend over an area that includes the proposed NEF site. Today, the Mescalero Reservation is located about 201 kilometers (125 miles) northwest of the project area. A remnant group of the Tigua (Ysleta del Sur Pueblo near El Paso, Texas) also has a traditional use presence in the area. Based on these data, the NRC staff consulted the following modern-day tribes:

- Apache Tribe of Oklahoma.
- Comanche Tribe of Oklahoma.
- Kiowa Tribe of Oklahoma.
- Mescalero Apache Tribe.
- Ysleta del Sur Pueblo.

Review of the extant literature has not identified any known individual tribal properties and resources or traditional cultural places of significance within or near the proposed NEF site.

### **3.3.3 Historic Euro-American**

The historic Euro-American period in the region began with Spanish exploration expeditions, beginning in 1541 with the Coronado expedition. However, no information was available that indicates any of the Spanish expeditions approached the project area (Morris, 1997). The first Anglo presence in the vicinity of the proposed NEF site was associated with U.S. military activities involved in conflicts with and the subjugation of the Indian tribes. Treaties in the 1860's and 1870's essentially ended the American Indian presence in the area as the various tribes were relocated to reservations. Following these events, American settlers slowly but steadily occupied the area in the vicinity of the proposed NEF site. This era leading to the present day was characterized by several phases of occupation and use. These phases included the open-cattle-ranching era (from the 1860's to about 1910), homesteading and settlement (beginning about 1905), and the development of the oil and gas industry (beginning in the 1920's). These events are summarized in the following county histories: Andrews County, Texas (organized in 1910) (ACHC, 1978); Gaines County, Texas (organized in 1905) (Coward, 1974); and Lea County, New Mexico (organized in 1917) (Brooks, 1993; Hinshaw, 1976; Mauldin, 1997; Mosely, 1973), on which sources the following discussion is based as it pertains to the proposed NEF site.

The 84 Ranch (also known as the Half Circle 84) was one of the earliest ranches in the area. The 84 Ranch was established in 1884 or 1885 with the digging of a well and the emplacement of a windmill (Hinshaw, 1976; Price, 1967). The well and ranch headquarters were located east of the present-day town of Eunice, about 4.8 kilometers (3 miles) northwest of the project area. The proposed NEF site was originally included in the ranch's grazing lands. The 84 Ranch was eventually purchased by the larger JAL Ranch, which raised about 40,000 head of cattle on an expansive tract of land that occupied the southeast quarter of Lea County until about 1910.

After 1900, changes in the *Homestead Act* allowed larger acreages that permitted settlers to take up tracts of the former open range. In 1908, John Carson homesteaded 129 hectares (320 acres) of former 84 Ranch land, a tract that would eventually become the city of Eunice. The Carson homestead was located about 8 kilometers (5 miles) west of the proposed NEF site. In 1909, Carson established a post office and general store at the locale named for his eldest daughter, Eunice. Other settlers were attracted to the location, and Eunice reached its pinnacle as a pioneer settlement in the years 1914-1915. However, drought and other larger events—including recession, World War I, and the influenza epidemic of 1918—led to a decline in the area's population. A regional oil boom reached Eunice in 1929, and the town began to again grow. In 1937, Eunice was incorporated as a city with a population of 2,188.

### **3.3.4 Historic and Archaeological Resources at the Proposed NEF Site**

Lea County, New Mexico, currently owns the proposed NEF site, which comprises 220 hectares (543 acres) of land lying north of U.S. Highway 234 in Section 32 of range 38E in Township 21S. Information obtained from the Historic Preservation Division of the New Mexico Office of Cultural Affairs, Archaeological Resource Management Records Section, reveals that prior to the current project, no cultural resources surveys have been conducted within the proposed project area nor were there any previously recorded archaeological sites. A review of the current listings for the New Mexico State Register of Cultural Resource Properties and the National Register of Historic Places indicate no listed properties within 8 kilometers (5 miles) of the project area.

In September 2003, an intensive cultural resources inventory was completed for the 220-hectare (543-acre) tract, resulting in the identification and recording of 7 new archaeological sites and 35 instances of isolated artifacts (Graves, 2004). The latter included isolated occurrences of prehistoric artifacts, except for two U.S. General Land Office bench markers dated 1911 located at the northeast and northwest corners of the section, and parts of an historic barbed-wire fence enclosure.

Each of the seven archaeological sites recorded within the proposed project area is designated as a prehistoric campsite of indeterminate age. In the New Mexico site file system, the archaeological sites are listed as Laboratory of Anthropology 140701-140707. All of the sites are similar in configuration, with a presence of one or more thermal features (concentrations of fire-cracked rocks), scattered fire-cracked rocks, and a scatter of stone tools and/or flakes. Field analysis of the artifacts indicates that these campsites and artifact scatters may have been associated with procurement of stone tool materials from nearby gravel cobbles.

Applying the significance criteria for possible listing in the National Register of Historic Places, the field investigators recommended to the New Mexico State Historic Preservation Office that each of the recorded archaeological sites falls into one of the following categories:

- **Not eligible** for listing in the National Register of Historic Places based on lack of buried cultural materials (field recording has exhausted the research potential) (Laboratory of Anthropology 140701, 140702, and 140703).
- **Potentially eligible** for listing in the National Register of Historic Places based on an observed potential for buried cultural deposits (Laboratory of Anthropology 140707).
- **Eligible** for listing in the National Register of Historic Places based on the expectation that buried cultural deposits exist and/or the surface data indicate a definite research potential (Laboratory of Anthropology 140404, 140705, and 140706).

Each of the recommendations for potential eligibility or eligible status for the proposed NEF archaeological sites falls under the National Register of Historic Places criterion (d), which identifies sites that have either yielded, or may likely yield, information important in prehistory or history. By designation, cultural items recorded as isolated artifacts are not considered as potentially eligible for listing in the National Register of Historic Places. All seven sites have been determined to be eligible for listing in the National Register of Historic Places.

### **3.4 Visual and Scenic Resources**

The proposed NEF site consists of open, vacant land. Nearby landscapes are similar in appearance, except for manmade structures associated with the neighboring industrial properties and the local oil and gas well heads. Figures 3-6 and 3-7 show that no existing structures are located on the site. The only agricultural activity in the site vicinity is cattle grazing.

The proposed NEF site is considered indistinguishable in terms of scenic attractiveness when compared to surrounding land. With the exception of a roadside picnic area and historical marker, no recreational resources are identified in the immediate area of the site.

The scenic quality of the proposed NEF site was assessed using the U.S. Bureau of Land Management (BLM) visual resource inventory process (LES, 2005a). The visual rating is determined by assessing the contrast of a proposed project on the surrounding area from key observation points. Based on the visual resource inventory process, the proposed NEF site received the lowest scenic-quality rating. This rating means that the level of change to the characteristic landscape can be high, and allows for the greatest level of landscape modification (BLM, 2003a; BLM, 2003b).

The proposed NEF site is not visible from the city of Eunice, which is located 8 kilometers (5 miles) to the west. However, the site is bordered to the south by New Mexico Highway 234 and is visible to westbound traffic approaching from the New Mexico/Texas State line, approximately 0.8 kilometer (0.5 mile) to the east. Eastbound highway traffic is partially shielded by a naturally occurring series of small sand dunes on the western portion of the site. Once traffic passes the sand dune buffer, the site becomes visible. The view from the nearest residences situated approximately 4.3 kilometers (2.6 miles) away is also limited by onsite sand dunes.

Properties adjacent to the site include Wallach Concrete, Inc., and Sundance Services, Inc., to the north and WCS to the east. The site is visible from these properties and slightly visible from the Lea County Landfill, located to the southeast, and from DD Landfarm, located to the west.

### 3.5 Climatology, Meteorology, and Air Quality

#### 3.5.1 Regional Climatology

The climate in the region of the proposed NEF site is semi-arid with mild temperatures, low precipitation and humidity, and a high evaporation rate. The weather is often dominated in the winter by a high-pressure system in the central part of the western United States and a low-pressure system in north-central Mexico. The region is affected by a low-pressure system located over Arizona in the summer.



Source: Louisiana Energy Services, "National Enrichment Facility Environmental Report," Revision 0, December 2003, 020604\_01\_TB

**Figure 3-6 View of the Proposed NEF Site Looking from the Northwest to the Southeast (LES, 2005a)**



Source: Louisiana Energy Services, "National Enrichment Facility Environmental Report," Revision 0, December 2003, 020604\_02\_TB

**Figure 3-7 View of the West Half of the Proposed NEF Site (LES, 2005a)**

### 3.5.2 Site and Regional Meteorology

There are no site-specific meteorological data available at the proposed NEF site. Data is available from WCS, 1.6 kilometers (1 mile) from the proposed NEF site, but these data are not fully verified. Climatological averages for atmospheric variables such as temperature, pressure, winds, and precipitation presented in this EIS are based on data collected from four weather stations. These stations are located in Eunice, New Mexico; Hobbs, New Mexico; Roswell, New Mexico; and Midland-Odessa, Texas (Figure 3-1). Table 3-1 presents the distances and directions of these stations from the site and the length of the records for the reported data.

**Table 3-1 Weather Stations Located near the Proposed NEF Site**

<b>Station</b>	<b>Distance and Direction from Proposed Site</b>	<b>Length of Record*</b>	<b>Station Elevation (meters)</b>
Eunice, New Mexico	8 kilometers (5 miles) west of site	1 (1993)	1,050
Hobbs, New Mexico	32 kilometers (20 miles) north of site	16 (1982-1997)	1,115
Midland-Odessa, Texas	103 kilometers (64 miles) southeast of site	16 (1982-1997)	872
Roswell, New Mexico	161 kilometers (100 miles) northwest of site	16 (1982-1997)	1,118

\* Years of compiled data for climatological analysis.

Source: WRCC, 2004

The Midland-Odessa monitoring station is the closest first-order National Weather Service station to the proposed NEF site. First-order weather stations record a complete range of meteorological parameters for 24-hour periods, and they are usually fully instrumental (NCDC, 2003). The National Oceanic and Atmospheric Administration (NOAA) compiles and certifies the hourly meteorological data for Midland-Odessa, Roswell, and Hobbs (NCDC, 1998). In addition to hourly data, the Western Regional Climate Center compiles and certifies the climatological summaries for Hobbs (WRCC, 2004). The State of New Mexico Environment Department Air Quality Bureau collects the only available data from Eunice (NMAQB, 2003).

#### 3.5.2.1 Temperature

Local climate data are available from a monitoring station in Hobbs, New Mexico. The Hobbs station is a part of the National Climatic Data Center Cooperative Network. The Hobbs, New Mexico, station shows a mean annual temperature of 16.6°C (61.9 °F) with the mean monthly temperature ranging from 5.7°C (42.2°F) in January to 26.8°C (80.2°F) in July. The highest daily maximum temperature on record is 45.6°C (114°F) (June 27, 1998) and the lowest daily minimum temperature is -21.7°C (-7°F) (January 11, 1962). Table 3-2 presents a summary of temperatures in the Hobbs area from 1914 to 2003.

#### 3.5.2.2 Precipitation

The normal annual total rainfall as measured in Hobbs, New Mexico, is 40 centimeters (16 inches). Precipitation amounts range from an average of 1.14 centimeter (0.45 inch) in January to 6.68 centimeters (2.63 inches) in September.

Maximum and minimum monthly totals are 35 centimeters (13.8 inches) and zero. Table 3-3 presents a summary of precipitation in the Hobbs area for monthly and annual means.

Summer rains fall almost entirely during brief, but frequently intense thunderstorms. The general southeasterly circulation from the Gulf of Mexico brings moisture from these storms into the State of New Mexico, and strong surface heating combined with orographic lifting as the air moves over higher terrain causes air currents and condensation. Orographic lifting occurs when air is intercepted by a mountain and is forcefully raised up over the mountain, cooling as it rises. If the air cools to its saturation point, the water vapor condenses and a cloud forms. August and September are the rainiest months with 30 to 40 percent of the year's total moisture falling at that time.

**Table 3-2 Summary of Monthly Temperatures at Hobbs, New Mexico, from 1914 to 2003<sup>a</sup>**

Month	Monthly Averages			Daily Extremes			
	Maximum	Minimum	Mean	High	Date	Low	Date
January	13.6°C (56.5°F)	-2.3°C (27.9°F)	5.7°C (42.2°F)	28.3°C (83°F)	01/11/1953	-21.7°C (-7°F)	01/11/1962
February	16.7°C (62.0°F)	0.0°C (32.0°F)	8.3°C (47.0°F)	30.6°C (87°F)	02/12/1962	-18.9°C (-2°F)	02/02/1985
March	20.5°C (68.9°F)	2.9°C (37.3°F)	11.7°C (53.1°F)	35.0°C (95°F)	03/27/1971	-17.2°C (1°F)	03/02/1922
April	25.5°C (77.8°F)	7.9°C (46.2°F)	16.7°C (62.0°F)	36.7°C (98°F)	04/30/1928	-7.8°C (18°F)	04/04/1920
May	29.7°C (85.5°F)	13.0°C (55.3°F)	21.3°C (70.4°F)	41.7°C (107°F)	05/30/1951	1.1°C (34°F)	05/02/1916
June	33.8°C (92.9°F)	17.5°C (63.4°F)	25.6°C (78.1°F)	45.6°C (114°F)	06/27/1998	4.4°C (40°F)	06/03/1919
July	34.3°C (93.8°F)	19.2°C (66.6°F)	26.8°C (80.2°F)	43.3°C (110°F)	07/15/1958	10.0°C (50°F)	07/01/1927
August	33.4°C (92.1°F)	18.7°C (65.6°F)	26.0°C (78.8°F)	41.7°C (107°F)	08/09/1952	8.3°C (47°)	08/29/1916
September	30.0°C (85.9°F)	15.2°C (59.4°F)	22.6°C (72.6°F)	40.6°C (105°F)	09/05/1948	1.1°C (34°F)	09/23/1948
October	25.1°C (77.1°F)	9.2°C (48.5°F)	17.1°C (62.8°F)	36.7°C (98°F)	10/03/2000	-11.1°C (12°F)	10/29/1917
November	18.5°C (65.2°F)	2.6°C (36.7°F)	10.5°C (50.9°F)	31.1°C (88°F)	11/01/1952	-15.6°C (4°F)	11/29/1976
December	14.5°C (58.1°F)	-1.3°C (29.6°F)	6.7°C (44.0°F)	28.9°C (84°F)	12/09/1922	-17.2°C (-1°F)	12/24/1983

<sup>a</sup>For monthly and annual means, thresholds, and sums: months with five or more missing days are not considered, years with one or more missing months are not considered.

Source: WRCC, 2004.

**Table 3-3 Summary of Monthly Precipitation at Hobbs, New Mexico, from 1914 to 2003**

Month	Precipitation						Total Snowfall			
	Mean	High	Year	Low	Year	1-Day Maximum		Mean	High	Year
January	1.14 cm (0.45 in)	7.52 cm (2.96 in)	1949	0.00	1924	3.07 cm (1.21 in)	01/11/1949	3.56 cm (1.4 in)	31.75 cm (12.5 in)	1983
February	1.14 cm (0.45 in)	6.20 cm (2.44 in)	1923	0.00	1917	3.53 cm (1.39 in)	02/05/1988	3.05 cm (1.2 in)	36.32 cm (14.3 in)	1973
March	1.35 cm (0.53 in)	7.57 cm (2.98 in)	2000	0.00	1918	5.08 cm (2.00 in)	03/20/2002	1.52 cm (0.6 in)	25.40 cm (10.0 in)	1958
April	2.03 cm (0.80 in)	13.13 cm (5.17 in)	1922	0.00	1917	4.75 cm (1.87 in)	04/20/1926	0.51 cm (0.2 in)	22.86 cm (9.0 in)	1983
May	5.23 cm (2.06 in)	35.13 cm (13.83 in)	1992	0.00	1938	13.21 cm (5.20 in)	05/22/1992	0.0	0.0	1948
June	4.78 cm (1.88 in)	23.62 cm (9.30 in)	1921	0.00	1924	11.23 cm (4.42 in)	06/07/1918	0.0	0.0	1948
July	5.36 cm (2.11 in)	23.90 cm (9.41 in)	1988	0.00	1954	11.35 cm (4.47 in)	07/19/1988	0.0	0.0	1948
August	6.02 cm (2.37 in)	23.29 cm (9.17 in)	1920	0.10 cm (0.04 in)	1938	11.30 cm (4.45 in)	08/09/1984	0.0	0.0	1948
September	6.68 cm (2.63 in)	32.99 cm (12.99 in)	1995	0.00	1939	19.05 cm (7.50 in)	09/15/1995	0.0	0.0	1948
October	3.99 cm (1.57 in)	20.70 cm (8.15 in)	1985	0.00	1917	14.22 cm (5.60 in)	10/09/1985	0.25 cm (0.1 in)	11.43 cm (4.5 in)	1976
November	1.45 cm (0.57 in)	11.00 cm (4.33 in)	1978	0.00	1915	9.65 cm (3.80 in)	11/04/1978	1.52 cm (0.6 in)	41.91 cm (16.5 in)	1980
December	1.42 cm (0.56 in)	12.90 cm (5.08 in)	1986	0.00	1917	4.72 cm (1.86 in)	12/21/1942	2.54 cm (1.0 in)	24.13 cm (9.5 in)	1986
Annual	40.59 cm (15.98 in)	81.76 cm (32.19 in)	1941	13.41 cm (5.28 in)	1917	19.05 cm (7.50 in)	09/15/1995	12.95 cm (5.1 in)	68.83 cm (27.1 in)	1980

cm - centimeter.

in - inch.

Source: WRCC, 2004.

As these storms move inland, much of the moisture is precipitated over the coastal and inland mountain ranges of California, Nevada, Arizona, and Utah. Much of the remaining moisture falls on the western slope of the Continental Divide and over northern and high-central mountain ranges. Winter is the driest season in New Mexico except for the portion west of the Continental Divide. This dryness is most noticeable in the Central Valley and on eastern slopes of the mountains. In New Mexico, much of the winter precipitation falls as snow in the mountain areas, but it may occur as either rain or snow in the valleys.

Climatological data collected from the Midland-Odessa station indicate the relative humidity throughout the year ranges from 45 to 61 percent, with the highest humidity occurring during the early morning hours (LES, 2005a).

### 3.5.2.3 Meteorological Data Analyses

The NRC staff examined the data from the four meteorological stations in Table 3-1 (NCDC, 1998; NMAQB, 2003). Because the Eunice meteorological data are limited to 1993, annual wind roses for Midland-Odessa, Roswell, Hobbs, and Eunice for 1993 were compared (Figure 3-8). From this one-year comparison, the general wind patterns for Midland-Odessa, Hobbs, and Eunice were somewhat similar. Roswell data, on the other hand, appeared to be different with a stronger northerly and westerly component. To illustrate such comparison further, Figure 3-9 presents the frequency distributions of atmospheric stability classes that were plotted for the 1993 data.

Histograms of atmospheric stability at Midland-Odessa, Roswell, Hobbs, and Eunice for the same year show that the stability-class frequency distribution for Midland-Odessa and Hobbs are similar. Distributions for Eunice and Roswell are different from Midland-Odessa and Hobbs. Stability class was determined using the solar radiation/cloud cover method for Midland-Odessa, Roswell, and Hobbs. The New Mexico Environment Department Air Quality Bureau provided stability categories for Eunice, which is limited to one year of data (NMEDAQB, 2003). Also, no information was available on the methods used to calculate the stability categories at this location.

Table 3-4 presents a statistical summary of the data completeness for Hobbs and Midland-Odessa that was performed to comply with EPA data completeness guidance for air quality modeling. The EPA requires that meteorological data be at least 75-percent complete (with less than 25 percent missing data) to be reliably usable as inputs for dispersion models (EPA, 2003b). Despite the fact that Hobbs is the closest station to the proposed NEF site, the Hobbs data did not meet the 75-percent completeness criteria. Therefore, these data were not used for dispersion modeling. However, Hobbs observations can be used

#### *Atmospheric Stability Classes*

*Stability classes are used to assess the dispersion behavior of materials released into the atmosphere. Dispersion is affected by ambient air temperature changes with height above ground and is categorized by Pasquill. Seven stability classes for use in dispersion calculations are established. Many times, the EPA and NRC will use only six stability classes by merging the sixth and seven (F and G) classes into one class.*

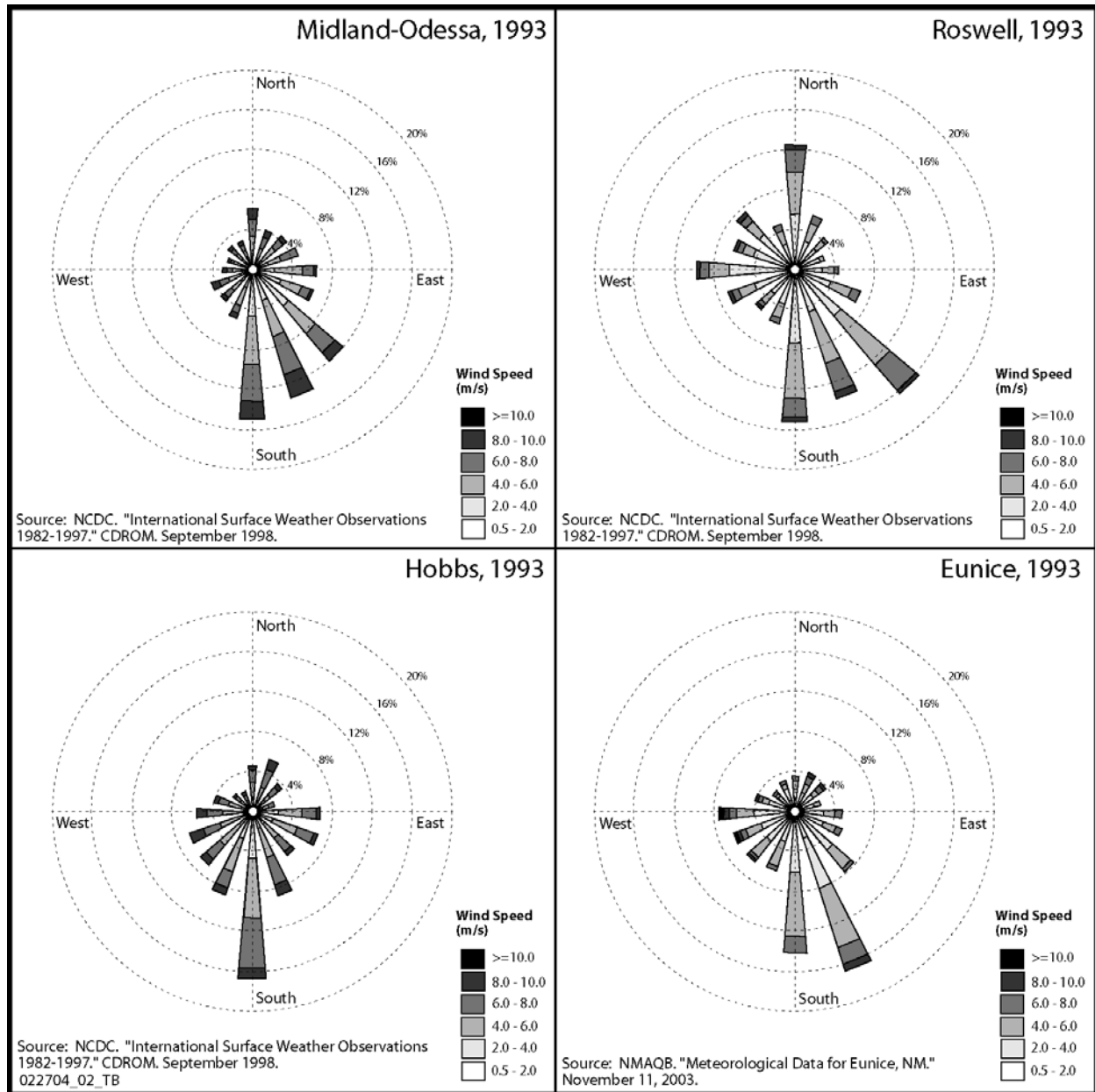
<i>Stability Classification</i>	<i>Pasquill Category</i>	<i>Temperature Change with Height (°C/100 meters)</i>
<i>Extremely Unstable</i>	<i>A</i>	<i>&lt;-1.9</i>
<i>Moderately Unstable</i>	<i>B</i>	<i>-1.9 to -1.7</i>
<i>Slightly Unstable</i>	<i>C</i>	<i>-1.7 to -1.5</i>
<i>Neutral</i>	<i>D</i>	<i>-1.5 to -0.5</i>
<i>Slightly Stable</i>	<i>E</i>	<i>-0.5 to 1.5</i>
<i>Moderately Stable</i>	<i>F</i>	<i>1.5 to 4.0</i>
<i>Extremely Stable</i>	<i>G</i>	<i>&lt;4.0</i>

*Source: NRC, 1972.*



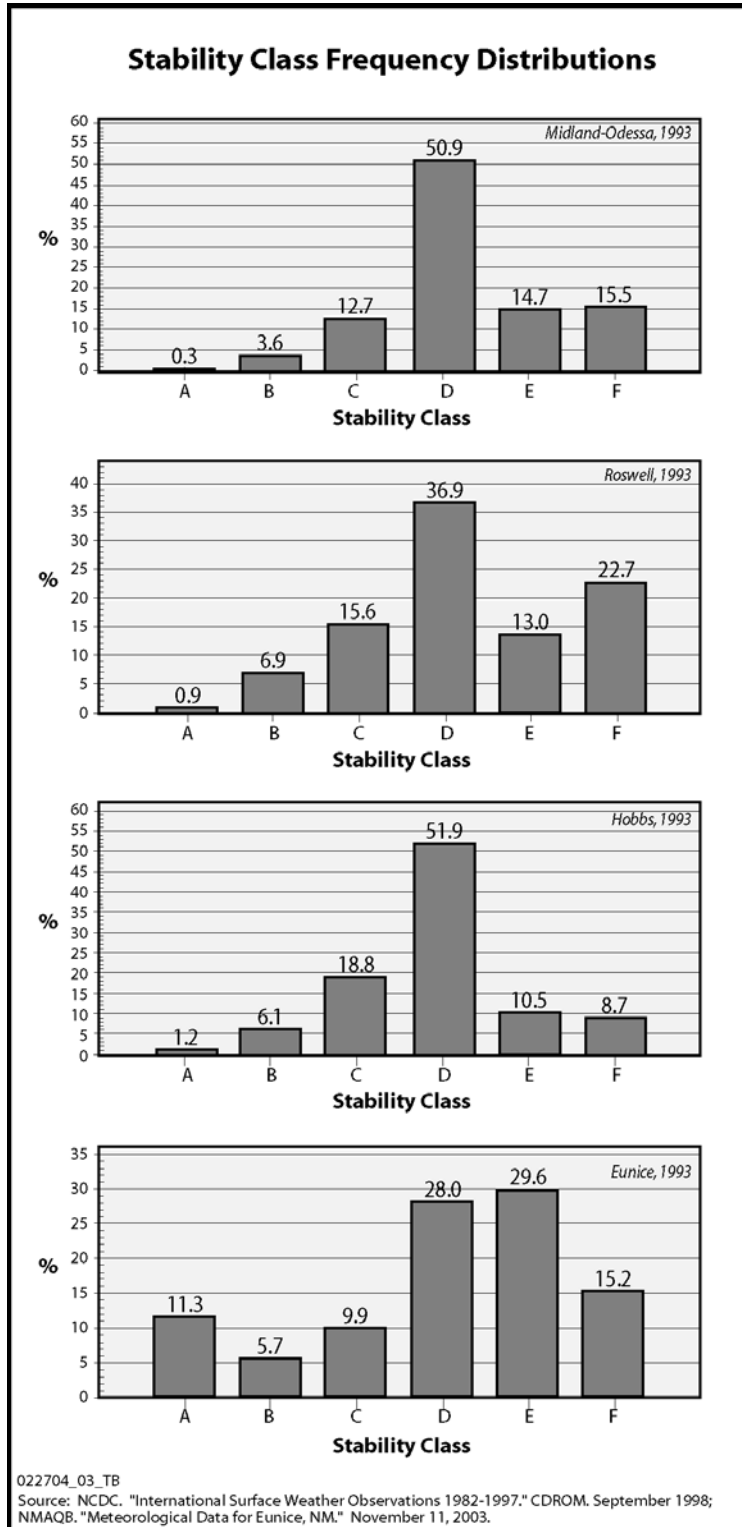
for a general description of the meteorological conditions at the proposed NEF site as they are all located within the same region and have similar climates.

Midland-Odessa and Hobbs had comparable climate data based on a comparative analysis of



**Figure 3-8 Wind Roses for Midland-Odessa, Roswell, Hobbs, and Eunice for 1993 (NCDC, 1998; NMAQB, 2003)**

meteorological data at the four locations surrounding the proposed NEF site. Roswell climate data were different, and Eunice data had too many severe shortcomings to be used reliably. Since Midland-Odessa was a first-order weather station with data completeness exceeding EPA guidance, it was used as the representative meteorological station for the dispersion modeling needs in this EIS.



**Figure 3-9 Histograms of Stability Categories for Midland-Odessa, Roswell, Hobbs, and Eunice, 1993  
(NCDC, 1998; NMAQB, 2003)**

**Table 3-4 Statistical Summary of the Data Completeness for Midland-Odessa and Hobbs**

Hobbs, NM			Midland-Odessa, NM		
Year	Number of Observations	% Complete	Year	Number of Observations	% Complete
1990	5,670	64.7	1990	8,168	93.2
1991	5,768	65.8	1991	8,251	94.2
1992	5,985	68.1	1992	8,431	96.0
1993	5,767	65.8	1993	8,368	95.5
1994	5,770	65.9	1994	8,325	95.0
1995	5,399	61.6	1995	7,863	89.8
1996	5,627	64.1	1996	6,621	75.4
1997	5,640	64.4	1997	8,208	93.7

Source: NCDC, 1998.

### 3.5.2.4 Winds and Atmospheric Stability

Wind speeds over the State of New Mexico are usually moderate, although relatively strong winds often accompany occasional frontal activity during late winter and spring months and sometimes occur just in advance of thunderstorms. Frontal winds may exceed 13 meters per second (30 miles per hour) for several hours and reach peak speeds of more than 22 meters per second (50 miles per hour).

Spring is the windy season. Blowing dust and serious soil erosion of unprotected fields may be a problem during dry spells. Winds are generally stronger in the eastern plains than in other parts of the State. Winds generally predominate from the southeast in summer and from the west in winter, but local surface wind directions will vary greatly because of local topography and mountain and valley breezes.

The hourly meteorological observations at Midland-Odessa were used to generate wind rose plots. Figure 3-10 shows wind speed and direction frequency for the years 1987 to 1991. Calculated annual mean wind speed was 5.1 meters per second (11.4 miles per hour), with prevailing winds from the south and a maximum 5-second wind speed of 31.2 meters per second (70 miles per hour). Figure 3-11 presents frequency distributions of wind speed and direction as a function of Pasquill stability class (A-F). The most stable classes—E and F—occur 18.9 and 13 percent of the time, respectively. The least stable classes, A and B, occur 0.3 and 3.5 percent of the time, respectively. Figure 3-12 presents frequency distribution of stability classes for a five-year period (1987-1991) at the Midland-Odessa National Weather Service Station.

The use of recent data generated at WCS from October 1999 through August 2002 (LES, 2005a) shows a similarity in wind patterns and distribution of wind speed between the Midland-Odessa and WCS locations. Although the meteorological data are from different time periods and the two sites are separated in distance, the data from both sites show a predominance of southerly winds, and both data sets shows similar distributions of wind speed.

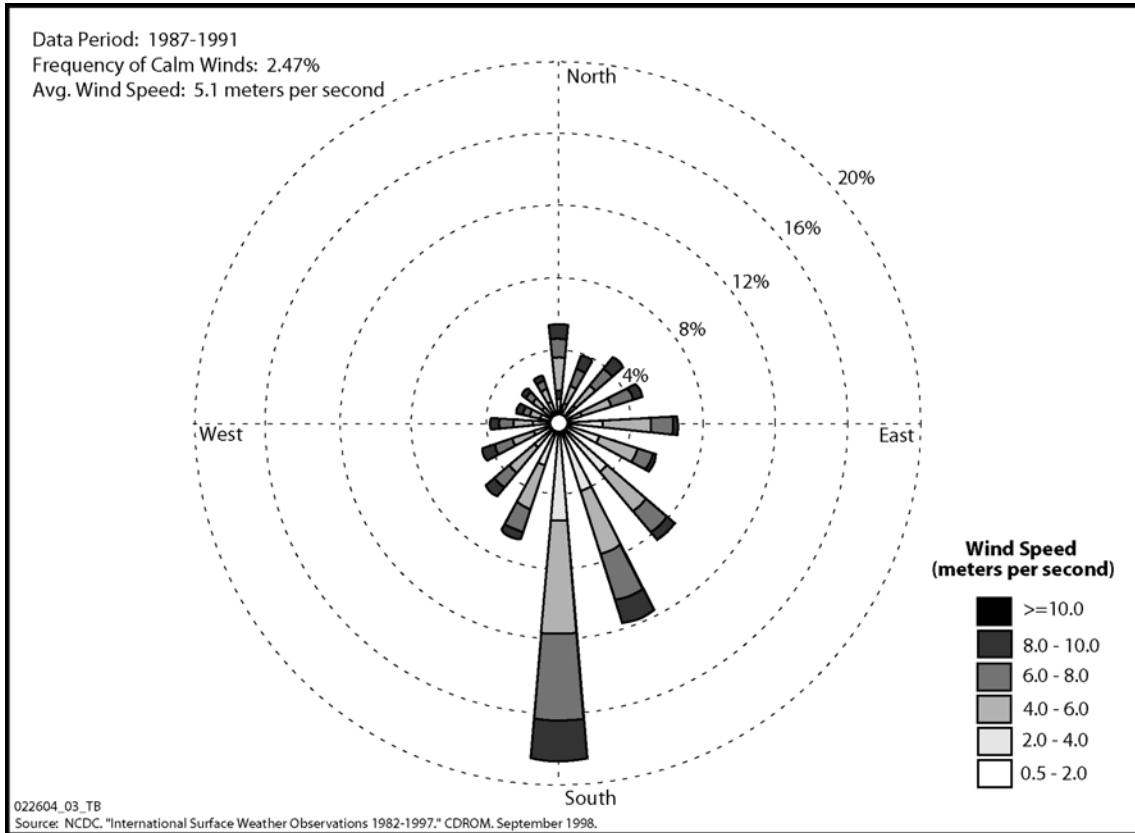


Figure 3-10 Wind Rose for Midland-Odessa, 1987-1991 (NCDC, 1998)

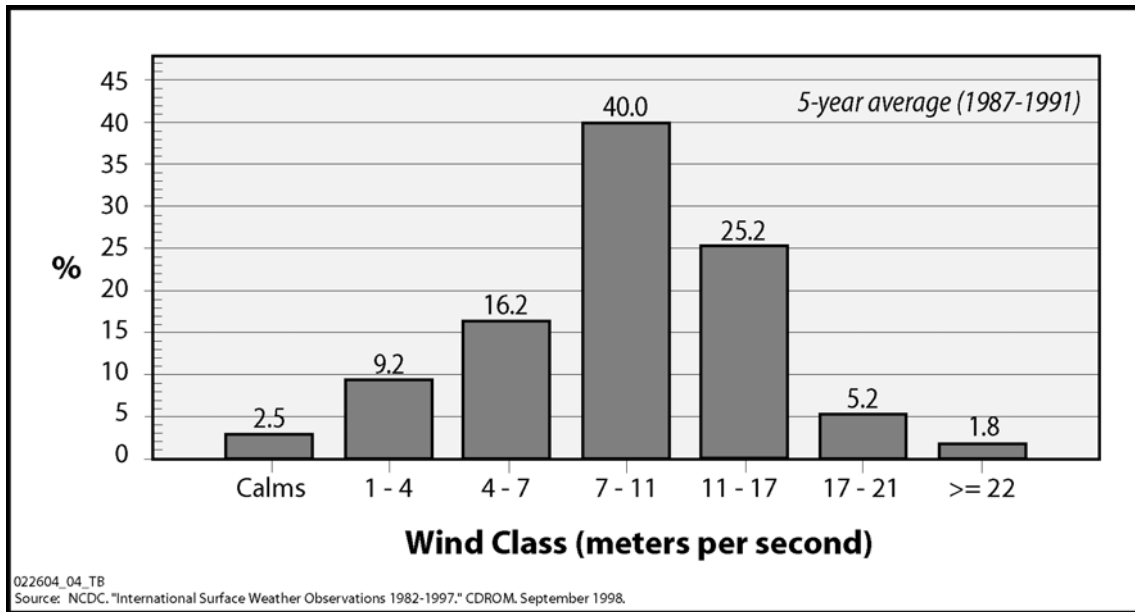
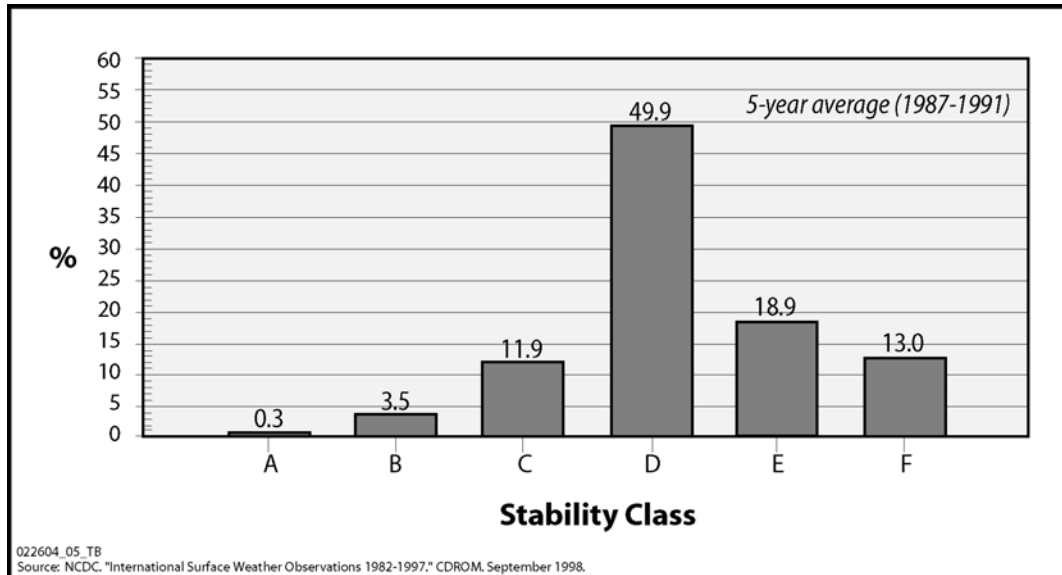


Figure 3-11 Wind Distribution for Midland-Odessa, 1987-1991 (NCDC, 1998)



**Figure 3-12 Distribution of Stability Classes for Midland-Odessa, 1987-1991 (NCDC, 1998)**

### 3.5.2.5 Severe Weather Conditions

According to data from Midland-Odessa, thunderstorms occur an average of 36.4 days/year in the southeastern area of New Mexico where the proposed site is located. Thunderstorms are most frequent in summer, averaging 17.4 days per year, and least frequent in winter, averaging 1.3 days per year. Occasionally, thunderstorms are accompanied by hail.

Using Marshall's methodology for determining attractive area and lightning strike frequency, it was determined that the proposed NEF site has an attractive area of 0.34 square kilometer (0.13 square mile) and a lightning strike frequency of 1.36 flashes per year. Only two lightning events having sufficient intensity to cause loss of life, injury, significant property damage, and/or disruption to commerce were reported in Lea County, New Mexico, between January 1, 1950, and April 30, 2004 (NCDC, 2004). The closest lightning event occurred in Hobbs with minor property damage of \$3,000 on August 12, 1997. The second occurred in Lovington on August 8, 1996, causing two deaths.

Tornadoes are occasionally reported in New Mexico, most frequently during afternoon and early evening hours from May through August. There is an average of nine tornadoes a year in New Mexico. Tornadoes are classified using the F-scale with classifications ranging from F0-F5 (NOAA, 2004) as follows:

- F0-classified tornadoes have winds of 64 to 116 kilometers per hour (40 to 72 miles per hour).
- F1-classified tornadoes have winds of 117 to 181 kilometers per hour (73 to 112 miles per hour).
- F2-classified tornadoes have winds of 182 to 253 kilometers per hour (113 to 157 miles per hour).
- F3-classified tornadoes have winds of 254 to 332 kilometers per hour (158 to 206 miles per hour).
- F4-classified tornadoes have winds of 333 to 419 kilometers per hour (207 to 260 miles per hour).
- F5-classified tornadoes have winds of 420 to 512 kilometers per hour (261 to 318 miles per hour).

In the 54-year period between January 1, 1950, and April 30, 2004, a total of 88 tornados were reported in Lea County, New Mexico. F2 or greater tornados occur infrequently in the vicinity of proposed NEF. No F4 or F5 tornadoes have ever been reported in the vicinity of the proposed NEF site. The strongest tornado in Lea County was an F3 that was reported on May 17, 1954. On May 27, 1982, an F2 tornado caused an estimated \$25 million in damage. All told, a reported 26 tornados have caused more than \$26 million in property damage in Lea County since 1950.

The proposed NEF site is located about 805 kilometers (500 miles) from the coast. Because hurricanes lose their intensity quickly once they pass over land, a hurricane would most likely lose its intensity before reaching the proposed NEF site and dissipate into a tropical depression.

Blowing sand or dust may occur occasionally in the area due to the combination of strong winds, sparse vegetation, and the semi-arid climate. High winds associated with thunderstorms are frequently a source of localized blowing dust. Sandstorms that cover an extensive region are rare (NCDC, 2004).

### 3.5.2.6 Mixing Heights

Mixing height is defined as the height above the earth’s surface through which relatively strong vertical mixing of the atmosphere occurs. G.C. Holzworth developed mean annual morning and afternoon mixing heights for the contiguous United States (Holzworth, 1972). According to Holzworth’s calculations, the mean annual morning and afternoon mixing heights at the proposed NEF site are approximately 436 meters (1,430 feet) and 2,089 meters (6,854 feet), respectively. Table 3-5 shows the average morning and afternoon mixing heights for Midland-Odessa, Texas.

**Table 3-5 Average Morning and Afternoon Mixing Heights for Midland-Odessa, Texas**

	Winter	Spring	Summer	Fall	Annual
Morning	290 meters (951 feet)	429 meters (1,407 feet)	606 meters (1,988 feet)	419 meters (1,375 feet)	436 meters (1,430 feet)
Afternoon	1,276 meters (4,186 feet)	2,449 meters (8,035 feet)	2,744 meters (9,003 feet)	1,887 meters (6,191 feet)	2,089 meters (6,854 feet)

Source: Holzworth, 1972.

### 3.5.3 Air Quality

To assess air quality, the EPA has established maximum concentrations for pollutants that are referred to as the National Ambient Air Quality Standards (NAAQS) (EPA, 2003c). Table 3-6 presents a list of the NAAQS and the State of New Mexico Air Quality Standards. Six criteria pollutants are used as indicators of air quality: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead (EPA, 2003c). Figure 3-13 shows the criteria air-pollutants attainment areas (i.e., areas within which air quality standards are met). Both Lea and Andrews Counties are in attainment for all of the EPA criteria pollutants (EPA, 2004a).

EPA lists 54 sources of criteria pollutants in Lea County, eight sources in Andrews County, and five sources in Gaines County for 2001. None of these sources are located near the proposed site. Table 3-7 presents a summary of the annual emissions for six of the criteria air pollutants for the three counties surrounding the proposed NEF site.

**Table 3-6 EPA National Ambient Air Quality Standards and  
State of New Mexico Air Quality Standards**

<b>Pollutant</b>	<b>EPA Standard Value<sup>a</sup></b>		<b>Standard Type</b>	<b>New Mexico Standard</b>
<b><i>Carbon Monoxide (CO)</i></b>				
8-hour Average	9 ppm	(10 mg/m <sup>3</sup> )	Primary	8.7 ppm
1-hour Average	35 ppm	(40 mg/m <sup>3</sup> )	Primary	13.1 ppm
<b><i>Nitrogen Dioxide (NO<sub>2</sub>)</i></b>				
Annual Arithmetic Mean	0.053 ppm	(100 : g/m <sup>3</sup> )	Primary and Secondary	0.05 ppm
<b><i>Ozone (O<sub>3</sub>)</i></b>				
1-hour Average	0.12 ppm	(235 : g/m <sup>3</sup> )	Primary and Secondary	None
8-hour Average	0.08 ppm	(157 : g/m <sup>3</sup> )	Primary and Secondary	None
<b><i>Lead (Pb)</i></b>				
Quarterly Average	1.5 : g/m <sup>3</sup>		Primary and Secondary	None
<b><i>Particulate (PM<sub>10</sub>) Particles with diameters of 10 : m or less</i></b>				
Annual Arithmetic Mean	50 : g/m <sup>3</sup>		Primary and Secondary	60 : g/m <sup>3</sup>
24-hour Average	150 : g/m <sup>3</sup>		Primary and Secondary	150 : g/m <sup>3</sup>
<b><i>Particulate (PM<sub>2.5</sub>) Particles with diameters of 2.5 : m or less</i></b>				
Annual Arithmetic Mean	15 : g/m <sup>3</sup>		Primary and Secondary	None
24-hour Average	65 : g/m <sup>3</sup>		Primary and Secondary	None
<b><i>Sulfur Dioxide (SO<sub>2</sub>)</i></b>				
Annual Arithmetic Mean	0.03 ppm	(80 : g/m <sup>3</sup> )	Primary	0.02 ppm
24-hour Average	0.14 ppm	(365 : g/m <sup>3</sup> )	Primary	0.10 ppm
3-hour Average	0.50 ppm	(1,300 : g/m <sup>3</sup> )	Secondary	None
<b><i>Hydrogen Sulfide (H<sub>2</sub>S)</i></b>				
1-hour Average (not to be exceeded more than once per year)	Not a NAAQS Pollutant		N/A	0.010 ppm
<b><i>Total Reduced Sulfur</i></b>				
½-hour Average	Not a NAAQS Pollutant		N/A	0.003 ppm

<sup>a</sup> Parenthetical value is an approximately equivalent concentration.

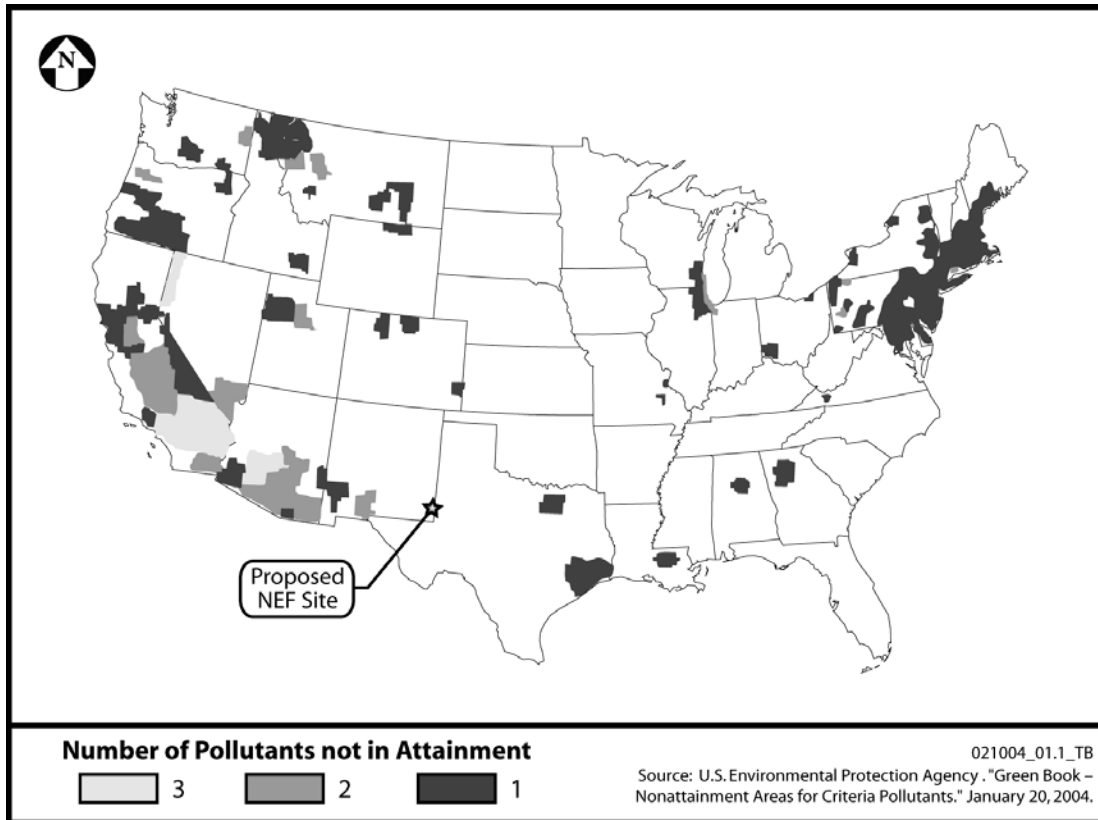
NAAQS - National Ambient Air Quality Standards.

: m - 10<sup>-6</sup> meters or 0.000001 meters. ppm - parts per million.

: g/m<sup>3</sup> - micrograms per cubic meter. mg/m<sup>3</sup> - milligrams per cubic meter.

N/A - not applicable.

Sources: EPA, 2003c; NMED, 2002.



**Figure 3-13 Criteria Air Pollutants Attainment Areas (EPA, 2004a)**

**Table 3-7 Total Annual Emissions (tons per year) of Criteria Air Pollutants at Lea County, New Mexico, and Andrews and Gaines Counties, Texas**

County, State	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
Lea County, New Mexico	6,713	38,160	31,185	16,096	5,188	28,548
Andrews County, Texas	2,873	3,259	6,680	1,398	440	1,577
Gaines County, Texas	2,696	2,791	7,709	735	1,825	8,650

A ton is equal to 0.9078 metric ton.

VOC: volatile organic compounds.

NO<sub>x</sub>: nitrogen oxides.

CO: carbon monoxide.

SO<sub>2</sub>: sulfur dioxide.

PM<sub>2.5</sub>: particulate matter less than 2.5 microns.

PM<sub>10</sub>: particulate matter less than 10 microns.

Source: Based on 1999 data (EPA, 2003d).



### **Criteria Pollutants**

**Nitrogen dioxide** is a brownish, highly reactive gas that is present in all urban atmospheres. Nitrogen dioxide can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. The major mechanism for the formation of nitrogen dioxide in the atmosphere is the oxidation of the primary air pollutant nitric oxide. Nitrogen oxides plays a major role, together with volatile organic carbons, in the atmospheric reactions that produce ozone. Nitrogen oxides form when fuel is burned at high temperatures. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.

**Ozone** is a photochemical (formed in chemical reactions between volatile organic compounds and nitrogen oxides in the presence of sunlight) oxidant and the major component of smog. Exposure to ozone for several hours at low concentrations has been shown to significantly reduce lung function and induce respiratory inflammation in normal, healthy people during exercise. Other symptoms include chest pain, coughing, sneezing, and pulmonary congestion.

**Lead** can be inhaled and ingested in food, water, soil, or dust. High exposure to lead can cause seizures, mental retardation, and/or behavioral disorders. Low exposure to lead can lead to central nervous system damage.

**Carbon monoxide** is an odorless, colorless, poisonous gas produced by incomplete burning of carbon in fuels. Exposure to carbon monoxide reduces the delivery of oxygen to the body's organs and tissues. Elevated levels can cause impairment of visual perception, manual dexterity, learning ability, and performance of complex tasks.

**Particulate matter** such as dust, dirt, soot, smoke, and liquid droplets are emitted into the air by sources such as factories, power plants, cars, construction activity, fires, and natural windblown dust. Exposure to high concentrations of particulate matter can affect breathing, cause respiratory symptoms, aggravate existing respiratory and cardiovascular disease, alter the body's defense systems against foreign materials, damage lung tissue, and cause premature death.

**Sulfur dioxide** results largely from stationary sources such as coal and oil combustion, steel and paper mills, and refineries. It is a primary contributor to acid rain and contributes to visibility impairments in large parts of the country. Exposure to sulfur dioxide can affect breathing and may aggravate existing respiratory and cardiovascular disease.

Source: EPA, 2004a.

The New Mexico Environment Department Air Quality Bureau operates a monitoring station about 32 kilometers (20 miles) north of the proposed NEF site in Hobbs, New Mexico, that monitors particulate matter. One exceedance for particulate matter (PM) occurred at Hobbs, New Mexico, on April 15, 2003, when air monitors in Hobbs recorded a PM<sub>10</sub> level of 387 ug/m<sup>3</sup>. This exceedance was caused by a dust storm. Because of this exceedance, a Natural Events Action Plan is being developed for PM<sub>10</sub> for Lea County, New Mexico, in which best available control measures will be implemented. By putting in place the action plan, the New Mexico Environment Department avoids having the area declared in nonattainment of the NAAQS (NMEDAQB, 2005).

### 3.6 Geology, Minerals, and Soils

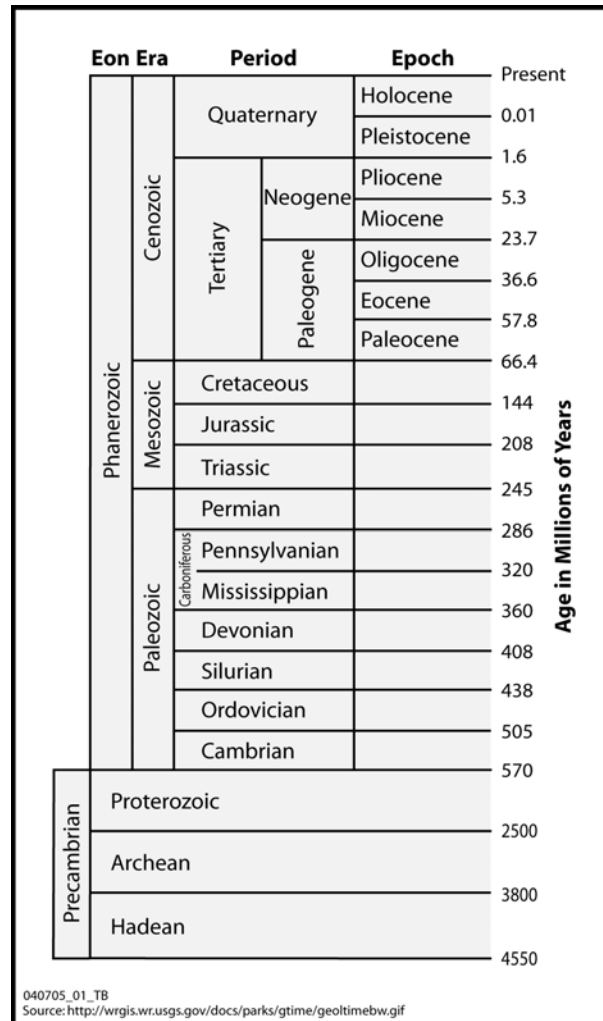
This section provides a brief description of regional and local geology and identifies the characteristics of the soil and mineral resources at the proposed NEF site. As described in Chapter 1 of this EIS, the NRC staff process for reviewing the license application includes an examination of the ability of the proposed NEF to withstand earthquakes. The discussion of geology in this section, however, is not intended to support a detailed safety analysis of the proposed NEF to resist seismic events. The NRC staff will document its analysis of hazards related to earthquakes in the Safety Evaluation Report.

Figure 3-14 shows a geologic time scale to depict when different geologic units formed, as described in section 3.6.1.

#### 3.6.1 Regional Geology

The proposed NEF site is located near the boundary between the Southern High Plains section (Llano Estacado) of the Great Plains Province to the east and the Pecos Plains section to the west. Figure 3-15 shows the regional physiography of the area.

The primary difference between the Pecos Plains and the Southern High Plains physiographic sections is a change in topography. The High Plains is a large flat mesa that uniformly slopes to the southeast. The Pecos Plains section is characterized by its more irregular erosional topographic expression (Scholle, 2000). The boundary between the two sections is locally referred to as Mescalero Ridge. In southern Lea County, Mescalero Ridge is an irregular erosional topographic feature with a relief of about 9 to 15 meters (30 to 50 feet) compared with a nearly vertical cliff and relief of approximately 46 meters (150 feet) in northwestern Lea County. The lower relief of the ridge in the southeastern part of the county is due to

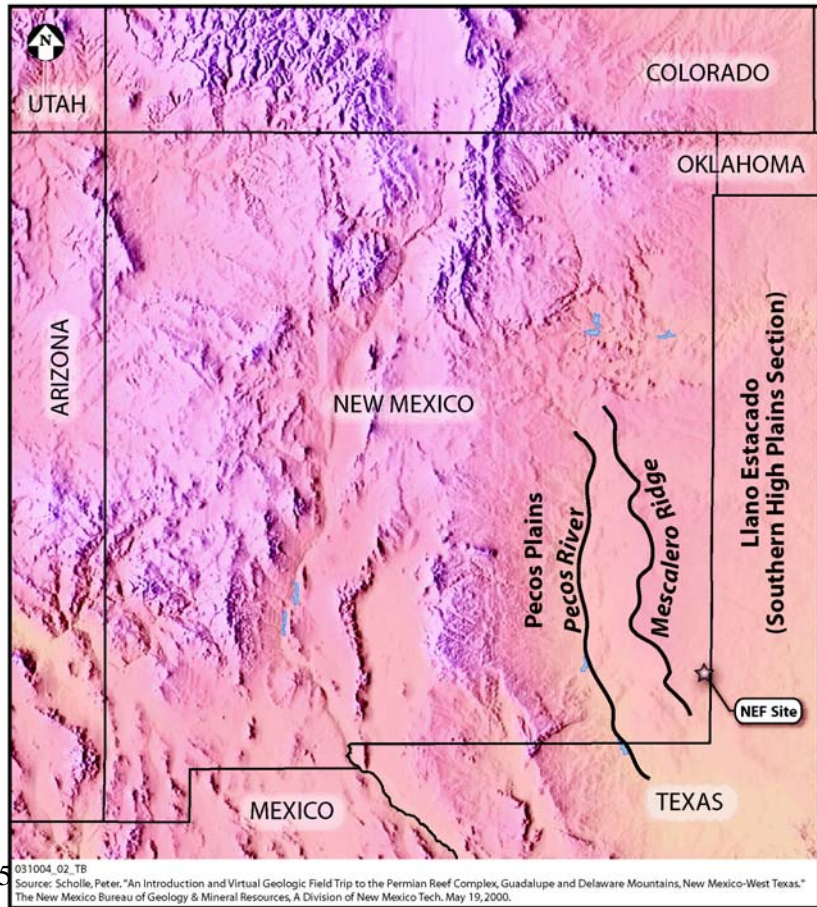


**Figure 3-14 Geologic Time Scale (USGS, 2003a)**

partial cover by wind-deposited sand. The proposed NEF site is located on the Southern High Plains, about 6.2 to 9.3 kilometers (10 to 15 miles) from the ridge.

The dominant geologic feature of this region is the Permian Basin. The Permian Basin is a massive subsurface bedrock structure that has a downward flexure of a large thickness of originally flat-lying, bedded, sedimentary rock. The Permian Basin extends to 4,880 meters (16,000 feet) below mean sea level. Figure 3-16 shows the major physiographic features of the Permian Basin (LES, 2005a).

The proposed NEF site is located within the Central Basin Platform area. The Central Basin Platform divides the Permian Basin into the Midland and Delaware subbasins. The top of the Permian deposits are approximately 434 meters (1,425 feet) below ground surface at the proposed NEF site (LES, 2005a). Overlying the Permian are the sedimentary rocks of the Triassic Age Dockum Group.



**Figure 3-15 Regional Physiography (Scholle, 2000)**

The upper formation of the Dockum Group is the Chinle Formation, a tight claystone and silty clay layer. The Chinle Formation is regionally extensive with outcrops as far away as the Grand Canyon region in Arizona. In the vicinity of the site, the Chinle Formation consists of red, purple, and greenish micaceous claystone and siltstone with interbedded fine-grained sandstone. The Chinle (also known as Red Bed) Formation is overlain by Tertiary Ogallala, Gatuña, or Antlers Formations (alluvial deposits). Only the latter two are found at the proposed NEF site. Caliche is a partly indurated zone of calcium carbonate accumulation formed in the upper layers of surficial deposits. Soft caliche is interbedded with the alluvial deposits near the surface. A fractured caliche layer can be found extending to the surface near the proposed NEF site. This “caprock” is not present at the proposed NEF site. Quaternary (dune) sands frequently overlie the Tertiary alluvial deposits (LES, 2005a). Figure 3-17 shows a generalized cross-section of these formations in the site area.

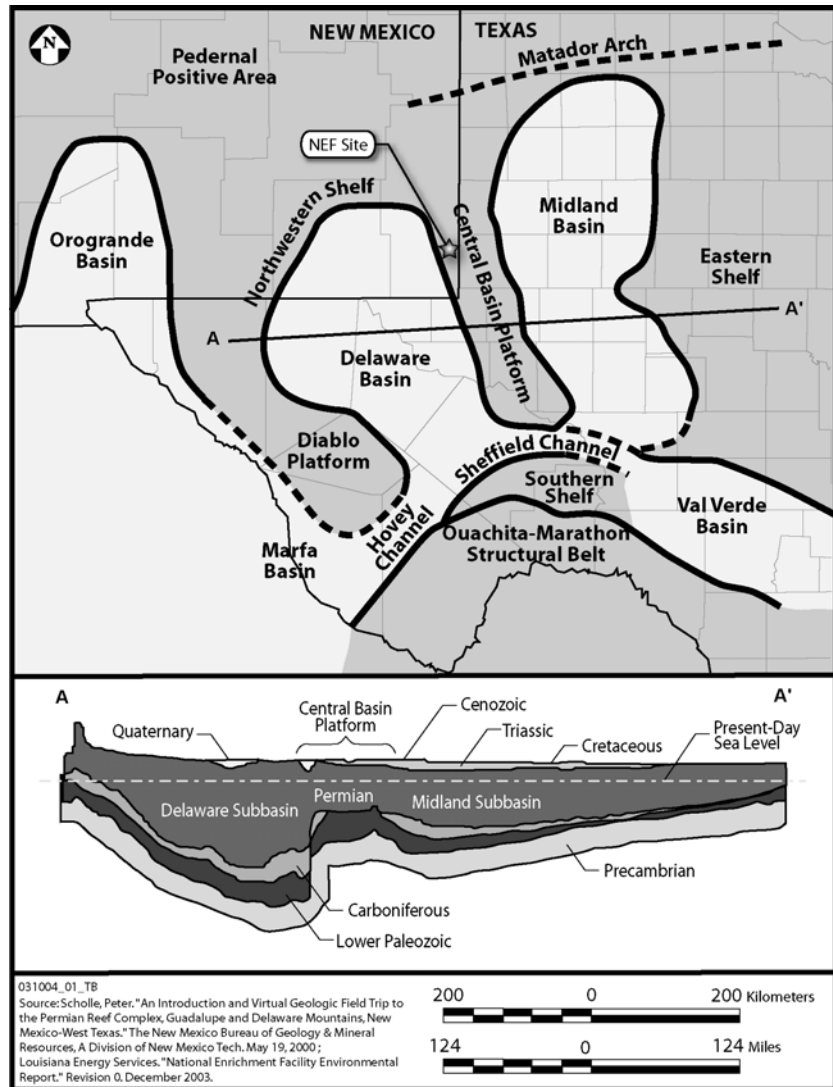
Red Bed Ridge is an escarpment of about 15 meters (50 feet) in height that occurs just north and northeast of the proposed NEF site. It is a buried ridge on the upper surface of the Red Bed Formation and extends for at least 161 kilometers (100 miles) from northern Lea County, New Mexico through western Andrews County, Texas and southward. The Red Bed Ridge is not associated with the Mescalero Escarpment.

The Southeast New Mexico-West Texas area is considered to be structurally stable. Since the Laramide Orogeny (a series of mountain-building events that affected much of western North America in Late

Cretaceous and Early Tertiary time), the Permian Basin has subsided slightly, most likely as a result of the dissolution of the Permian evaporate layers by ground-water infiltration and possibly from oil and gas extraction.

Two types of faulting are associated with the early Permian deformation. Most of the faults are long, high-angle reverse faults with well over 100 meters (328 feet) of vertical displacement that often involved the Precambrian basement rocks. The second type of faulting is found along the western margin of the platform where long strike-slip faults with displacements of tens of kilometers are found. The closest evaluated fault to the site within the Permian deposits is over 161 kilometers (100 miles) to the west associated with the deeper portions of the Permian Basin. No major tectonic event has occurred within the Permian Basin since the Laramide Orogeny that ended about 35-million years ago (WCS, 2004c). Recently, a small reverse fault in the Triassic beds with about 3 to 6 meters (10 to 20 feet) of offset was observed on the WCS site approximately 1.6 kilometer (1 mile) to the east of the proposed NEF in Texas. There was no fault displacement through the overlying younger Antlers Formation or the Caprock caliche. The fault in the Triassic beds is believed to be inactive (WCS, 2004c; NRC, 2004).

There has been virtually no tectonic movement within the basin since the Permian period. The faults that uplifted the platform do not appear to have displaced the younger Permian sediments. No Quaternary age faults were identified in New Mexico within 161 kilometers (100 miles) of the site. Quaternary age faults within 240 kilometers (150 miles) of the site include the Guadalupe fault located approximately 191 kilometers (119 miles) west of the site in New Mexico and in Texas; and the West Delaware Mountains fault zone, the East Sierra Diablo fault, and the East Flat Top Mountain fault, located 185 kilometers (115 miles) southwest, and 196 kilometers (122 miles) southwest, and 200 kilometers (124 miles) west-southwest of the site, respectively. The East Baylor Mountain-Carrizo Mountain fault, located 201 kilometers (125 miles) southwest of the proposed NEF site, is considered a possible capable fault but there has been no demonstration of movement within the last 35,000 years (LES, 2005a).



**Figure 3-16 Major Physiographic Features of the Permian Basin (Scholle, 2000; LES, 2005a)**

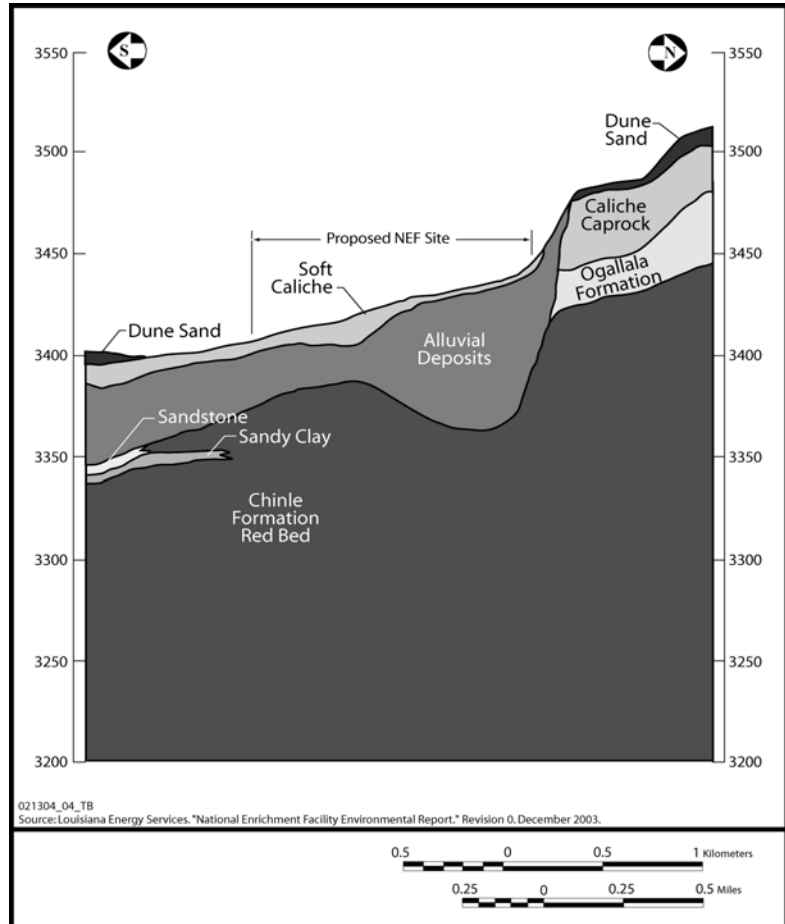
### 3.6.1.1 Regional Earthquakes

The majority of earthquakes in the United States are located in the tectonically active western portion of the country. The southwestern portion of the United States tends to experience earthquakes at a lower rate and lower intensity. Much of New Mexico's historical seismicity has been concentrated in the Rio Grande Valley between Socorro and Albuquerque (USGS, 2003b). A fault zone exists deep in the subsurface along the eastern side of the Delaware Basin bordering the Central Basin Platform (Hill, 1996). The zone is believed to extend from the west of Hobbs, New Mexico, to southeast of Fort Stockton, Texas. Although most of the activity in this zone was ancient (i.e., dating back to the Pennsylvanian and early Permian times), it may still be active, resulting in low to moderate earthquake activity (Hill, 1996).

Earthquakes in the vicinity of the proposed NEF site include isolated, small clusters of low- to moderate-size events (i.e., Richter magnitude earthquakes of 3 to 5.9). A review of earthquake data collected for the site and vicinity indicates that the vast majority of earthquakes that occurred near the proposed NEF site were likely induced by gas/oil recovery methods and were not tectonic in origin (NMBMMR, 1998). A magnitude 5.0 earthquake occurred in the area of Eunice in 1992. This earthquake is attributed to a tectonic origin as seismological data for this event was insufficient to constrain the focal depth sufficiently to permit a correlation with local oil/gas-producing horizons (LES, 2005a). No volcanic activity exists in the region surrounding the proposed NEF site.

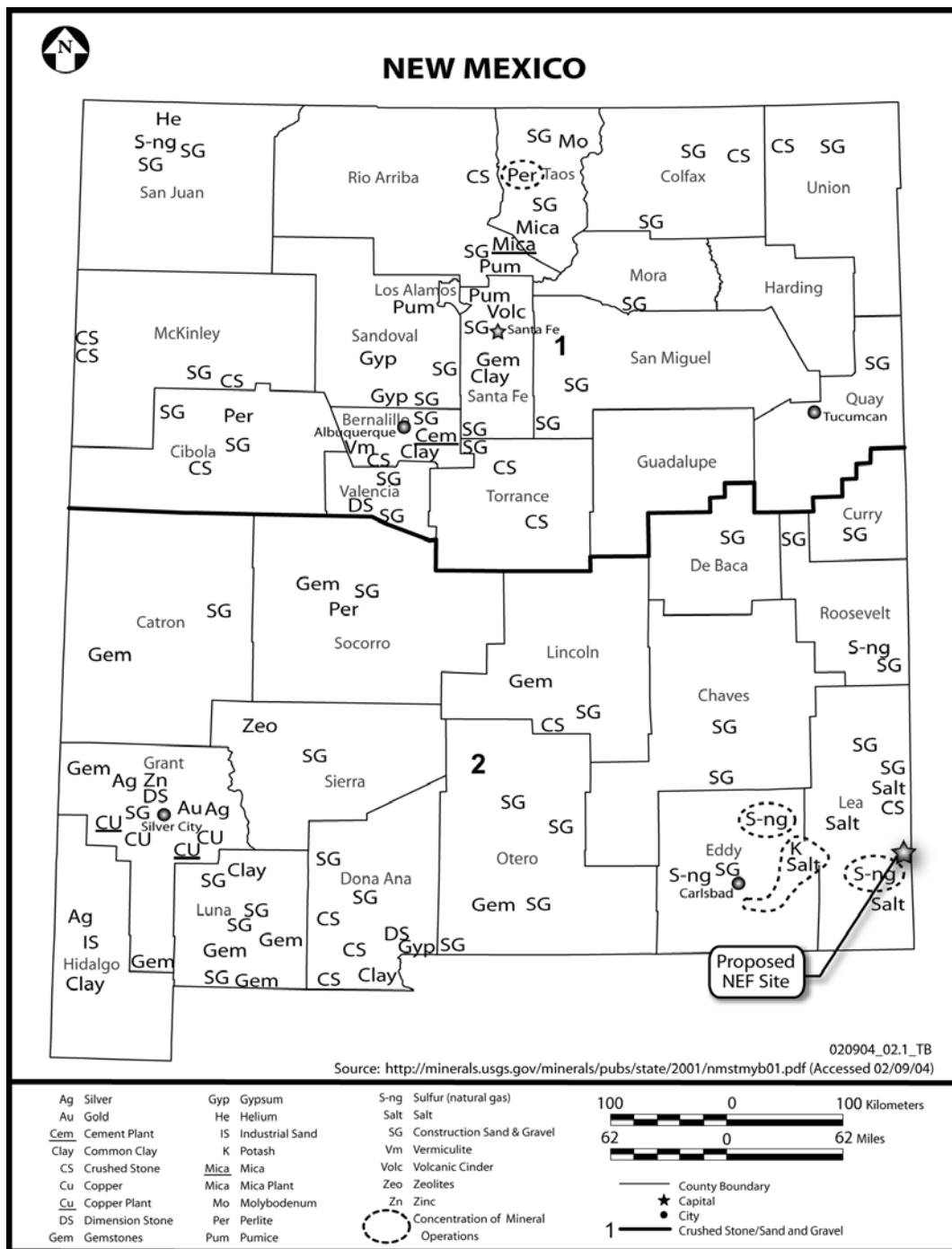
### 3.6.1.2 Mineral Resources

LES has not found any abandoned petroleum drill holes or existing or former well locations for petroleum within the proposed NEF site. No significant nonpetroleum mineral deposits are known to exist on the proposed NEF site (LES, 2005a). According to information collected by the New Mexico Bureau of Mines and Mineral Resources on behalf of the U.S. Geological Survey (USGS), the top nonpetroleum minerals in New Mexico are, by value, potash, copper, construction sand and gravel, crushed stone, and cement. Figure 3-18 shows the potential mineral resources in the State of New Mexico.



**Figure 3-17 Geologic Units in the Proposed NEF Site Area (LES, 2005a)**

According to the New Mexico Bureau of Mines and Mineral Resources/USGS survey, there are suitable mineral resources in Lea County for the excavation of construction sand and gravel, crushed stone, and



**Figure 3-18 New Mexico Mineral Resources (USGS, 2004a)**

salt. There is also an area of Lea County that has a concentration of mineral operations for sulfur (USGS,

2001). An active sand and gravel quarry located to the north of the proposed NEF site is operated by Wallach Concrete, Inc.

### **3.6.2 Site Geology**

Geologically, the proposed NEF site is located in an area where surface exposures consist mainly of Quaternary-aged eolian and piedmont sediments along the far eastern margin of the Pecos River Valley. Surface soils in the vicinity of the site are described as sandy alluvium with subordinate amounts of gravel, silt, and clay. Other surficial units in the site vicinity include Caliche and loose sand deposits, the latter would be subject to wind erosion.

Topographic relief on the site is generally subdued. Site elevations range between about 1,033 and 1,045 meters (3,390 and 3,430 feet) above mean sea level, generally sloping to the south and southwest. Eolian processes resulted in a closed depression evident at the northern center of the site. Dune sand creates a topographic high at the southwest corner of the site. The dune sands, also known as the Brownsfield-Springer Association, are reddish-brown, fine to loamy-fine sands (USDA, 1974a).

The major geologic features underlying the site generally follow those of the region. The Gatuna and Antlers formations are sand and silty sand with sand and gravel at the base. A layer of caliche below this alluvium is present at some locations on the proposed NEF site. The formation directly beneath the alluvium is the Chinle Formation. The Santa Rosa Formation lies between the base of the Chinle formation and the top of the Permian. This formation includes sandy beds containing a groundwater aquifer. Table 3-8 shows the stratigraphy, including the depths and thicknesses, underlying the proposed NEF site.

### **3.6.3 Site Soils**

Figure 3-19 presents a soil map of the proposed NEF site area. Geotechnical and site boring investigations confirm a thin layer of loose sand at the surface that overlies about 12 meters (40 feet) of alluvial silty sand, and sand and gravel cemented with caliche. Chinle Formation clay extends from about 12 meters (40 feet) below ground surface to a depth of approximately 340 meters (1,115 feet). The granular soils located in the uppermost 12 meters (40 feet) of the subsurface provide potentially high-quality bearing materials for building and heavy machine foundations. For extremely heavy or settlement-intolerant facilities, foundations can be constructed in the Chinle Formation, which has an unconfined compressive strength of over 195,000 kilograms per square meter (20 tons per square foot).

The USDA soil survey indicates the proposed NEF site surface soils consist primarily of Dune Land, Kermit soils, and the Brownfield-Springer association (USDA, 1974a; USDA, 1974b). Soils associated with the Brownfield-Springer association, Kermit soils, and dune land are suitable for range, wildlife habitat, and recreational areas. On the western portion of the proposed NEF site in the vicinity of the sand dune buffer, soils are mapped as active dune land, which is made up of light-colored, loose sands. Sloping ranges from 5 to 12 percent or more. The surface of active dune land soil is typically bare except for a few shinnery oak shrubs.

**Table 3-8 Geologic Units at or near the Proposed NEF Site**

Formation	Geologic Age	Descriptions	Estimates for the Proposed NEF Site Area <sup>a</sup>	
			Depths: meters (feet)	Thickness: meters (feet)
Topsoils	Recent	Silty fine sand with some fine roots—eolian	Range: 0 to 0.6 (0 to 2) Average (Top/Bottom): 0/0.4 (0/1.4)	Range: 0.3 to 0.6 (1 to 2) Average: 0.4 (1.4)
Mescalero Sands/Blackwater Draw Formation	Quaternary	Dune or dune-related sands	Range (sporadic across site): 0 to 3 (0 to 10) Average: N/A <sup>b</sup>	Range (sporadic across site): 0 to 3 (0 to 10) Average: N/A <sup>c</sup>
Gatuña/Antlers Formation	Pleistocene/mid-Pliocene	Pecos River Valley alluvium: Sand and silty sand with interbedded caliche near the surface and a sand and gravel base layer	Range: 0.3 to 17 (1 to 55) Average (Top/Bottom): 0.4/12 (1.4/39)	Range: 6.7 to 16 (22 to 54) Average: 12 (38)
Mescalero Caliche	Quaternary	Soft to hard calcium carbonate deposits	Range: 1.8 to 12 (6 to 40) Average (Top/Bottom): 3.7/8 (12/26)	Range: 0 to 6 (0 to 20) Average (all 14 borings) <sup>d</sup> : 1.4 (5) Average (five borings that encountered caliche): 4.3 (14)
Chinle Formation	Triassic	Claystone and silty clay: red beds	Range: 7 to 340 (23 to 1,115) Average (Top/Bottom): 12/340 (39/1,115)	Range: 323 to 333 (1,060 to 1,092) Average: 328 (1,076)
Santa Rosa Formation	Triassic	Sandy red beds, conglomerates, and shales	Range: 340 to 434 (1,115 to 1,425) Average: N/A <sup>b</sup>	Range: N/A <sup>e</sup> Average: 94 (310)
Dewey Lake Formation	Permian	Muddy sandstone and shale red beds	Range: 434 to 480 (1,425 to 1,575) Average: N/A <sup>b</sup>	Range: N/A <sup>e</sup> Average: 46 (150)

<sup>a</sup> Range of depths is below ground level to shallowest top and deepest bottom of geological unit determined from site boring logs, unless noted. Average depths are below ground level to average top and average bottom of geological unit determined from site boring logs, unless noted. Range of thickness is from the smallest thickness to the largest thickness of geological unit determined from site boring logs, unless noted. Average thickness is the average as determined from site boring logs, unless noted. Bottom of Chinle Formation, top and bottom of Santa Rosa Formation, and top and bottom of Dewey Lake Formation are single values from a deep boring just south of the proposed NEF site.

<sup>b</sup> Average depths are not available.

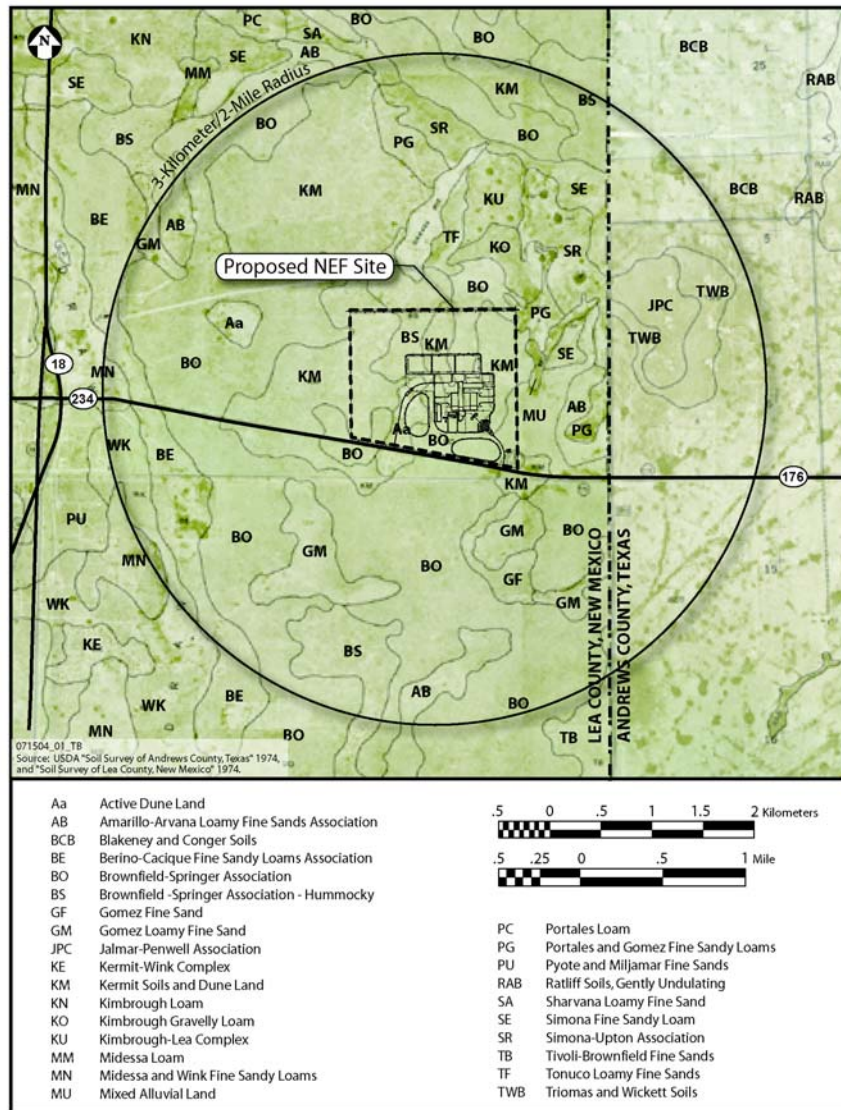
<sup>c</sup> Average thickness is not available.

<sup>d</sup> Caliche is not present at some locations of the site. Where not present in a particular boring, a thickness of '0' meter (feet) is used in calculating the average.

<sup>e</sup> Range of thickness is not available.

Sources: LES, 2005a; Nicholson and Clebsch, 1961.





**Figure 3-19 Soil Map of the Proposed NEF Site Area (USDA, 1974a; USDA, 1974b)**

### 3.6.4 Soil Radiological and Chemical Characteristics

LES conducted soil sampling at 10 random locations across the proposed NEF site (LES, 2005a). The soil was sampled for radioactive components including uranium, thorium, and their daughter products. Potassium-40, a naturally occurring radionuclide, and cesium-137, produced by past weapons testing, were also measured. Subsequent to this, LES performed an additional round of testing of both radionuclides and nonradionuclide chemicals. Six of the eight sites sampled in the latter round were selected to represent background conditions at proposed plant structures (e.g., the proposed basins and storage pads). The other two sites were representative of topographically upgradient, onsite locations (LES, 2005a). Table 3-9 presents the results of the most recent measurements; the previous sampling measurements were consistent with these latest results.

**Table 3-9 Chemical Analyses of Proposed NEF Site Soil**

<b>Radionuclides</b>	<b>Measured Concentration becquerels/kilogram (picocuries/kilogram)<sup>a, b</sup></b>	<b>Representative Soil Concentration<sup>b</sup> becquerels/kilogram (picocuries/kilogram)</b>
Potassium-40	138 ± 3 (3,730 ± 82)	130 (3,500)
Cesium-137	2.9 ± 0.9 (77 ± 24)	N/A
Actinium-228	6.5 ± 0.7 (176 ± 19)	8.1 (218)
Thorium-228	7.0 ± 1.0 (187 ± 26)	8.1 (218)
Thorium-230	5.8 ± 0.5 (158 ± 13)	N/A
Thorium-232	7.0 ± 0.6 (187 ± 17)	8.1 (218)
Uranium-234	6.0 ± 0.3 (161 ± 7.9)	12 (333)
Uranium-235	0.33 ± 0.08 (8.8 ± 2.2)	N/A
Uranium-238	5.9 ± 0.2 (158 ± 6.5)	12 (333)
<b>Chemicals</b>	<b>Measured Concentration (milograms/kilogram)<sup>a, b</sup></b>	<b>New Mexico Soil Screening Level (milograms/kilogram)<sup>c</sup></b>
Barium	23 ± 12	1,440
Chromium	3.6 ± 0.9	180
Lead	2.7 ± 0.3	400

N/A = not available.

<sup>a</sup> Concentrations noted as average ± standard deviation.

<sup>b</sup> LES, 2005a; NCRP, 1992.

<sup>c</sup> NMEDHWB, 2004.

No nuclides other than those in the table were above minimum detectable concentrations in the laboratory. The measured radionuclides are all naturally occurring except for cesium-137, which is ubiquitous in the environment as a result of past atmospheric weapons testing. Chemicals analyzed for but not detected above minimum detectable concentrations include volatiles, semivolatiles, metals (arsenic, cadmium, mercury, selenium, and silver), organochlorine pesticides, organophosphorous compounds, chlorinated herbicides, and fluoride. Only barium, chromium, and lead were detected above minimum detectable concentrations in the soil samples. These measured levels were orders of magnitude less than the New Mexico soil-screening concentrations. The soil-screening concentrations are intended to be levels below which there are no health concerns (NMEDHWB, 2004).

### 3.7 Surface Water

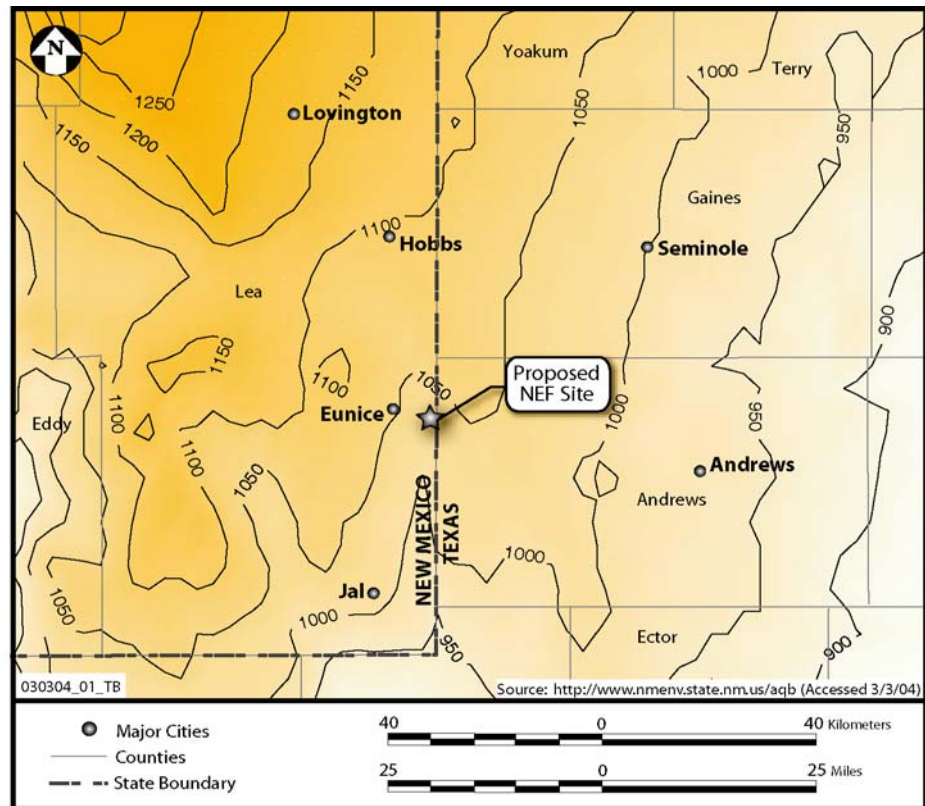
This section addresses the surface-water features at or near the proposed NEF site.

### 3.7.1 Surface Water Features in the Vicinity of the Proposed NEF Site

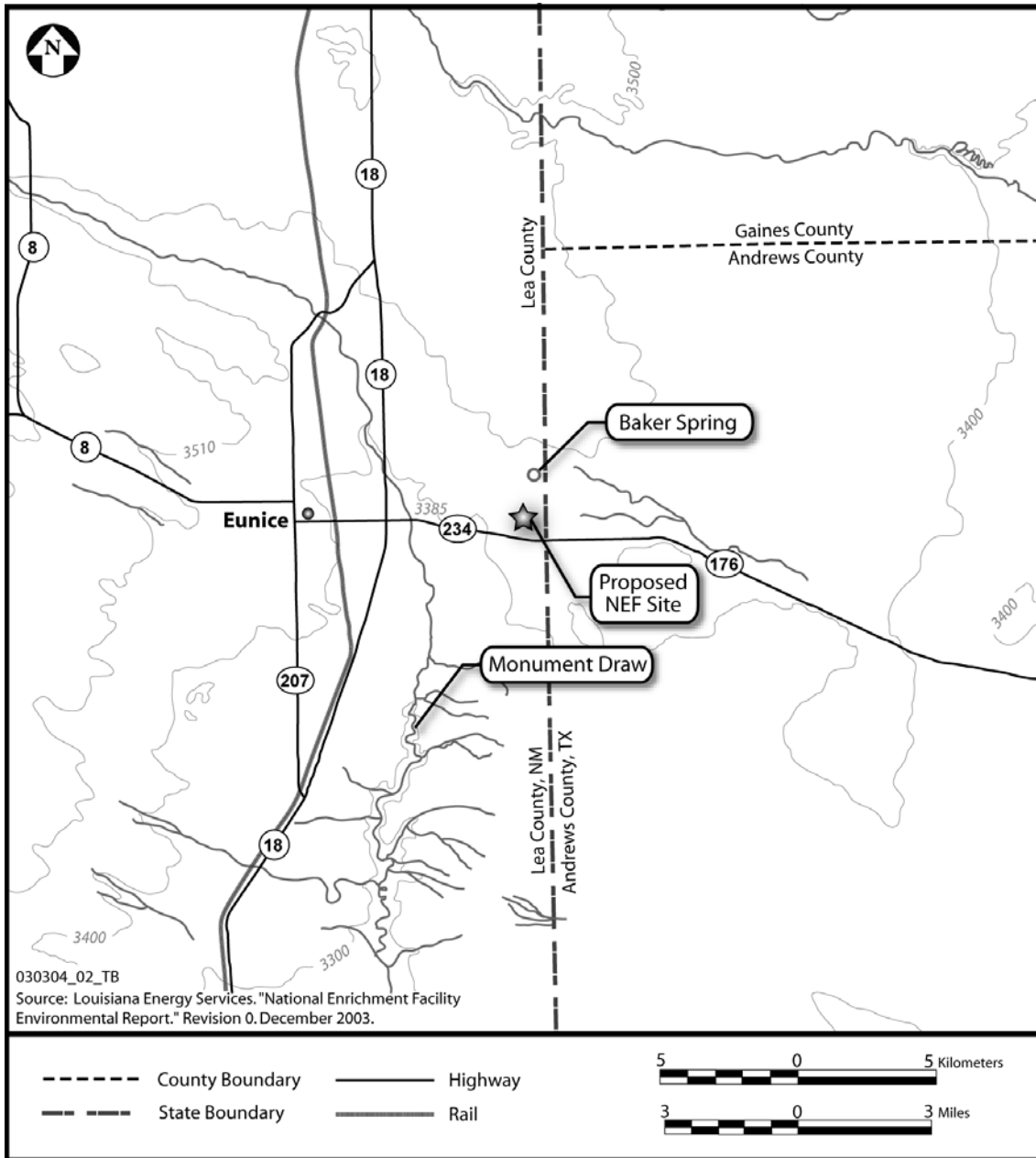
There are no surface-water bodies or surface-drainage features on the proposed NEF site (USGS, 1979). The site topography is relatively flat, ranging between about 1,033 and 1,045 meters (3,390 and 3,430 feet) above mean sea level, with an average slope of 0.0064 centimeter per centimeter. Wind erosion has created localized depressions; however, these depressions are not large enough to have an impact on surface-water collection. The vegetation on the site is primarily shrubs and native grasses. The surface soils tend to hold moisture in storage rather than allow rapid infiltration to depth. Water held in storage in the soil is subsequently subject to evapotranspiration. The evapotranspiration processes are significant enough to severely limit potential groundwater recharge. Essentially all of the precipitation that occurs at the site is subject to infiltration and subsequent evapotranspiration. Net evaporation/transpiration, as measured at Red Bluff Dam, approximately 97 kilometers (60 miles) southwest of the site, is estimated as 165 centimeters (65 inches) per year (Reed and Associates, 1977). Figure 3-20 illustrates local topography in the area of the proposed NEF site.

The site is contained within the Monument Draw watershed; however, there are no freshwater lakes, estuaries, or oceans in the vicinity of the site. Local surface hydrologic features in the vicinity of the site include Monument Draw, Baker Spring, and several ponds on the Wallach Concrete, Inc., Sundance Services, Inc., and WCS properties. Monument Draw is an intermittent stream and the closest surface-water-conveyance feature to the proposed NEF site. Figure 3-21 shows the location of Monument Draw. While Monument Draw is typically dry, the maximum historical flow occurred on June 10, 1972, and measured 36.2 cubic meters per second (1,280 cubic feet per second).

Baker Spring is located to the northeast of the proposed NEF site at the edge of an escarpment where the caprock ends. Surface water is present in Baker Spring intermittently. The Baker Spring area is underlain by Chinle Formation clay, whose low permeability



**Figure 3-20 General Topography Around the Proposed NEF Site (NMEDAQB, 2004)**



**Figure 3-21 Regional Hydrologic Features (LES, 2005a)**

impedes deep infiltration of that water. Therefore, the intermittent localized flow and ponding of water in this area may be attributed to seepage and/or precipitation/runoff. LES conducted a pedestrian survey of the Baker Spring area and noted the presence of a surface engineering control or diversion berm just north of the Baker Spring area. Based on field observations, it appears that the berm was constructed to divert surface water from the north and redirect the flow to the east of the Baker Spring area. Aerial photographs suggest that the sand and gravel reserves in this area have been excavated to the top of the red bed. These excavation activities have resulted in the Baker Spring area having a lower elevation than the natural drainage features, and the surface water that formerly flowed through the natural drainage features now ponds in Baker Spring.

Because the excavation floor consists of very low permeability red-bed clay, limited vertical migration of the ponded water occurs. Shading from the high wall and trees that have flourished in the excavated area slow the natural evaporation rates, and water stands in the pond for extended periods of time. It is also suspected that during periods of ponding, surface water infiltrates into the sands at the base of the excavated wall and is retained as bank storage. As the surface-water level declines, the bank storage is discharged back to the excavation floor.

On the Wallach Concrete, Inc., property, a shallow surface depression is located at the base of one of the gravel pits. Water is perennially present in the pit due to a seep at the base of the sand and gravel unit at the top of the Chinle Formation clay. Wallach Concrete, Inc., occasionally pumps water out of this depression for use onsite; however, the amount of water in the depression is insufficient to fully supply the quarry operations. While the rate of replenishment has not been quantified, it appears to be relatively slow. This shallow zone of groundwater is not observed throughout Wallach's property; therefore, it appears to be representative of a local perched water condition and is not considered to be an aquifer.

### **3.7.1.1 Wetlands**

The proposed NEF site does not contain wetlands, freshwater streams, rivers, or lakes. No commercial and/or sport fisheries are located on the proposed NEF site or in the local area. The closest fishery is situated about 121 kilometers (75 miles) west of the site on the Pecos River near Carlsbad, New Mexico. No important aquatic ecological systems are onsite or in the local area that are vulnerable to change or contain important species habitats such as breeding and feeding areas. Relative regional significance of the aquatic habitat is low.

### **3.7.1.2 Flooding**

The proposed NEF site is not located near any floodplains. The site grade is above the elevation of the 100-year and the 500-year flood elevations. As described in section 3.7.1, the site is in the Monument Draw watershed. The draw, an intermittent stream, is the closest surface water conveyance feature to the site, at approximately 4 kilometers (2.5 miles) from it, and has a maximum historical flow of 36.2 cubic meters per second (1,280 cubic feet per second). There is no direct outfall to a surface water body on the site.

## **3.8 Ground-Water Resources**

This section describes the groundwater resources and uses in the area that are available for the proposed NEF construction, operations, and decommissioning.

### **3.8.1 Site and Regional Hydrogeology**

Because the climate in southeastern New Mexico is semi-arid, the onsite vegetation consists predominately of shrubs and native grasses. The surface soils are predominately of an alluvial or eolian origin. The near-surface soils are primarily silts and silty sands. These silty types of soils have relatively low permeability compared with sands and tend to hold moisture in storage rather than allow for rapid infiltration to deeper below the ground surface (DeWiest, 1969).

The top approximately 17 meters (56 feet) of soil are comprised of a silty sand, grading to a sand and gravel just above the red-bed-clay unit. The porosity of the surface soils is on the order of 25 to 50 percent, and the saturated hydraulic conductivity of the surface soils is likely to range from  $10^{-5}$  to  $10^{-1}$  centimeters per second ( $3.9 \times 10^{-6}$  to  $3.9 \times 10^{-2}$  inches per second) (Freeze and Cherry, 1979).

Field investigation and computer modeling were used to show that no precipitation recharge (i.e., rainfall seeping deeply into the ground) occurs in thick, desert vadose zones with desert vegetation (Walvoord et al., 2002). Precipitation that infiltrates into the subsurface is, instead, efficiently transpired by the native vegetation. Sites with thick vadose zones, such as the proposed NEF site, have a natural thermal gradient in the deeper part of the vadose zone that induces water vapor to diffuse upward toward the vegetation root zone. The water vapor creates a negative pressure potential at the base of the root zone that acts like a sink where water is taken up by the plants and transpired. Measurements in the High Plains of Texas, which indicated an upward hydraulic gradient in the upper 10-15 meters (33-49 feet) of the vadose zone, support this behavior (Walvoord et al., 2002).

Localized shallow groundwater, which can occur under specific circumstances, exists to the east of the proposed NEF site on the WCS property and to the north on the Wallach Concrete, Inc. and Sundance Services, Inc. property. Several abandoned windmills are located on the WCS property. The windmills were used to supply water for stock tanks by tapping small saturated lenses above the Chinle Formation red beds. The amount of groundwater in these zones is limited, and the source of recharge is likely to be "buffalo wallows" located near the windmills. The buffalo wallows are substantial surface depressions that collect surface-water runoff. Water collecting in these depressions is inferred to infiltrate below the root zone due to the ponding conditions. A subsurface investigation by WCS in the vicinity of the windmills found that when water was encountered in the sand and gravel above the Chinle Formation red beds, the water level was slow to recover following a sampling event. This slow recovery is attributed to the low permeability of the saturated zones and the high water storage in the overlying soils. The discontinuity of this saturated zone and its low permeability suggest that the groundwater is representative of a perched water condition and not an aquifer.

Below this lies approximately 328 meters (1,076 feet) of Chinle Formation (red bed) clay with measured permeabilities in the range of  $1 \times 10^{-9}$  to  $1 \times 10^{-8}$  centimeters per second ( $3.9 \times 10^{-10}$  to  $3.9 \times 10^{-9}$  inches per second). Moisture content in the Chinle Formation generally averages from 8 to 12 percent, with a dry density of the clay averaging 2.12 grams per cubic centimeter (132 pounds per cubic foot) (JHA, 1993). The Chinle Formation has a surface slope of approximately 0.02 centimeter per centimeter towards the south-southwest under the proposed NEF site. It is thought that the Chinle Formation is exposed in a large excavation about 3.2 kilometers (2 miles) southeast of the town of Monument (approximately 22.5 kilometers [14 miles] northwest of the proposed NEF site) and at Custer Mountain (approximately 33.8 kilometers [21 miles] southwest of the proposed NEF site) (Nicholson and Clebsch, 1961). The presence of the thick Chinle Formation clay beneath the site isolates the deep and shallow hydrologic systems. Although the presence of fracture zones that can significantly increase vertical water transport through the Chinle Formation has not been precluded, the low measured permeabilities indicate the absence of such zones. Visual inspection of this clay has also shown that it is continuous, solid, and tight with few fracture planes (Rainwater, 1996).

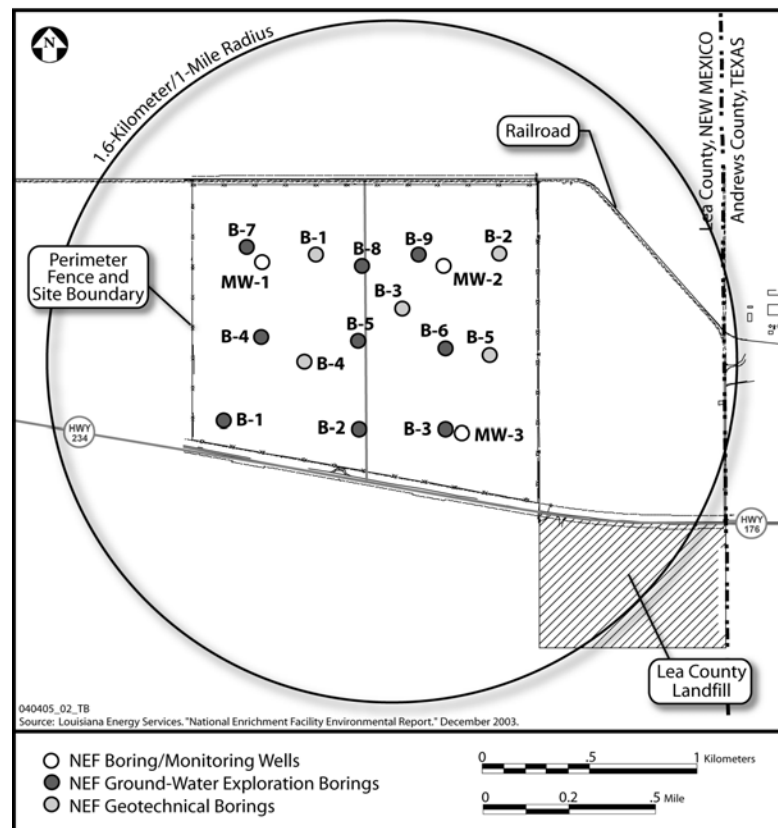
Ground water occurring beneath the surface of the red-bed clay occurs at distinct and distant elevations. The most shallow of these occurs approximately 67 meters (220 feet) beneath the land surface, just below the surface of the red-bed unit. This siltstone or silty sandstone unit has low permeability and does not yield groundwater readily. The permeability of this layer was measured in the field at the proposed NEF site as  $3.7 \times 10^{-6}$  centimeters per second ( $1.5 \times 10^{-6}$  inches per second). The local gradient was 0.011 centimeter per centimeter towards the south-southeast with a porosity estimated as 0.14.

There is also a 30.5-meter-thick (100-foot-thick) water-bearing sandstone layer at about 183 meters (600 feet) below ground surface. However, the first occurrence of a well-defined aquifer capable of producing significant volumes of water is the Santa Rosa Formation. This formation is located about 340 meters

(1,115 feet) below ground surface (LES, 2005a). The Santa Rosa is recharged by precipitation on sand dunes and directly on outcrop areas in the western part of southern Lea County and the eastern part of Eddy County (Nicholson and Clebsch, 1961). No local investigations of this aquifer were conducted due to the depth of the aquifer and the thickness and low permeability of the overlying Chinle Formation clay, which inhibits potential groundwater migration to the Santa Rosa. There is no indication of a hydraulic connection among the Chinle saturated horizons and the Santa Rosa Formation.

Ground-water velocities were estimated based on the above parameters for both the saturated siltstone unit in the red-bed clay and vertical travel through the clay. The velocity in the saturated siltstone unit within the clay is a slow 0.09 meters per year (0.3 feet per year) towards the south-southeast, reflecting the low permeability of this layer (Cook-Joyce, 2003). Using the largest measured Chinle Formation permeability, vertical groundwater velocity through the clay is conservatively estimated as 0.04 meters per year (0.13 feet per year); the resulting travel time from the surface of the clay to its base (the top of the Santa Rosa Formation) would be greater than 8,000 years.

Figure 3-22 depicts the locations of borings on the proposed NEF site. Onsite borings include nine site groundwater exploration boreholes, the installation of three groundwater monitoring wells, and five geotechnical borings in the soil above the Chinle Formation. The nine borings were also to the top of the Chinle Formation ranging in depth from 10-18 meters (35-60 feet) (Cook-Joyce, 2003). No groundwater was observed in any of the finished boreholes nor was groundwater observed after allowing the boreholes to stand open for 24 hours. The cuttings taken from the boreholes were dry or contained only residual saturation. The dry nature of the soils from the boreholes indicates no recharge from the ground surface at the site.



**Figure 3-22 Borings on or Near the Proposed NEF Site (LES, 2005a)**

The three groundwater monitoring wells were installed in the uppermost water-bearing zone. This 4.5-meter-thick (15-foot-thick) pocket of water is within the Chinle Formation (red beds) at a depth of approximately 67 meters (220 feet) below ground level. Ground water was not observed in any of the groundwater monitoring wells upon completion of the wells. One well (MW-2) did produce water after one month of monitoring, and the groundwater in that well continued to recharge throughout the monitoring period.

### **3.8.2 Ground-Water Use**

No surface water would be used from the proposed NEF site nor groundwater from beneath the site. Instead, the proposed site would receive all of its water supply from the Eunice and/or Hobbs municipal water supply systems. No water wells are located within 1.6 kilometers (1 mile) of the site boundary.

Water wells completed in the alluvium above the Chinle are present approximately 4.8 kilometers (3 miles) south-southwest of the proposed site in the neighborhood of Monument Draw. Of these wells, those on the east side of Monument Draw are dry or have been abandoned, while those on the west side provide limited water for domestic and livestock use (NMSE, 2005). Nicholson and Clebsch (1961) propose a groundwater divide associated with Rattlesnake Ridge, a north-south trending topographic rise east of Eunice, as the cause for this difference in the availability of alluvial water east and west of Monument Draw.

The local municipalities obtain water from groundwater sources in the Ogallala Aquifer near the city of Hobbs, approximately 32 kilometers (20 miles) north of the site. The drinking water wells are positioned in the most productive portion of the Ogallala Formation in New Mexico where hydraulic conductivity approaches 70 meters per day (240 feet per day) (Woomer, 2004). Specific yields are between 0.1 and 0.28, and the saturated thickness is about 30 meters (90 feet) (LCWUA, 2003).

#### **3.8.2.1 The Ogallala Aquifer**

The Ogallala Aquifer, also known as the High Plains Aquifer, is a huge underground reservoir created millions of years ago that supplies water to the region which includes the proposed NEF site. The aquifer extends under the High Plains from west of the Mississippi River to the east of the Rocky Mountains. The aquifer system underlies 450,000 square kilometers (174,000 square miles) in parts of eight States (Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming). Figure 3-23 shows the Ogallala Aquifer and the proposed NEF site. Approximately 20 percent of the irrigated land in the United States is in the High Plains, and about 30 percent of the groundwater used for irrigation in the United States is pumped from the Ogallala Aquifer. Irrigation accounts for about 94 percent of the daily aquifer use of more than 60 million cubic meters (16 billion gallons). Irrigation withdrawals in 1990 were greater than 53 million cubic meters (14 billion gallons) daily. Domestic drinking is the second largest groundwater use within the High Plains States, amounting to about 2.5 percent or 1.6 million cubic meters (418 million gallons) of total daily withdrawals (USGS,2003c). In 1990, 2.2 million people were supplied by groundwater from the Ogallala Aquifer with total public-supply withdrawals of 1.3 million cubic meters (332 million gallons) per day (USGS, 2004b). Withdrawals from the aquifer exceed recharge to it, and so the Ogallala Aquifer is being depleted. The amount of water in storage in the aquifer in each State depends on the actual extent of the formation's saturated thickness.

The Ogallala Aquifer, the largest groundwater system in North America, contains approximately 4 trillion cubic meters (3.3 billion acre-feet) of water. About 65 percent of the Ogallala Aquifer's water is located under Nebraska (USGS, 2003c; RRAT, 2004); about 12 percent is located under Texas; about 10 percent is located under Kansas; about 4 percent is located under Colorado; and 3.5, 2, and 2 percent are located under Oklahoma, South Dakota, and Wyoming, respectively. The remaining 1.5 percent—or about 60 billion cubic meters (16 trillion gallons)—of the water is located under New Mexico (HPWD,2004).



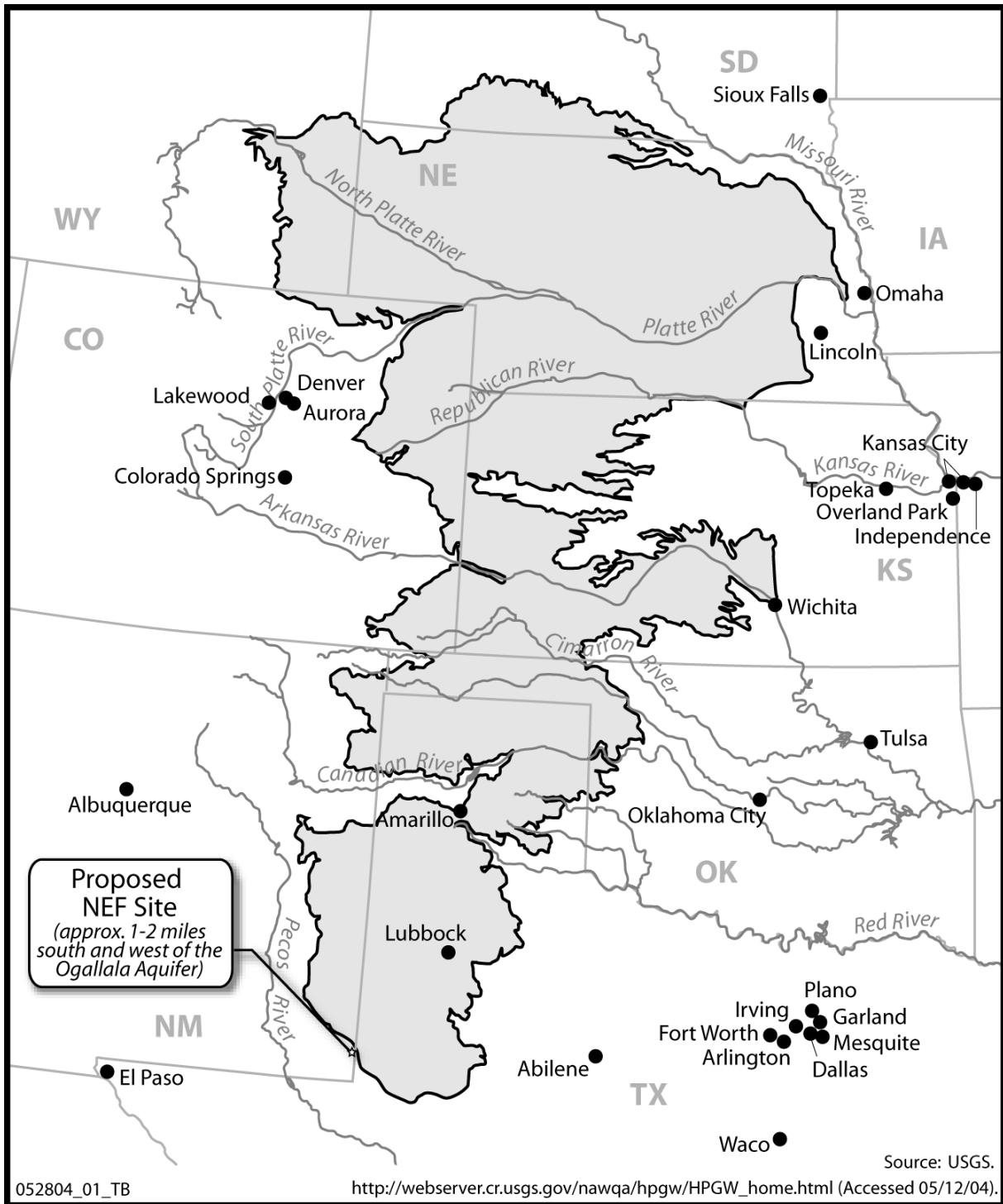


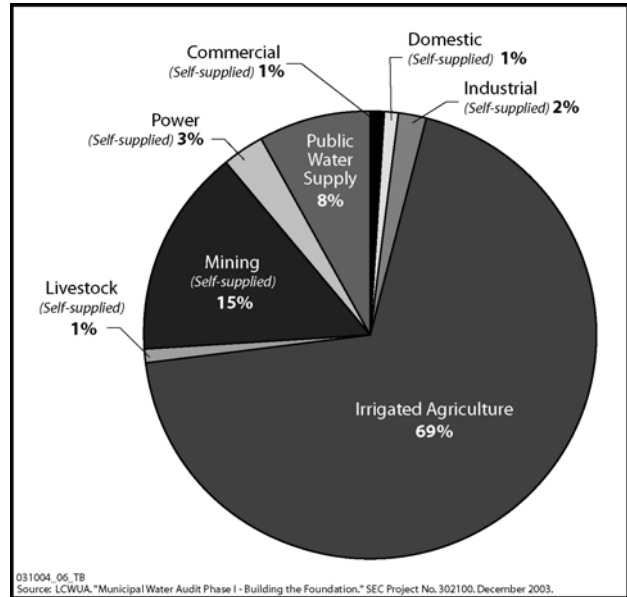
Figure 3-23 Ogallala Aquifer (USGS, 2004b)

### 3.8.2.2 Municipal Water Supply Systems

The Eunice and Hobbs, New Mexico, municipal water-supply systems have capacities of 16,350 cubic meters per day (4.32 million gallons per day) and 75,700 cubic meters per day (20 million gallons per day), respectively. Current usage of the Eunice and Hobbs municipal water-supply systems are 5,600 cubic meter per day (1.48 million gallons per day) and 29,678 cubic meters per day (7.84 million gallons per day), respectively (LCWUA, 2000). Figure 3-24 reflects the local water uses (withdrawals) for community water systems (including Eunice and Hobbs) in Lea County for the year 2000.

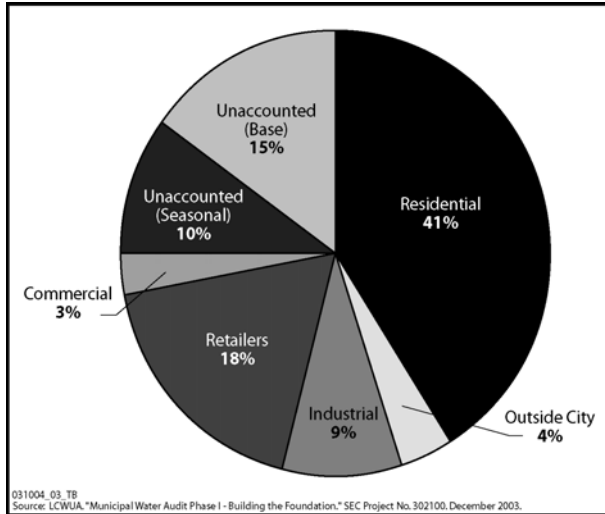
The Lea County Water Users Association report also estimated the year 2000 uses for the water that Lea County pumps from the Ogallala Aquifer. Irrigation uses for agricultural purposes was 69 percent of the total usage (LCWUA, 2003). Public water supply constitutes 8 percent of the groundwater uses. Hobbs and Lovington pump more than 70 percent of the water needs for Lea County. Other Lea County communities, including Eunice, Jal, and Tatum, together account for only 17 percent. Carlsbad, an Eddy County community, pumps about 10 percent of the water from Lea County public water-supply sources (LCWUA, 2003).

The city of Eunice's residential use poses the single largest demand for water from its municipal system (LCWUA, 2003). Figure 3-25 shows that it accounts for 41 percent of the total demand, while sales to retailers make up the second largest demand. Figure 3-26 shows that the city of Hobbs produces similar findings with residential (domestic) and commercial uses accounting for more than 70 percent of total water use (LCWUA, 2003).

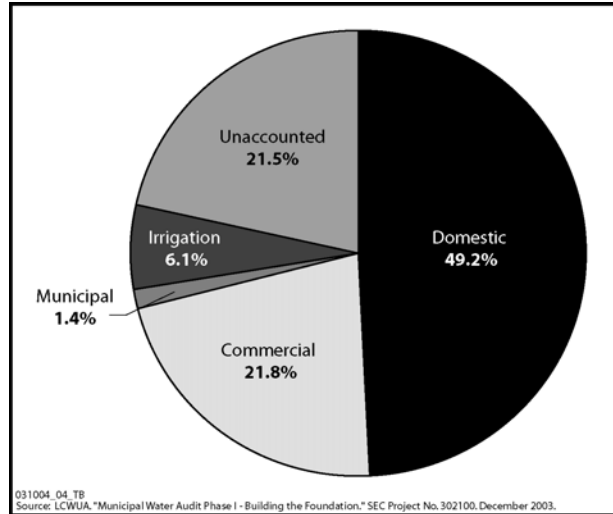


**Figure 3-24 Lea County Water Use for 2000 (LCWUA, 2003)**

Future regional demand for water would deplete Lea County's current water supply contingent upon usage and conservation efforts (LCWUA, 2003). County plans for increasing the water supply include conservation efforts and developing additional water supplies such as developing deeper aquifers (e.g., Santa Rosa Aquifer) and desalinization of saline waters. Model studies have shown that the Ogallala Aquifer may be completely dewatered in some areas by the year 2040 (LCWUA, 2003). In addition, the Lea County Water Users Association has drafted drought management plans (LCWUA, 2003) that include action levels denoted as Advisory, Alert, Warning, and Emergency with associated water-use actions ranging from voluntary reductions through allocation reductions of 20 (Warning) to 30 (Emergency) percent.



**Figure 3-25 Eunice, New Mexico, Average Water Use for 2000-2002 (LCWUA, 2003)**



**Figure 3-26 Hobbs, New Mexico, Average Water Use for 2000-2002 (LCWUA, 2003)**

### 3.8.3 Ground-Water Quality

The waters of the Ogallala Aquifer, while very hard with a total dissolved solid content of less than 500 milligrams per liter, are consistently good quality and can be used for a variety of activities including public supply and irrigation (RRAT, 2004). The water in the southernmost region of the aquifer, mostly in Texas, is characterized by having higher levels of total dissolved solids that would exceed 1,000 milligrams per liter and in certain areas might reach 3,000 milligrams per liter. In this region, highly mineralized water in underlying rocks of marine origin seem to have invaded the aquifer. Increases of sodium and total dissolved solids contents may also be due to increased local industrial and irrigation practices (RRAT, 2004).

Table 3-10 lists recent water-quality testing results of local (Hobbs and Eunice) public water systems that obtain water from the Ogallala Aquifer. Total dissolved solids concentrations of 415 milligrams per liter are high but acceptable for various uses. Fluoride concentrations of 1.1 milligrams per liter are also high but acceptable. Chloride concentrations are moderate with concentrations up to 114 milligrams per liter, and sulfates are low ranging locally from 67 to 113 milligrams per liter (LCWUA, 2000).

The proposed NEF site has historically been used for cattle grazing. There is no documented history of manufacturing, storage, or significant use of hazardous chemicals on the property; therefore, there are no known previous activities that could have contributed to degradation of groundwater quality. The operations at the surrounding facilities (DD Landfarm, Lea County Landfill, Sundance Services, Inc., Wallach Concrete, Inc., and WCS) have not affected groundwater quality at the proposed NEF site. Ground water from WCS would be transported to the southeast away from the proposed NEF site. Sundance Services, Inc., is located between Wallach Concrete, Inc., and the proposed NEF site. While Sundance Services, Inc. uses ponds to recover oil, there are over 100 monitoring wells along the southern property of Sundance Services, Inc., that have not detected contamination from the property. Neither the DD Landfarm nor the Lea County Landfill are expected to affect the proposed NEF site because they are down-gradient.

**Table 3-10 Ogallala Aquifer Annual Water Quality Averages  
for Hobbs and Eunice, New Mexico**

Parameter	Units	Hobbs	Eunice	EPA Maximum Contaminant Levels*
Alkalinity—Total	mg/l	163 <sup>a</sup>	186.5	N/A
Color		not detected	0.25	250 <sup>g</sup>
Specific Conductivity	: mhos/cm	839.9	716.8	N/A
Hardness	mg/l	293.3	248	N/A
pH	standard	7.5	7.2	6.5 - 8.5
Turbidity	NTU	not detected	1.0	N/A
Total Dissolved Solids	mg/l	410.0	415.7	500 <sup>g</sup>
Arsenic	mg/l	0.008	0.008 <sup>d</sup>	0.01 (as of 1/3/06)
Calcium	mg/l	80.7	80.5	N/A
Chloride	mg/l	114.0	63.4	250 <sup>g</sup>
Fluoride	mg/l	1.1	1.0 <sup>e</sup>	4.0
Iron	mg/l	0.05	<0.25 <sup>f</sup>	0.3
Magnesium	mg/l	44.4	11.5	4.0
Mercury	mg/l	not detected	<0.0002 <sup>d</sup>	N/A
Nitrate	mg/l	3.8	2.6	10
Potassium	mg/l	3.4 <sup>a</sup>	4.8	
Sodium	mg/l	38.0	42.6	N/A
Sulfate	mg/l	113.1 <sup>b</sup>	67.2	
Gross Alpha	pCi/l	3.1 ± 0.9 to 16.6 ± 2.9 <sup>c</sup>	2.8 ± 1 to 6.6 ± 1 <sup>c</sup>	15

\*EPA, 2004b.

N/A - not applicable; mg/l - milligrams per liter; NTU - Nephelometric Turbidity Units; pCi/l - picocuries per liter; : mhos/cm - micromhos per centimeter.

<sup>a</sup> Sampled at entry point, August 23, 2004.

<sup>b</sup> Sampled at entry point, February 1996.

<sup>c</sup> Range in concentration, low and high; sampled from 1994 through 1997.

<sup>d</sup> Sampled at entry point, March 1995.

<sup>e</sup> Sampled at entry point, March 1996.

<sup>f</sup> Samples taken from 1975 to 1979.

<sup>g</sup> Results are either annual averages for all wells in a system, at the entry point of a system, or averages of all wells in a system for a particular sampling date.

Source: LCWUA, 2000.

To confirm this, LES installed nine soil boreholes and three monitoring wells as part of its groundwater

investigation of the site. Of the three groundwater-monitoring wells installed on the site, only one has produced sufficient water to sample. This groundwater, the first encountered below the site surface, was approximately 67 meters (220 feet) deep within a siltstone layer imbedded in the Chinle Formation clay. The groundwater from this well was analyzed for standard inorganic compounds, volatile organic compounds, semivolatile organic compounds, pesticides, polychlorinated biphenyls, and radiological constituents.

Table 3-11 presents the results of the groundwater-quality sampling and testing program. Almost all of the elements tested were within the New Mexico regulatory limits and EPA maximum contaminant levels. Measurements of those elements which did not meet one standard or the other are highlighted in the table.

**Table 3-11 Chemical Analyses of Proposed NEF Site Ground Water**

Parameter	Units	NEF Sample	Existing Regulatory Standards*	
			New Mexico	EPA Maximum Contaminant Levels
<i>General Properties</i>				
Total Dissolved Solids	mg/l	2,500 <sup>c</sup>	1,000	500 <sup>a</sup>
Total Suspended Solids	mg/l	6.2	NS	NS
Specific Conductivity	: mhos/L	6,800	NS	NS
<i>Inorganic Constituents</i>				
Aluminum	mg/l	0.480 <sup>c</sup>	5.0 <sup>d</sup>	0.05 – 0.2 <sup>a</sup>
Antimony	mg/l	<0.0036	NS	0.006
Arsenic	mg/l	<0.0049	0.1	0.01 (as of 1/3/06)
Barium	mg/l	0.021	1	2
Beryllium	mg/l	<0.00041	NS	0.004
Boron	mg/l	1.6	0.75 <sup>d</sup>	NS
Cadmium	mg/l	<0.00027	0.01	0.005
Chloride	mg/l	1600	250	250 <sup>a</sup>
Chromium	mg/l	0.043	0.05	0.1
Cobalt	mg/l	<0.00067	0.05 <sup>d</sup>	NS
Copper	mg/l	0.0086	1.0	1.3 <sup>b</sup>
Cyanide	mg/l	<0.0039	0.2	0.2
Fluoride	mg/l	<0.5	1.6	4
Iron	mg/l	0.51	1	0.3 <sup>a</sup>
Lead	mg/l	<0.0021	0.05	0.015 <sup>b</sup>
Manganese	mg/l	1.0	0.2	0.05 <sup>a</sup>
Mercury	mg/l	<0.000054	0.002	0.002
Molybdenum	mg/l	0.04	1.0 <sup>d</sup>	NS
Nickel	mg/l	0.034	0.2 <sup>d</sup>	0.1
Nitrate	mg/l	<0.25	10	10
Nitrite	mg/l	<1	NS	1

Parameter	Units	NEF Sample	Existing Regulatory Standards*	
			New Mexico	EPA Maximum Contaminant Levels
Selenium	mg/l	<0.0046	0.05	0.05
Silver	mg/l	<0.0007	0.05	0.05
Sulfate	mg/l	2,200	600 <sup>a</sup>	250 <sup>a</sup>
Thallium	mg/l	<0.0081 <sup>f</sup>	NS	0.002
Zinc	mg/l	0.016	10	5 <sup>a</sup>
<b>Radioactive Constituents</b>				
Gross Alpha*	Bq/l	0.6	NS	0.6
	pCi/L	15.1		15
Gross Beta	Bq/L	1.2	NS	4 (mrem/yr)
	pCi/L	31.4		
Uranium	pCi/L	5.97	0.030	0.030
	mg/L	0.00873		
U-234	pCi/L	4.75		
	mg/L	0.00695		
U-235	pCi/L	0.158		
	mg/L	0.000231		
U-238	pCi/L	1.06		
	mg/L	0.001551		

\* The proposed standard excludes <sup>222</sup>Rn, <sup>226</sup>Ra, and uranium activity; New Mexico Standards (NMWQCC, 2002); EPA Maximum Contaminant Levels (EPA, 2004b).

Highlighted values exceed a regulatory standard.

NS - No standard or goal has been defined; mg/l - milligrams per liter; pCi/l - picocuries per liter; ; mhos/cm - micromhos per centimeter; Bq/L - becquerels per liter.

<sup>a</sup>EPA Secondary Drinking Water Standard (EPA, 2004c).

<sup>b</sup>Action Level requiring treatment.

<sup>c</sup>Results of laboratory or field-contaminated sample.

<sup>d</sup>Crop irrigation standard.

<sup>e</sup>Likely inaccurate. Subsequent measurements indicate concentrations in the range of 6,000-6,400 mg/L.

<sup>f</sup>The minimum detection limit (0.0081) for thallium is greater than the EPA maximum contaminant level of 0.002.

Source: LES, 2005a.

### 3.9 Ecological Resources

This section describes the terrestrial and aquatic communities of the proposed NEF site and the associated plant and animal species. The interrelationships of these species are also discussed along with habitat requirements, life history, and population dynamics.

Ecological field surveys at the proposed NEF site were conducted in September 2003 (LES, 2005a), October 2003 (Sias, 2003), April 2004 (EEI, 2004a; LES, 2005a), May 2004 (EEI, 2004b), and June 2004 (Sias, 2004). These surveys focused on established empirical data for vegetation cover, mammals, birds, reptiles, and amphibians. A trapping or capture-and-release survey was not used during these initial surveys. Emphasis was placed on determining the habitats of candidate species that would occur at the proposed NEF site. In addition, Lea County conducted surveys in 1997 that covered the 350-acre (142-hectare) Lea County Landfill located across from the proposed NEF site (LCSWA, 1998).

Due to the lack of suitable water-related habitat at the proposed NEF site, no waterfowl or water birds are currently found at the proposed NEF site. The lack of permanent water bodies at the site also results in the presence of few associated amphibian species. Therefore, no aquatic environment discussion is presented in this EIS.

### 3.9.1 Fauna in the Vicinity of the Proposed Site

The proposed NEF site is located in an extensive deep sand environment. The area is a transitional zone between the short grass prairie of the Southern High Plains and the desert communities of the Chihuahuan Desert Scrub. It is dominated by deep-sand-tolerant or deep-sand-adapted plant species and is unique due to the dominance of the shinnery oak community.

The Plains Sand Scrub vegetation community at the proposed NEF site has remained stable since the introduction of domestic livestock grazing in the area by Spanish settlers. The site has not been impacted by farming or oil and gas development that is prevalent in the region.

The species composition of the wildlife at the site is reflective of the type, quality, and quantity of habitat present. Wildlife species at the proposed NEF site are those typical of species that occur in grassland and desert habitats. Table 3-12 lists the mammalian, bird, and amphibian/reptile species likely to be present at the site and vicinity, and presents information regarding their preferred habitats and probable distribution and abundance.

**Table 3-12 Mammals, Birds, and Amphibians/Reptiles Potentially Inhabiting the Proposed NEF Site and Vicinity, and Their Habitat and Seasonal Preferences**

Common Name	Scientific Name	Preferred Habitat
<i>Mammals</i>		
Black-Tailed Jackrabbit	<i>Lepus californicus</i>	Grasslands and open areas.
Black-Tailed Prairie Dog	<i>Cynomys ludovicianus</i>	Short grass prairie.
Cactus Mouse	<i>Peromyscus eremicus</i>	Grasslands, prairies, and mixed vegetation.
Collared Peccary	<i>Dicotyles tajacu</i>	Brushy, semi-desert, chaparral, mesquite, and oaks.
Coyote	<i>Canis latrans</i>	Open space, grasslands, and brush country.
Deer Mouse	<i>Peromyscus maniculatus</i>	Grasslands, prairies, and mixed vegetation.
Desert Cottontail	<i>Sylvilagus audubonii</i>	Arid lowlands, brushy cover, and valleys.
Mule Deer	<i>Odocoileus hemionus</i>	Desert shrubs, chaparral, and rocky uplands.
Ord's Kangaroo Rat	<i>Dipodomys ordii</i>	Hard desert soils.
Plains Pocket Gopher	<i>Geomys bursarius</i>	Deep soils of the plains.
Pronghorn Antelope	<i>Antilocapra americana</i>	Sagebrush flats, plains, and deserts.
Raccoon	<i>Procyon lotor</i>	Brushy, semi-desert, chaparral, and mesquite.
Southern Plains Woodrat	<i>Neotoma micropus</i>	Grasslands, prairies, and mixed vegetation.
Spotted Ground Squirrel	<i>Spermophilus spilosoma</i>	Brushy, semi-desert, chaparral, mesquite, and oaks.

Common Name	Scientific Name	
Striped Skunk	<i>Mephitis mephitis</i>	All land habitats.
Swift Fox	<i>Vulpes velox</i>	Rangeland with short grasses and low shrub density.
White-Throated Woodrat	<i>Neotoma albigula</i>	Grasslands, prairies, and mixed vegetation.
Yellow-Faced Pocket Gopher	<i>Pappogeomys castanops</i>	Deep soils of the plains.
<b>Birds</b>		<b>Seasonal Preference</b>
American Kestrel <sup>*+</sup>	<i>Falco sparverius</i>	Summer.
Ash-Throated Flycatcher <sup>*+</sup>	<i>Myiarchus cinerascens</i>	Summer.
Bewick's Wren <sup>+</sup>	<i>Thyromanes bewickii</i>	Spring.
Black-Chinned Hummingbird	<i>Archilochus alexandri</i>	Year round.
Blue Grosbeak <sup>+</sup>	<i>Guiraca caerulea</i>	Summer and winter.
Bullock's Oriole <sup>+</sup>	<i>Icterus bullockii</i>	Summer.
Cassin's Sparrow <sup>+</sup>	<i>Aimophila cassinii</i>	Spring.
Cactus Wren <sup>+</sup>	<i>Campylorhynchus brunneicapillus</i>	Spring.
Chihuahuan Raven <sup>*+</sup>	<i>Corvus cryptoleucus</i>	Rare.
Common Raven	<i>Corvus corax</i>	Summer and winter.
Crissal Thrasher <sup>+</sup>	<i>Toxostoma dorsale</i>	Summer and winter.
Eastern Meadowlark <sup>+</sup>	<i>Sturnella magna</i>	Spring.
European Starling <sup>+</sup>	<i>Sturnus vulgaris</i>	Spring.
Gambel's Quail	<i>Lophortyx gambelii</i>	Rare.
Great-Tailed Grackle <sup>+</sup>	<i>Quiscalus mexicanus</i>	Spring.
Green-Tailed Towhee	<i>Pipilo chlorurus</i>	Migrant.
House Finch <sup>*+</sup>	<i>Carpodacus mexicanus</i>	Summer and winter.
Killdeer <sup>+</sup>	<i>Charadrius vociferus</i>	Year round.
Lark Bunting <sup>+</sup>	<i>Calamospiza melanocorys</i>	Winter.
Lark Sparrow <sup>+</sup>	<i>Chondestes grammacus</i>	Summer.
Lesser Prairie Chicken	<i>Tympanuchus pallidicinctus</i>	Rare
Loggerhead Shrike <sup>*+</sup>	<i>Lanius ludovicianus</i>	Uncommon.
Long-Eared Owl	<i>Asio otus</i>	Summer and winter.
Mallard <sup>+</sup>	<i>Anas platyrhynchos</i>	Summer.
Mourning Dove <sup>*+</sup>	<i>Zenaida macroura</i>	Summer and winter.
Nighthawk <sup>+</sup>	<i>Chordeiles minor</i>	Summer and winter.
Northern Mockingbird <sup>*+</sup>	<i>Mimus polyglottos</i>	Summer.
Northern Bobwhite <sup>+</sup>	<i>Colinus virginianus</i>	Summer and winter.



<b>Common Name</b>	<b>Scientific Name</b>	
Pyrrhuloxia <sup>+</sup>	<i>Cardinalis sinuatus</i>	Uncommon.
Red-Tailed Hawk	<i>Buteo jamaicensis</i>	Summer and winter.
Red-Winged Blackbird <sup>+</sup>	<i>Agelaius phoeniceus</i>	Spring.
Roadrunner	<i>Geococcyx californianus</i>	Summer and winter.
Sage Sparrow	<i>Amphispiza belli</i>	Summer and winter.
Scaled Quail <sup>*+</sup>	<i>Callipepla squamata</i>	Summer and winter.
Scissor-Tailed Flycatcher <sup>+</sup>	<i>Tyrannus forficatus</i>	Migrant.
Scott's Oriole	<i>Icterus parisorum</i>	Summer and winter.
Swainson's Hawk <sup>*+</sup>	<i>Buteo swainsoni</i>	Summer.
Turkey Vulture	<i>Cathartes aura</i>	Winter migrant.
Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>	Winter migrant.
Vesper Sparrow <sup>+</sup>	<i>Pooecetes gramineus</i>	Spring.
Western Burrowing Owl	<i>Athene cunicularia hypugea</i>	Uncommon
Western Kingbird <sup>+</sup>	<i>Tyrannus verticalis</i>	Summer.
<b>Amphibians/Reptiles</b>		<b>Preferred Habitat</b>
Coachwhip	<i>Masticophis flagellum</i>	Mixed grass prairie and desert grasslands.
Collared Lizard	<i>Crotaphytus collaris</i>	Desert grasslands.
Eastern Fence Lizard	<i>Sceloporus undulates</i>	Mixed grass prairie and desert grasslands.
Garter Snake	<i>Thamnophis Sp.</i>	Desert grasslands.
Ground Snake	<i>Sonora semiannulata</i>	Desert grasslands.
Longnose Leopard Lizard	<i>Gambelia wislizenii</i>	Mixed grass prairie and desert grasslands.
Lesser Earless Lizard	<i>Holbrookia maculata</i>	Mixed grass prairie and desert grasslands.
Longnosed Snake	<i>Rhinocheilus lecontei</i>	Desert grasslands.
Ornate Box Turtle	<i>Terrapene ornata</i>	Desert grasslands and short grass prairie.
Pine-Gopher Snake	<i>Pituophis melanoleucus</i>	Short grass prairie and desert grasslands.
Plains Blackhead Snake	<i>Tantilla nigriceps</i>	Short grass prairie and desert grasslands.
Plains Spadefoot Toad	<i>Spea bombifrons</i>	Shallow to standing pools of water.
Rattlesnakes	<i>Crotalus Sp.</i>	Short grass prairie and desert grasslands.
Sand Dune Lizard	<i>Sceloporus arenicolus</i>	Open sand and takes refuge under shinnery oak.
Six-Lined Racerunner	<i>Cnemidophorus sexlineatus</i>	Mixed grass prairie and desert grasslands.
Tiger Salamander	<i>Ambystoma tigrinum</i>	Tall-grass and mixed prairie.
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	Desert grasslands.
Western Whiptail Lizard	<i>Cnemidophorus tigris</i>	Mixed grass prairie and desert grasslands.

\* Species detected during the April 2004 survey (EEI, 2004a).

+ Species detected during the May 2004 survey (EEI, 2004b).

Sources: LES, 2005a; EEI, 2004a; EEI, 2004b; LCSWA, 1998; WCS, 2004c.

### 3.9.1.1 Endangered and Threatened Species

The U.S. Fish and Wildlife Service (FWS) provided a list of endangered and threatened species, candidate species, and species of concern for Lea County (FWS, 2004a). Endangered species are any species which are in danger of extinction throughout all or a significant portion of its range. Threatened species are any species which are likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. For Lea County, the black-footed ferret and northern aplomado falcon are listed as endangered, and the bald eagle is listed as threatened. Surveys did not identify these animals at or near the proposed NEF site.

### 3.9.1.2 Candidate Species

Candidate species are those that the FWS has sufficient information to propose that they be added to the Federal list of threatened and endangered species. Three of the species that are likely to occur at the proposed NEF site are on the candidate list: the lesser prairie chicken (*Tympanuchus pallidicinctus*), the sand dune lizard (*Sceloporus arenicolus*), and the black-tailed prairie dog (*Cynomys ludovicianus*).

The State of New Mexico has listed the sand dune lizard as a threatened species in Lea County (NMDGF, 2000). The black-tailed prairie dog and the lesser prairie chicken were listed as sensitive taxa in Lea County.

The three candidate species are described below.

#### Lesser Prairie Chicken

In the area of the proposed NEF site, the presence of a sand shinnery oak habitat would meet the requirements for suitable habitat for the lesser prairie chicken (NRCS, 2004). Figure 3-27 shows the male lesser prairie chicken. The area consists of prairie mixed shrub lands suitable for cover, food, water, and breeding areas (known as booming grounds or leks). Two areas within Lea County have been nominated as an area of critical environmental concern for the lesser prairie chicken. One of these sites is located about 48 kilometers (30 miles) northwest of the site, and one is located further north. The nominations are under evaluation by the BLM (Johnson, 2000). The BLM plans to address this issue through an amendment to the Resource Management Plan (BLM, 2004).

The nearest known lek site (i.e., breeding area) for the lesser prairie chicken is located about 6.4 kilometers (4 miles) north of the site (LES, 2005a). A field survey conducted in the fall of 2003 at the proposed NEF site did not locate any lesser prairie chickens (LES, 2005a). A subsequent field survey in the spring of 2004 confirmed that the lesser prairie chicken habitat at the proposed site is of moderate quality and is limited to a small area. The study highlighted the fact that the eastern portion of the site harbors dense mesquite, and the western portion is dominated by shinnery oak-grassland communities and short grass prairie that provide unfavorable habitats to the lesser prairie chicken. The proposed NEF site contains suitable food sources, but there are no permanent water sources onsite (Johnson, 2000).



**Figure 3-27 Male Lesser Prairie Chicken (FWS, 2004b)**

The nearest known lek site (i.e., breeding area) for the lesser prairie chicken is located about 6.4 kilometers (4 miles) north of the site (LES, 2005a). A field survey conducted in the fall of 2003 at the proposed NEF site did not locate any lesser prairie chickens (LES, 2005a). A subsequent field survey in the spring of 2004 confirmed that the lesser prairie chicken habitat at the proposed site is of moderate quality and is limited to a small area. The study highlighted the fact that the eastern portion of the site harbors dense mesquite, and the western portion is dominated by shinnery oak-grassland communities and short grass prairie that provide unfavorable habitats to the lesser prairie chicken. The proposed NEF site contains suitable food sources, but there are no permanent water sources onsite (Johnson, 2000).

### Sand Dune Lizard

Sand dune lizards (Figure 3-28) only occur in areas with open sand, but they forage and take refuge under shinnery oak (NMDGF, 1996). They are restricted to areas where sand dune blowouts, topographic relief, and shinnery oak occur. They are seldom more than 1.2 to 1.8 meters (4 to 6 feet) from the nearest plant. The sand dune lizard feeds on invertebrates such as ants, crickets, grasshoppers, beetles, spiders, ticks, and other arthropods. Feeding appears to take place within or immediately adjacent to patches of vegetation.

The proposed NEF site contains areas of sand dunes in the eastern central area of the site, southwestern quadrant, and a small area in the northwestern corner. Two surveys of the site did not identify favorable sand dune lizard habitats (Sias, 2003; Sias, 2004). The surveys indicated that the vegetation substrate at the proposed NEF site reflects conditions that would not support sand dune lizards. The dominance of the mesquite and grassland combinations at the site are not conducive environmental conditions for this species. The closest sand dune lizard population occurs about 5 kilometers (3 miles) north of the proposed NEF site (Sias, 2004).



**Figure 3-28 Sand Dune Lizard (CBD, 2003)**

### Black-Tailed Prairie Dog

The black-tailed prairie dog (Figure 3-29) is a close cousin of the ground squirrel. A heavy-bodied rodent with a black-tipped tail, the black-tailed prairie dog is native to short-grass prairie habitats of western North America where they play an important role in the prairie ecosystem. They serve as a food source for many predators and leave vacant burrows for the burrowing owl, the black-footed ferret, the Texas horned lizard, rabbits, hares, and even rattlesnakes. Black-tailed prairie dogs avoid brush and tall-grass areas due to the reduced visibility these habitats impose. In Texas, they may be found in western portions of the State and in the Panhandle.

At one time, Texas reported huge prairie dog towns, such as one that covered 25,000 square miles and supported a population of about 400 million prairie dogs. Although prairie dog towns are still present in Texas, their current populations has been significantly reduced due to extensive loss of habitat during the last century.

Black-tailed prairie dogs depend on grass as their dominant food source and usually establish colonies in short-grass vegetation types that allow them to see and escape predators. Plains-mesa sand scrub, the predominant vegetation type on the proposed NEF site, is not optimal black-tailed prairie dog habitat due to the high density of shrubs (LES, 2005a). There have been no sightings of black-tailed prairie dogs, no active or inactive prairie dog mounds/burrows, or any other evidence of prairie dogs at the proposed NEF site.

### 3.9.1.3 Species of Concern

The proposed site was also examined for suitable habitats that would be attractive to the listed Species of Concern in the State of New Mexico (FWS, 2004a). Species of concern are species for which further biological research and field study are needed to resolve their conservation status or which are considered sensitive, rare, or declining on lists maintained by Natural Heritage Programs, State wildlife agencies, other Federal agencies, or professional/academic scientific societies. The Species of Concern for the proposed NEF site are the swift fox (*Vulpes velox*), the American peregrine falcon (*Falco peregrinus anatum*), the arctic peregrine falcon (*Falco peregrinus tundrius*), the Baird's sparrow (*Ammodramus bairdii*), the Bell's vireo (*Vireo bellii*), the western burrowing owl (*Athene cunicularia hypugea*), and the yellow-billed cuckoo (*Coccyzus americanus*). The swift fox is a species of concern for Lea County under the Federal listing and is listed as a sensitive species under the State of New Mexico classification (FWS, 2004b; NMDGF, 2000).

The examination of the habitats indicates the proposed NEF site has the potential to attract the swift fox and the western burrowing owl. Given the availability of neighboring open land in the immediate area of the proposed NEF site and the low population density of the swift fox, the proposed NEF site is marginally attractive to the swift fox. However, species such as the swift fox are relatively more susceptible to population-level effects of cumulative habitat loss, and the ultimate effect of this habitat loss is reduced carrying capacity and wildlife population levels. The western burrowing owl requires burrows (natural or human-constructed) for nesting such as the rip raps lining ditches and ponds. If there are burrowing mammals such as prairie dogs (which are not likely to occur) or badgers in the area, then it is likely that the area may be attractive to burrowing owls.

### 3.9.2 Flora in the Vicinity of the Proposed Site

The vegetation community on the proposed NEF site is classified as plains sand scrub. The dominant shrub species associated with this classification is Shinoak (*Quercus havardii*) with lesser amounts of sand sage (*Artemesia filifolia*), honey mesquite (*Prosopis glandulosa*), and soapweed yucca (*Yucca*



**Figure 3-29 Black-Tailed Prairie Dog (USGS, 2004c)**

*glauca*). The community is further characterized by the presence of forbs, shrubs, and grasses that are adapted to the deep sand environment that occurs in parts of southeastern New Mexico (NRCS, 1978).

The dominant perennial grass species is red lovegrass (*Eragrostis oxylepis*). Other grasses include dropseed (*Sporobolus Sp.*) and purple three awn (*Aristida purpurea*), which are present in a lesser degree.

The total vegetative cover for the proposed NEF site is approximately 26.5 percent. Herbaceous plants cover about 16.7 percent of the total ground area, and shrubs cover approximately 9.6 percent of the total ground area. Perennial grasses account for 63.1 percent of the relative cover, shrubs account for 36.1 percent, and forbs account for 0.8 percent. The relative cover is the fraction of total vegetative cover that is composed of a certain species or category of plants.

Total shrub density for the proposed NEF site is 16,660 individuals per hectare (6,748 individuals per acre). The most abundant shrubs are shinoak with 14,040 individuals per hectare (5,688 individuals per acre), followed by the soapweed yucca with 1,497 individuals per hectare (606 individuals per acre), and then the sand sage with 842 individuals per hectare (341 individuals per acre).

### **3.9.3 Pre-Existing Environmental Stresses**

There are no onsite important ecological systems that are vulnerable to change or that contain important species habitats such as breeding areas, nursery, feeding, resting, and wintering areas, or other areas of seasonally high concentrations of individuals of candidate species or species of concern. The candidate species that have the potential to be present at the site are all highly mobile with the exception of the sand dune lizard. Ecological studies indicate, however, the absence of habitats for these species at the proposed NEF site (LES, 2005a; LES, 2005b; EEI, 2004a; EEI, 2004b; Sias, 2003; Sias, 2004). The vegetation type covering the proposed NEF site is not unique to that site and covers thousands of acres in southeastern New Mexico.

Past and present cattle grazing, fencing, and the maintenance of access roads and pipeline right-of-ways represent the primary preexisting environmental stress on the wildlife community of the site. The colonization of the disturbed areas by local plant species has alleviated the impact of pipeline installation and maintenance of pipeline right-of-ways. Disturbed areas immediately adjacent to the road, however, are being invaded by weeds. The proposed NEF site has large stands of mesquite indicative of long-term grazing pressure that has changed the vegetative community dominated by climax grasses to a sand scrub community and the resulting changes in wildlife habitat. Changes in local climatic and precipitation patterns are also an environmental stress for the southeastern New Mexico area.

Past and current uses of the proposed NEF site have most likely resulted in a shift from wildlife species associated with mature desert grassland to those associated with grassland shrub communities. Examples of this include a decrease in the pronghorn antelope, a species requiring large, open prairie areas, and an increase in species that thrive in a midsuccessional plant community like the black-tailed jackrabbit and the mule deer. Other environmental stresses on the terrestrial wildlife community, such as disease and chemical pollutants, have not been identified at the proposed NEF site.

### **3.10 Socioeconomic and Local Community Services**

The socioeconomic characteristics for the 120-kilometer (75-mile) region of influence surrounding the proposed NEF site include Lea County, New Mexico, and Andrews County and Gaines County, Texas, as well as portions of Eddy County, New Mexico, and Ector, Loving, Winkler, and Yoakum Counties, Texas.

Established in March 1917, Lea County covers approximately 11,378 square kilometers (4,393 square miles). Its county seat, Lovington, is located 64 kilometers (39 miles) north-northwest of the proposed NEF site. The largest city in the county is Hobbs, and it is situated 32 kilometers (20 miles) to the north. Other incorporated communities in Lea County are Jal, 37 kilometers (23 miles) to the south; Eunice, 8 kilometers (5 miles) to the west; and Tatum, 72 kilometers (45 miles) to the north-northwest.

Due east of the proposed NEF site is Andrews County, Texas. Organized in 1910, Andrews County has a land area of 3,895 square kilometers (1,504 square miles). The county seat, city of Andrews, is 51 kilometers (32 miles) east-southeast of the proposed NEF site and is the only incorporated community in the county. There are no other major communities in Andrews County.

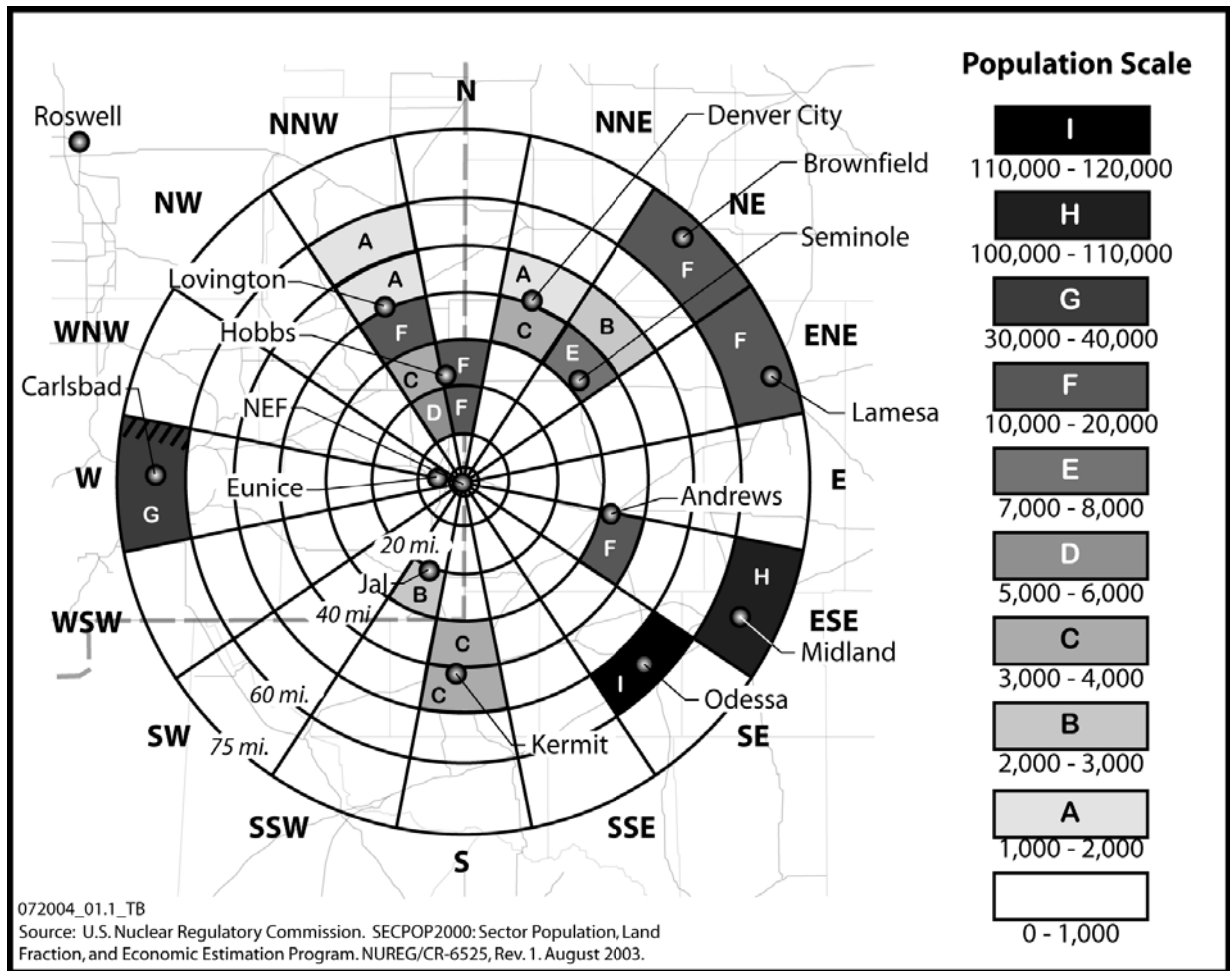
Northeast of the proposed NEF site is Gaines County, Texas, which was organized in 1905. Gaines County is approximately the same size as Andrews County (3,892 square kilometers (1,503 square miles)). The county seat is Seminole, and it is located 51 kilometers (32 miles) to the northeast (Coward, 1974).

The majority of the impacts are expected to occur in Lea County, given its larger population and workers living in closer proximity to the proposed NEF site and, to a lesser extent, in Andrews and Gaines Counties, Texas. Portions of Eddy County, New Mexico, and Ector, Loving, Winkler, and Yoakum Counties, Texas, are within the region of influence but are not expected to be impacted to any great extent. Figure 3-30 shows the population density surrounding the proposed NEF site.

Figure 3-1 shows the major communities and transportation routes in the region of influence. The remainder of this section presents information and data for population, housing, and education; employment and income; community services, infrastructure, and finances; utilities; waste disposal; and tax structure and distribution.

#### **3.10.1 Population, Housing, and Education**

In 2000, the population of Lea County was approximately 55,511 with slightly more than half (28,660) living in Hobbs. The county seat, Lovington, had a population of 9,470. The other three incorporated communities in the county had a combined population of 5,240. About 22 percent of the county population lives in the unincorporated areas. Overall, the county has a population density of 4.9 people per square kilometer (12.76 square miles) (USCB, 2004). As shown in Table 3-13, the population of Lea County declined by about 1 percent between 1980 and 2000. This decline is in sharp contrast to the State of New Mexico, whose population increased by more than a half million people—or by nearly 40 percent—over the same period. Table 3-13 does not show the rapid increase in population that occurred in the early 1980's followed by a more gradual decrease during the remainder of the decade because the table presents an average over the decade and not annual changes. Beginning in the late 1970's, the population of Lea County expanded by 10,000 residents reaching a peak of more than 66,000 by the end of 1983. This population growth and decline was due to the expansion and contraction of the oil industry. From 1985 to 1990, the county lost population as oil prices stabilized and subsequently fell.



**Figure 3-30 Population Density Surrounding the Proposed NEF Site (NRC, 2003a)**

Andrews County is the 151<sup>st</sup> largest of the 254 counties in Texas. According to the U.S. Census Bureau, the population of Andrews County was 13,004 in 2000 with a population density of 3.3 people per square kilometer (8.7 square miles) (USCB, 2004). Its population experienced a similar growth/decline pattern as that of Lea County. The population of Gaines County in 2000 was 14,467. Unlike in Andrews County, the population of Gaines County was relatively stable during the 1990's. The total population of the three principal counties in the region of influence was nearly 83,000 in 2000. The area did not experience the population increases that occurred in other areas of New Mexico and Texas.

Table 3-13 shows that population growth in Lea County is projected to decline through the remainder of the decade (BBER, 2002). This is in contrast to Andrews County and Gaines County, where the population is expected to increase by 8.3 and 12.5 percent, respectively, between 2000 and 2010 (WSG, 2004). For the region of influence as a whole, the population is projected to remain stable throughout the decade. Both New Mexico and Texas are expected to continue to experience high population growth rates. As shown earlier, there are no significant populations within 24 kilometers (15 miles) of the proposed NEF with the exception of the city of Eunice 8 kilometers (5 miles) due west. Figure 3-1 shows the town of Hobbs due north of the site and Lovington further away in the north-northwestern direction. Between 24 and 48 kilometers (15 and 30 miles) south-southwest of the proposed site is a concentration of about 2,000-3,000 people that includes the community of Jal. East-southeast between 48 and 80

kilometers (30 and 50 miles) away from the proposed NEF is the city of Andrews and surrounding area with a population concentration of 12,000 to 14,000 people. The two major population concentrations in Gaines County—Seminole and Denver City—are northeast of the proposed NEF site.

Table 3-14 shows that the housing density in Lea County is 2.0 units per square kilometer (5.3 units per square mile), and the median cost of a home is \$50,100. The New Mexico State average housing density is 2.5 units per square kilometer (6.4 units per square mile), and the median cost of a home is \$108,000. In Andrews and Gaines counties, the housing units density is 1.4 units per square kilometer (3.6 units per square mile). The median cost of a home in Andrews and Gaines Counties is \$42,500 and \$48,000, respectively. The Texas State average housing density is 12 units per square kilometer (31.2 units per square mile), and the median cost of a home is \$82,500. The variation in housing between the counties and the State averages is reflective of the rural nature of the county areas. The percentage of vacant housing units is 15.8 percent for Lea County, 14.8 percent for Andrews County, and 13.5 percent for Gaines County. This compares to a housing vacancy of 13.1 percent in New Mexico and 9.4 percent in Texas.

**Table 3-13 Baseline Values for Population and Growth in the Region of Influence**

County	Population					
	1980	1990	2000	2010	2020	2030
Lea County, New Mexico	55,993	55,765	55,511	54,551	52,556	49,417
Andrews County, Texas	13,323	14,338	13,004	14,083	14,704	14,923
Gaines County, Texas	13,150	14,123	14,467	16,273	17,852	18,894
Region of Influence	82,466	84,226	82,982	84,907	85,112	83,234
New Mexico Total	1,303,303	1,515,069	1,819,046	2,112,957	2,382,999	2,626,333
Texas Total	14,225,512	16,986,335	20,851,820	24,395,179	27,917,492	31,197,014

County	Percent Decade Change					
	1980-1990	1990-2000	2000-2010	2010-2020	2020-2030	
Lea County, New Mexico	--	-0.4	-0.5	-1.7	-3.7	-6.0
Andrews County, Texas	--	7.6	-9.3	8.3	4.4	1.5
Gaines County, Texas	--	7.4	2.4	12.5	9.7	5.8
Region of Influence	--	1.1	-2.3	0.2	-2.0	-4.3
New Mexico Total	--	16.3	20.1	16.2	12.8	10.2
Texas Total	--	19.4	22.8	17.0	14.4	11.7

Sources: USCB, 2002a; USCB, 2002b; BBER, 2002; Fedstats, 2004; WSG, 2004.



The population surrounding the proposed NEF site generally has a lower level of educational attainment than the State averages. Table 3-14 summarizes the school enrollment and educational attainment data for the three principal counties. These counties have approximately the same proportion of their residents in primary and secondary grades, and a significantly smaller proportion attending college than averages for New Mexico and Texas (WSG, 2004).

### 3.10.2 Employment and Income

In 2000, the labor force was nearly 33,573 (Lea County – 22,286, Andrews County – 5,511, and Gaines County – 5,776). The unemployment rate was 9.1 percent in Lea County and 8.1 percent in Andrews County. In Gaines County, the unemployment rate was less at 5.5 percent. For these counties, unemployment was higher than their State averages.

**Table 3-14 Demographic, Housing, and Education Characteristics in the Region of Influence**

Subject	Lea County	Andrews County	Gaines County	Region of Influence	New Mexico Total	Texas Total
<i>Demographics (Year 2000)</i>						
Total Population	55,511	13,004	14,467	82,982	1,819,046	20,851,820
<i>Housing Characteristics (Year 2000)</i>						
Total Housing Units	23,405	5,400	5,410	34,215	780,579	8,157,575
Occupied Units	19,699	4,601	4,681	28,981	677,971	7,393,354
Land Area	4,383	1,501	1,503	7,387	121,356	261,797
Housing Density (units per square mile)	5.3	3.6	3.6	4.6	6.4	31.2
Median Value (Year 2000 \$)	\$50,100	\$42,500	\$48,000	\$48,570	\$108,100	\$82,500
<i>Educational Characteristics (Year 2000)</i>						
School Enrollment	16,534	3,864	4,369	24,767	533,786	5,948,260
Grades <8	48.4%	51.0%	57.8%	50.4%	55.2%	58.0%
Grades 9-12	25.5%	30.3%	25.1%	26.2%	22.3%	21.9%
College	16.7%	8.6%	6.1%	13.6%	22.5%	20.2%
Educational Attainment (>25 years age)	33,291	7,815	8,006	49,112	1,134,801	12,790,893
High School Graduate	67.1%	68.0%	56.2%	65.4%	78.9%	75.7%
Bachelor's Degree or Higher	11.6%	12.4%	10.5%	11.6%	23.5%	23.2%

Sources: USCB, 2002a; USCB, 2002b.

Table 3-15 shows the employment and income for the region of influence. Petroleum production, processing, and distribution (which falls under Agriculture, Forestry, Fishing, and Mining in Table 3-15)

and agriculture are the dominant industries in the surrounding area. Associated with this sector are various support services including machining and tooling, chemical production, specialty construction, metal fabrication, and transportation and handling. Approximately 21.5 percent of the jobs are classified in these industries. This percentage compares to 4 percent and 2.7 percent in New Mexico and Texas, respectively. The percentage of the labor force in professional, scientific, and management-related occupations in these counties is about half of the labor force for New Mexico and Texas. Other sectors are similar to State averages.

In the early 1980's, the median household incomes for Lea County, Andrews County, and Gaines County exceeded the median income for New Mexico and Texas as a whole. Since then, the median household income in both counties has fallen considerably below that of the State averages. The decline in income to levels below State averages is due to a shift in employment from relatively high-paying jobs in the oil and gas industry to lower paying jobs in the service sector. In 2000, per capita income ranged from \$13,088 in Gaines County to \$15,916 in Andrews County. Per capita income is about \$3,100 per year less than the State average in Lea County and \$3,700 per year less in Andrews County. In Gaines County, the per capita income is more than \$6,500 lower than the State average. The median household income is \$29,799 for Lea County, \$34,036 for Andrews County, and \$30,432 for Gaines County—well below their respective State averages.

**Table 3-15 Employment and Income in the Region of Influence**

<b>Subject</b>	<b>Lea County, New Mexico</b>	<b>Andrews County, Texas</b>	<b>Gaines County, Texas</b>	<b>Region of Influence</b>	<b>New Mexico Total</b>	<b>Texas Total</b>
<b><i>Employment (Year 2000)</i></b>						
In-Labor Force	22,286	5,511	5,776	33,573	823,440	9,830,559
Employed	20,254	5,064	5,460	30,778	763,116	9,234,372
Unemployed	2,032	447	316	2,795	60,324	596,187
Unemployment Rate	9.1%	8.1%	5.5%	8.3%	7.3%	6.1%
<b>Industry</b>						
<b>Share of Total Employment</b>						
Agriculture, Forestry, Fishing, and Mining	20.7%	21.0%	25.0%	21.5%	4.0%	2.7%
Construction	6.3%	5.1%	7.3%	6.2%	7.9%	8.1%
Manufacturing	3.5%	8.6%	5.3%	4.7%	6.5%	11.8%
Trade (wholesale and retail)	15.2%	13.9%	14.5%	14.8%	14.9%	15.9%
Transportation and Utilities	6.7%	4.1%	7.4%	6.4%	4.7%	5.8%
Information	1.1%	1.8%	1.3%	1.3%	2.4%	3.1%
Finance, Insurance, and Real Estate	3.2%	3.5%	3.7%	3.3%	5.5%	6.8%
Professional, Scientific, Management, Administration, and Waste Management	4.5%	4.6%	1.5%	4.0%	9.4%	9.5%
Educational, Health, and Social Services	20.6%	24.6%	20.2%	21.2%	21.7%	19.3%

<b>Subject</b>	<b>Lea County, New Mexico</b>	<b>Andrews County, Texas</b>	<b>Gaines County, Texas</b>	<b>Region of Influence</b>	<b>New Mexico Total</b>	<b>Texas Total</b>
Arts, Entertainment, Recreation, etc.	6.6%	5.2%	4.7%	6.0%	9.8%	7.3%
Other Services	6.6%	4.5%	6.6%	6.3%	5.1%	5.2%
Public Administration	5.1%	3.2%	2.7%	4.4%	8.0%	4.5%
<b>Income</b>						
Median Household Income (\$)	29,799	34,036	30,432	30,572	34,133	39,927
Per Capita Income (\$)	14,184	15,916	13,088	14,264	17,261	19,617

Sources: USCB, 2002a; USCB, 2002b.

### 3.10.3 Community Services, Infrastructure, and Finances

There are four schools located within an 8-kilometer (5-mile) radius of the proposed NEF site. These include an elementary school, a middle school, a high school, and a private K-12 school. The school system in Hobbs, New Mexico, includes a special education facility, 12 elementary schools, 3 junior high schools, and a high school that serves grades 10 through 12. There are also two private schools, a community vocational college (New Mexico Junior College), and a four-year college (College of the Southwest). The closest schools in Texas are located about 50 kilometers (32 miles) away from the proposed site.

The nearest hospital to the site is the Lea Regional Medical Center. It is located about 32 kilometers (20 miles) north of the proposed NEF site in Hobbs. It has 250 beds and handles both acute and stable chronic-care patients. Nursing or retirement homes are also located in Hobbs. The next closest hospital, Nor-Lea Hospital, is located in Lovington, about 64 kilometers (39 miles) north-northwest of the proposed NEF. It is a full-service hospital with 27 beds. The Eunice Medical Clinic is the closest medical clinic to the proposed NEF.

Public safety within the vicinity of the site includes fire support provided by the Eunice Fire and Rescue Service (with a full-time Fire Chief and 34 volunteers) and the Eunice Police Department (with 5 full-time officers). Mutual-aid agreements also exist with all of the county fire and police departments. If additional fire or police services are required, nearby counties can provide additional response services. In particular, members of the proposed NEF Emergency Response Organization can provide information and assistance in instances where radioactive/hazardous materials are involved. Table 3-16 describes the available fire and rescue equipment.

The main highway in the county is U.S. Highway 62-180, which runs east-west through Hobbs. It is designated as a primary feeder to the interstate highway system. The community of Eunice lies near the junction of New Mexico Highways 207 and 234. New Mexico Highways 234 (east-west) and 18 (north-south) are the major transportation routes near the proposed NEF site and intersect about 6.4 kilometers (4 miles) west. The nearest residences are located along the west side of New Mexico Highway 18, just south of its intersection with New Mexico Highway 234.

An active railroad line operated by the Texas-New Mexico Railroad runs parallel to New Mexico Highway 18 and is located just east of Eunice. There is also an active private railroad spur line that runs from the Texas-New Mexico Railroad along the north boundary of the proposed NEF site and terminates

at the WCS facility just across the New Mexico-Texas border. Section 3.13.2 of this Chapter provides additional information on this railroad.

The nearest airport is about 24 kilometers (15 miles) west from the site. It is maintained by Lea County and is used primarily by privately owned planes. The airport has two runways that are 1,000 meters (3,280 feet) and 780 meters (2,550 feet) in length. There is neither a control tower nor commercial air carrier flights at this airport. Lea County Regional Airport is the nearest commercial carrier airport located 40 kilometers (25 miles) north in Hobbs, New Mexico (LES, 2005a). Section 3.13.3 of this Chapter provides additional information on the airports within the region of influence.

**Table 3-16 Eunice Fire and Rescue Equipment in the Vicinity of the Proposed NEF Site**

Type of Equipment	Quantity	Description
Ambulance	3	None
Pumper Fire Trucks	3	340 m <sup>3</sup> /hr (1,500 gpm) pump; 3,785 L (1,000 gal) water capacity 227 m <sup>3</sup> /hr (1,000 gpm) pump; 1,893 L (500 gal) water capacity 284 m <sup>3</sup> /hr (1,250 gpm) pump; 2,839 L (750 gal) water capacity
Water Truck	1	114 m <sup>3</sup> /hr (500 gpm) pump; 22,700 L (6,000 gal) water capacity
Grass Fire Truck	3	68 m <sup>3</sup> /hr (300 gpm) pump; 3,785 L (1,000 gal) water capacity 34 m <sup>3</sup> /hr (150 gpm) pump; 1,136 L (300 gal) water capacity 34 m <sup>3</sup> /hr (150 gpm) pump; 946 L (250 gal) water capacity
Rescue Truck	1	45 m <sup>3</sup> /hr (200 gpm) pump; 379 L (100 gal) water capacity

m<sup>3</sup>/hr - cubic meters per hour.

gpm - gallons per minutes.

L - liters; gal - gallons.

Source: LES, 2005a.

### 3.10.4 Utilities

#### 3.10.4.1 Electric Power Services

Southwestern Public Service Company, now operating as Xcel Energy, provides electricity to the area surrounding the proposed NEF (EDCLC, 2004). The electrical power for the proposed NEF would be derived by means of two synchronized 115-kilovolt overhead transmission lines from a substation east of the site. The Xcel Energy service territory encompasses about 134,700 square kilometers (52,000 square miles). Large commercial and industrial users are provided service under contract. There is a demand charge of \$1,654 for the first 200 kilowatts that increases by \$7.76 for each additional kilowatt. Energy rates are \$0.02505 per kilowatt-hour for the first 230 kilowatt-hour per month-kilowatt or the first 120,000 kilowatts. Energy rates decline slightly for additional usage. Power-factor adjustments may apply to large users, and fuel-cost adjustments may be imposed on all customers.

#### 3.10.4.2 Natural Gas Services

The Public Service Company of New Mexico provides natural gas services to the Eunice area (EDCLC, 2004). As with electricity service, natural gas is relatively inexpensive. The average cost of gas is about \$2.51 per thousand cubic feet for all customer classes and is significantly below national averages.

#### **3.10.4.3 Domestic Water Supply**

Lea County municipal water comes from wells that tap the Ogallala Aquifer (EDCLC, 2004). In Eunice, water is pumped from a well field located near Hobbs and transported south in two parallel cross-country mains (LCWUA, 2003). The pumping depth is about 15 meters (50 feet). The water quality is good, and disinfection is the only treatment performed prior to delivery. Currently, Eunice is pumping about 2.04 million cubic meters (1654 acre-feet) annually with a difference between base winter demand and summer peak demand of nearly 240 percent (EDCLC, 2004).

#### **3.10.4.4 Waste Disposal**

In Eunice and Hobbs, solid-waste-disposal pickup is contracted to Waste Management, Inc. Pickups are offered once or twice a week. Solid wastes are disposed of in the Lea County Landfill located about 8 kilometers (5 miles) east of Eunice just across from the proposed NEF site. The landfill accepts all types of residential, commercial, special wastes, and sludges (EDCLC, 2004).

#### **3.10.5 Tax Structure and Distribution**

Property taxes in New Mexico are among the lowest in the United States. Four governmental entities within New Mexico are authorized to tax—the State, counties, municipalities, and school districts. Property assessment rates are 33-1/3 percent of value. The tax applied is a composite of State, county, municipal, and school district levies. The Lea County tax rate for nonresidential property outside the city limits of Eunice is \$18.126 per \$1,000 of net taxable value of a property. Rates for nonresidential property are slightly higher within the city limits of Eunice. Residential property tax rates are somewhat lower for properties within and outside Eunice. For Hobbs, tax rates are somewhat higher.

New Mexico also imposes a gross receipts tax on producers and businesses. This tax is mostly passed onto the consumer. The State gross receipts tax rate is 5.00 percent, and local communities may also impose an additional 1.9375 percent.

In Texas, property taxes are based on the most current year's market value. Andrews County, Texas, has a county property tax rate (per \$100 assessed value) of \$0.539 per \$100 assessment, a school district tax of \$1.717 per \$100 assessed value, and a municipal rate for the city of Andrews of \$0.305 per \$100 assessed value. The county tax rate for Gaines is \$0.381, with municipal and school district rates for Seminole of \$0.60 and \$0.98, respectively. There is also a State sales tax of 6.25 percent and municipal sales tax of 1 percent.

### **3.11 Environmental Justice**

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 FR 7629), directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. In December 1997, the Council on Environmental Quality released its guidance on environmental justice under NEPA (CEQ, 1997). Although an independent organization, NRC has committed to undertake environmental justice reviews.

The NRC Nuclear Material Safety and Safeguards (NMSS) environmental justice guidance is found in Appendix C to NUREG-1748 (NRC, 2003b).

This environmental justice review analyzes whether the proposed NEF has the potential for an environmental justice concern for low-income and minority populations resulting from the proposed action and its alternatives. The NRC staff analyzed demographic data to identify the minority and low-income groups within the area of environmental study. Next, the impacts from the proposed action and its alternatives were evaluated to determine if the impacts disproportionately affected minority and low-income groups in an adverse manner.

For the purpose of this procedure, minority is defined as individual(s) who are members of the following population groups: American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; African American (not of Hispanic or Latino origin); some other race; and Hispanic or Latino (of any race). In the States of New Mexico and Texas, it is likely that “some other race” mainly includes individuals who identified themselves on the 2000 Census in a Latino or Hispanic group under “race”(e.g., Mexican or Puerto Rican), even though Hispanic/Latino is not a Census racial category. The 2000 Census introduced the multiracial category. Anyone who identifies themselves as white and a minority is counted as that minority group. In the small number of cases where individuals identify themselves as more than one minority, the analysis counts that individual in a “Two or More Races” group.

To determine if environmental justice will have to be considered in greater detail, the NRC staff compares the percentage of minority and low-income populations in Census block groups in the area for assessment to the State and county percentages. If the minority or low-income population percentage in a block group exceeds 50 percent or is significantly greater than the State or county percentage, environmental justice will have to be considered in greater detail. Generally (and where appropriate), the NRC staff may consider differences greater than 20 percentage points to be significant. When determining the area for impact assessment for a facility located outside the city limits or in a rural area, a 6.4-kilometer (4-mile) radius (or 130-square kilometer [50-square mile]) could be used. A larger area should be considered if the potential impact area is larger. The staff also supplements the demographic analysis with scoping to identify low-income and minority populations (NRC, 2003b).

In the current situation, the States of New Mexico and Texas have very high percentages of minority populations, and rural areas in the State tend to have sparsely-populated large block groups (a block group is a cluster of census blocks that are normally comprised of up to several hundred people). As a result of the nature of the proposed action being examined and the rural nature of the area, the area for impact assessment was expanded to an 80-kilometer (50-mile) radius and includes an assessment along transportation routes. It is important to note that the expanded radius does not dilute the environmental justice impact of the proposed NEF because no averaging of environmental effects takes place; instead, each minority community is evaluated on its own. The criteria for identifying minority and low-income communities are not diluted by the wider radius because the demographic and income characteristics of each block group are individually compared against the States of New Mexico and Texas and the relevant counties. Rather, it simply expands the geographic area where additional minority and low-income block groups can be (and were) identified.

Usually, under NRC guidance, a minority population with environmental justice potential would be one with a minority percentage of at least 50 percent or at least 20 percentage points greater than the State and relevant counties. However, the State of New Mexico has a high Statewide minority population. Table 3-17 shows the Hispanic/Latino population in New Mexico is 42.1 percent and the total minority population is 55.3 percent, while the corresponding national percentages are 12.5 percent and 30.9

percent. A similar situation occurs in Texas, with an Hispanic/Latino population of 32.0 percent and a total minority population of 47.6 percent. Therefore, in both States, a census block group within the impact assessment area with a Hispanic/Latino population of at least 50 percent or with a minority population of at least 50 percent ordinarily would count as a minority population worthy of further study.

In view of the resulting anomalously high standard for designating minority populations in New Mexico and to better meet the spirit of the NRC guidance to identify minority and low-income populations, the NRC staff included Census block groups with a percentage of Hispanics and Latinos at least as great as the Statewide average. This more inclusive definition adds two additional minority block groups in Lea County and four in Andrews County. Each block group was compared to the corresponding State and county percentages for each individual racial category and the Hispanic/Latino category and for the sum of all minority categories taken together (all racial minorities, plus white Hispanic/Latinos) using the percentage criteria. Although New Mexico and Texas are both within the top 10 States for percentage of low-income individuals (with percentages of 18.4 and 15.4 percent, respectively) for the 80-kilometer (50-mile) region surrounding the proposed NEF, the percentage of low-income persons in almost all of the block groups is within 20 percentage points of the national average of 12.4 percent. The usual “50 percent or 20 percent greater than” standard based on the Statewide percentage appears adequate to identify the concentrations of low-income population.

In some cases, minority and low-income groups may rely on environmental resources for their subsistence and to support unique cultural practices. Therefore, NRC guidance specifies that the NRC staff review special resource uses or dependencies of identified minority and low-income populations including cultural practices and customs, previous environmental impacts, and features of previous and current health and economic status of the identified groups. In some circumstances, these groups could be unusually vulnerable to impacts from the proposed action.

Potential resource dependencies were sought in the course of public meetings and other information supplied by the Hispanic/Latino and African American/Black communities in meetings with the NRC staff. Letters were also sent to local Federally recognized Indian tribes to determine any potential resource dependencies. These letters described the construction and operation of the proposed NEF, solicited their concerns on the project, and inquired about whether the Indian tribes desired to participate in the Section 106 consultation process (see Appendix B). The Kiowa Tribe of Oklahoma, Comanche Tribe of Oklahoma, and Ysleta del Sur Pueblo and Mescalero Apache Tribe have indicated that there are no historic properties in the area of potential effects that could have cultural or religious significance to them. Currently, very few Indians live in the area. The NRC staff examined data provided by the States of New Mexico and Texas concerning the health status of the minority and low-income populations in Lea and Eddy Counties in New Mexico and Andrews County in Texas. The results are described in section 4.2.9 of this EIS.

The NRC staff examined the geographic distribution of minority and low-income populations within 80 kilometers (50 miles) of the proposed NEF site (see Appendix G). This data was based on 2000 U.S. Census information and supplemented by field inquiries by the NRC staff to the local planning departments in Lea, Eddy, and Andrews counties and to social service agencies in the two States. In addition, public comments during the scoping process were reviewed to see if any additional environmental justice populations could be identified.

**Table 3-17 Percentage of Minority and Low-Income Census Block Groups Within 80 Kilometers (50 Miles) of the Proposed NEF Site**

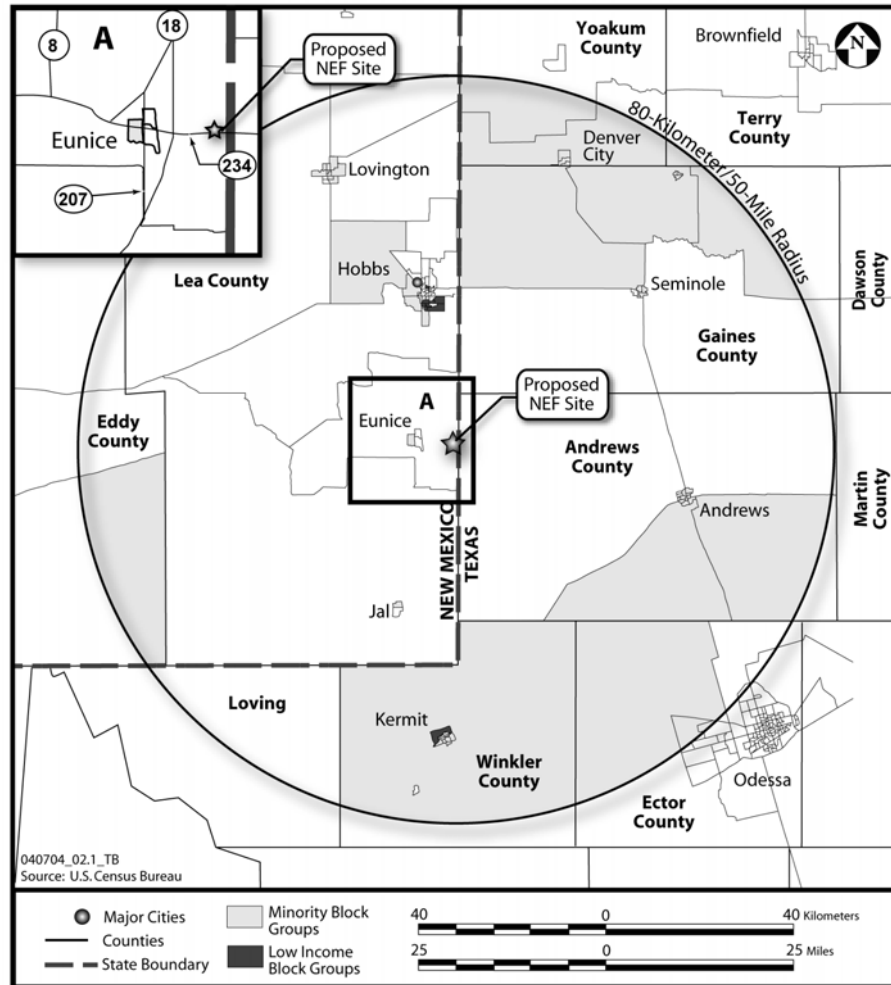
	Total Census Block Groups in County	Below Poverty Level	African American/ Black	Native American	Asian and Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (All Races)	Minorities (Racial Minorities plus White Hispanics)	Total Minority Block Groups
State of New Mexico (%)	--	18.4	2.1	10.2	1.4	19.0	0.6	42.1	55.3	--
Threshold for EJ Concerns (%)	--	38.4	22.1	30.2	21.4	39.0	20.6	50.0/42.1	50.0	--
<i>Number of Block Groups Meeting Environmental Justice Criteria</i>										
Eddy County	3	0	0	0	0	0	0	1	1	1
Lea County	63	8	1	0	0	15	0	28	29	31
New Mexico Counties	66	8	1	0	0	15	0	29	30	32
State of Texas (%)	--	15.4	11.7	0.9	3.0	13.0	0.4	32.0	47.6	--
Threshold for EJ Concerns (%)	--	35.4	31.7	20.9	23.0	33.0	20.4	50.0/32.0	50.0	--
Andrews County	15	0	0	0	0	1	0	11	6	11
Ector County	5	0	0	0	0	0	0	3	1	3
Gaines County	13	0	0	0	0	1	0	10	4	10
Loving County	1	0	0	0	0	0	0	0	0	0
Terry County	1	0	0	0	0	0	0	1	0	1
Winkler County	10	1	0	0	0	1	0	9	3	9
Yoakum County	6	0	0	0	0	1	0	6	2	6
Texas Counties	51	1	0	0	0	4	0	40	16	40
<b>Grand Total</b>	<b>117</b>	<b>9</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>0</b>	<b>69</b>	<b>46</b>	<b>72</b>

Sources: USCB, 2002a; USCB, 2002b.



### 3.11.1 Minority Populations

The significant minority populations near the proposed NEF are Hispanics/Latinos. Lea County had a 2000 Census population of 22,010 persons of Hispanic/Latino ethnicity out of a total resident population of 55,511 (39.6 percent). Figure 3-31 illustrates the minority population census block groups within 80 kilometers (50 miles) of the proposed NEF and shows the locations of the block groups that meet the minority criteria. Table 3-17 shows the number of minority populations and low-income census block groups within 80 kilometers (50 miles) that satisfy each criterion used for this analysis. Taken together, the criteria resulted in 72 minority block groups out of 117 total block groups within 80 kilometers (50 miles) of the proposed NEF. Of these, 69 were identified using the total minority criterion, and an additional 3 were identified from 1 of the individual minority categories. Many of the minority block groups satisfied one or more individual minority group criteria in addition to the total minority criterion.



**Figure 3-31 Geographic Distribution of Minority and Low-Income Census Block Groups within an 80-Kilometer (50-Mile) Radius of the Proposed NEF Site (USCB, 2003)**

The minority and low-income percentages for each census block group within 80 kilometers (50 miles) of the proposed NEF are tabulated in Appendix G. In the table, the census block groups exceeding the 50 percent/20-percent-age-point criterion are in boldface, while additional block groups with Hispanic/Latino populations at least as great as the Statewide percentage are shown in italics.

It should be noted that for this analysis, the State was used as the area of geographic comparison. That is, the minority and low-income populations were based on a comparison to the State averages. Using county averages instead made no difference in the minority and low-income block groups identified. There is a small African American/Black population in Lea County. One block group in Lea County has an elevated African American/Black population, but would have qualified as a minority block group because it has a Hispanic/Latino majority.

Hispanics/Latinos are Lea County's principal minority group with 22,010 individuals. There is a significant Hispanic community in all towns in the county. Also, there are concentrations of Hispanics in all seven Texas counties within 80 kilometers (50 miles) of the proposed NEF site. There are Hispanic/Latino block groups along all of the principal commuting and construction access routes to the proposed NEF site. The African-American/Black community on the south side of Hobbs, New Mexico also lies close to one of these routes. No other significant minority populations were identified in any census block group either close to the proposed NEF site or along the proposed transportation corridors into the site.

In summary, 72 census block groups within 80 kilometers (50 miles) of the proposed NEF site were identified as satisfying the criteria used in this analysis to consider environmental justice in greater detail based on their minority population. The minority population nearest to the proposed NEF site is the Hispanic/Latino population living on the west side of Eunice, New Mexico approximately 8 kilometers (5 miles) from the proposed NEF. Minority block groups also are located along the likeliest commuting and construction access routes. The staff supplemented the demographic analysis with scoping to identify minority populations.

The NRC scoping meeting was held at the Community Center in Eunice, New Mexico on March 4, 2004. The notice of the scoping meeting was published in local and regional newspapers. The fact sheet, meeting slides, agenda and meeting flyers were printed in Spanish. Spanish-language invitations were given to local government leaders and to the Hispanic Awareness Council for further distribution. In addition, the NRC staff held a meeting with persons considered knowledgeable about the concerns of the Hispanic Community in Lea County. This meeting took place on the morning of March 4, 2004, in Hobbs, New Mexico. Seven persons attended the meeting and all of them were from Hobbs, New Mexico, although they have broader contacts in the county. In the afternoon, the NRC staff met with two individuals, both from Hobbs, who were acquainted with issues in the African-American community. The issues raised by the members of the minority communities at these meetings have been addressed in the EIS.

### **3.11.2 Low-Income Populations**

Figure 3-31 also shows the location of low-income populations for the environmental study area out to 80 kilometers (50 miles) from the proposed NEF site. Table 3-17 shows that a total of 9 block groups exceed the 20-percentage-point criterion. However, many other block groups in the area also have relatively high percentages of people living below the poverty line. Appendix G shows detailed information on individual block groups within 80 kilometers (50 miles) that satisfy the criteria used for this analysis. The nearest block groups meeting the NRC low-income criteria are on the south side of Hobbs. About 19,000 (20 percent) of the 96,300 people estimated to be living within 80 kilometers (50 miles) of the proposed site are low income. The main low-income areas within 80 kilometers (50 miles) of the proposed NEF are located, as shown in Figure 3-31, within a mile or two of the principal commuting and construction access routes.

### **3.11.3 Resource Dependencies and Vulnerabilities of the Minority/Low-Income Population**

While people in the area of the proposed NEF site do depend on groundwater supplied from personal wells or public water utilities, inquiries to the minority and low-income community did not show any exceptional or disproportionate dependence on natural resources that might be affected by the proposed NEF.

Information from the New Mexico and Texas State Departments of Health was examined to see whether there were any exceptional patterns of diminished health status among residents of the area surrounding the proposed NEF site. In particular, this search was seeking any exceptional vulnerabilities among minority and low-income residents of the area. Tables 3-18 and 3-19, which summarize this information, show local populations that have lower cancer incidence than the Statewide averages and higher local crude (total, not age-adjusted) death rates from four other major groups of diseases (possibly due to differences in the age structure of the population in Lea and Andrews counties) (NMDH, 2003a; TDH, 2004; TDH, 2003). No unusual incidence of disease in the minority and low-income population was found in either county. Statewide data on crude death rates for both States do not show any unusual health vulnerabilities among minority populations (separate data on low-income residents were not available). Low crude death rates for Hispanics/Latinos in Texas appear to be the result of an exceptionally young Hispanics/Latino population in that State because age-specific death rates are more in line with those of the majority population (NMDH, 2003b; TDH, 2003).

**Table 3-18 Selected Health Statistics for Counties Near the Proposed NEF Site**

	Lea County	New Mexico	Andrews County	Texas
<i>Cancer Incidence (Rate per 100,000 population)</i>				
Male	456.5	468.7	496.4	537.9
Female	318.3	353.8	333.8	384.3
<i>Age-Adjusted Cancer Deaths (Rate per 100,000 population)</i>				
Male	251.9	210.8	238.0	260.8
Female	167.9	146.2	135.1	164.3
<i>Leading Causes of Death 1996-2000 (Rate per 100,000 population)</i>				
Diseases of Heart	231.2	184.6	286.4	218.8
Malignant Neoplasms	179.7	161.4	281.4	165.3
Cerebrovascular Diseases	61.1	46.4	72.6	51.8
Chronic Lower Respiratory Diseases	50.1	45.4	54.4	35.0

Sources: NMDH, 2003a; NMDH, 2004; TDH, 2004; TDH, 2003.

Interviews with members of the minority community during the scoping process did not turn up any additional minority or low-income populations not identified by the mapping shown in Figure 3-31. Although there were no specific environmental health concerns among minority and low-income populations mentioned in these interviews, two types of pre-existing health conditions were mentioned. One was a high rate of heart disease among African Americans/Blacks in Lea County, which was believed to be diet-related. The other was a high national rate of diabetes incidence among Hispanics that could also be true of the Lea County area although this could not be documented. The Statewide statistics for New Mexico and Texas shown in Table 3-19 tend to confirm possible high diabetes incidence with elevated rates of death from diabetes in New Mexico and Texas among minority populations. Heart disease death rates in Table 3-18 are higher locally in Lea and Andrews counties than Statewide in New Mexico and Texas although Statewide death rates among minority populations in Table 3-19 are lower than among non-Hispanic whites.

It was not possible to obtain comparative death rates or disease incidence rates for local ethnic groups. There were no other potential vulnerabilities identified for minority and low-income populations other than their geographic proximity to the proposed NEF site and potential transportation routes. The proximity of these populations means that there is a potential for environmental justice concerns. Section 4.2.9 evaluates the potential impact of construction and operation of the proposed NEF to determine whether there are likely to be any disproportionately high and adverse effects on the minority and low-income populations in the area.

**Table 3-19 Incidence of Selected Causes of Death Among New Mexico and Texas Populations**

	Annual Death Rates			
	White Non-Hispanics	White Hispanics	Native Americans	African American / Black
<b>New Mexico</b>	<b>(No. Per 1,000, 1998-2002)</b>			
Infant Mortality, All Causes	6.4	6.8	7.5	11.1
.....				
	<b>(No. Per 100,000, 1998-2000)</b>			
Diabetes Death	20.5	45.1	83.9	N/A
Influenza/ Pneumonia Death	20.0	21.6	41.7	N/A
Cancer Death	184.8	174.1	138.5	N/A
Heart Disease Death	221.6	194.4	185.6	N/A
.....				
<b>Texas</b>	<b>(No. Per 1,000, 1998-2000)</b>			
Infant Mortality All Causes	5.4	6.2	NA	11.3
.....				
	<b>(No. Per 100,000, 1998-2000)</b>			
Diabetes Death	22.9	25.4	NA	34.5
Influenza/ Pneumonia Death	27.0	9.1	NA	17.0
Cancer Death	207.6	73.8	NA	180.5
Heart Disease Death	275.3	93.1	NA	233.4

Sources: NMDH, 2003b; TDH, 2003.

### 3.12 Noise

The proposed NEF site is located in an unpopulated area of southeastern New Mexico that is used primarily for intermittent cattle grazing. The nearest commercial noise receptors are five businesses located between a 0.8-kilometer (0.5-mile) and 2.6-kilometer (1.6-mile) radius of the proposed site. These five businesses are WCS, located due east of the site over the Texas border; Lea County Landfill, located to the southeast; Sundance Services, Inc., and Wallach Concrete, Inc., located to the north; and DD Landfarm, located just west of the site. The nearest residential noise receptors are homes located approximately 4.3 kilometers (2.6 miles) to the west near the city of Eunice, New Mexico.

LES conducted a background noise-level survey at the four corners of the site boundary on September 16-18, 2003 (LES, 2005a). The measured background noise levels at the site boundaries, which ranged

between 40.1 and 50.4 decibels A-weighted, represent the nearest receptor locations for the general public. These locations are anticipated to receive the highest noise levels during construction and when the plant is operational. Noise intensity can be affected by many factors including weather conditions, foliage density, temperature, and land contours.

There are no city, county, or New Mexico State ordinances and regulations governing noise. There are no affected Indian tribes within the sensitive receptor distances from the site; therefore, the proposed NEF site is not subject to Federal, State, tribal, or local noise regulations. The U.S. Department of Housing and Urban Development (HUD) and the EPA have standards for community noise levels. HUD has developed land use compatibility guidelines (HUD, 2002) for acceptable noise versus the specific land use. Table 3-20 shows these guidelines. The EPA has defined a goal of 55 decibels A-weighted for day-night sound level in outdoor spaces (EPA, 2002). The background noise levels measured for the proposed NEF site are below both criteria for a daytime period.

**Table 3-20 HUD Land Use Compatibility Guidelines for Noise**

Land Use Category	Sound Pressure Level (dBA L <sub>dn</sub> )			
	Clearly Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	<60	60-65	65-75	>75
Livestock Farming	<60	60-75	75-80	>80
Office Buildings	<65	65-75	75-80	>80
Wholesale, Industrial, Manufacturing & Utilities	<70	70-80	80-85	>85

dBa = decibels A-weighted.  
L<sub>dn</sub> = day-night sound level.  
Source: HUD, 2002.

### 3.13 Transportation

#### 3.13.1 Local Roads and Highways

Figure 3-1 shows transportation routes near the proposed NEF site. An onsite, gravel-surfaced road bisects the site in an east-west direction. New Mexico Highway 234 is located along the south side of the site and provides direct access to the site. New Mexico Highway 234 is a two-lane highway with 3.7-meter (12-foot) driving lanes, 2.4-meter (8-foot) shoulders, and a 61-meter (200-foot) right-of-way easement on either side. According to the New Mexico Department of Transportation, there are no plans to upgrade New Mexico Highway 234. New Mexico Highway 234 requires maintenance on the road and shoulders, but it is not known when this would occur (NMDOT, 2005).

To the north of the site, U.S. Highway 62/180 intersects New Mexico Highway 18 and provides access from the city of Hobbs to New Mexico Highway 234. New Mexico Highway 18 is a four-lane divided highway that was rehabilitated within the last four to six years. To the east of the proposed site, U.S. Highway 385 intersects Texas Highway 176 and provides access from the town of Andrews, Texas, to New Mexico Highway 234. To the south of the proposed site and in the State of Texas, Interstate 20 intersects Texas Highway 18 in Texas, which becomes New Mexico Highway 18 when it enters the State

of New Mexico. To the west, New Mexico Highway 8 provides access from the city of Eunice east to New Mexico Highway 234. Table 3-21 lists current traffic volume for the road systems in the vicinity of the proposed NEF site.

The State of New Mexico and the State of Texas have indicated that there are no known restrictions on the types of materials that may be transported along the important transportation corridors (NMDOT, 2004a; TDOT, 2004).

**Table 3-21 Current Traffic Volume for the Road Systems  
In the Vicinity of the Proposed NEF Site**

<b>Road Name</b>	<b>Traffic Volume Per Day</b>
New Mexico Highway 234 (between New Mexico Highway 18 and Texas border)	1,823
New Mexico Highway 18 (South of New Mexico Highway 234)	5,446
New Mexico Highway 18 (North of New Mexico Highway 207)	5,531
New Mexico Highway 18 (between New Mexico Highway 234 and New Mexico Highway 207)	5,446
Texas Highway 176 (near New Mexico/Texas border)	1,750

Source: NMDOT, 2004b.

### **3.13.2 Railroads**

The Texas-New Mexico Railroad operates an active rail transportation line in Eunice, New Mexico, approximately 5.8 kilometers (3.6 miles) west of the proposed site. The rail line is predominately used for freight transport by the local oil and gas industry. Trains travel on this rail line at an average rate of one train per day. An active rail spur is located along the northern property line of the proposed site. The rail spur is owned by WCS, owner of the neighboring property to the east. Trains travel on this rail spur at an average rate of one train per week. The trains that travel on the spur typically consist of five to six cars. The rail spur has a speed limit of 16 kilometers (10 miles) per hour.

### **3.13.3 Other Transportation**

The nearest commercial airport is the Lea County Regional Airport, located 40 kilometers (25 miles) northwest of the proposed NEF site near Hobbs, New Mexico. The nearest airport is located approximately 24 kilometers (15 miles) west of the site near Eunice. The airport is used by privately owned planes and has no control tower. The airport has two runways that are 1,000 meters (3,280 feet) and 780 meters (2,550 feet) in length. Four additional local airports are located within Lea County and adjacent Texas counties:

- Lea County/Jal Airport is located approximately 40 kilometers (25 miles) south-southwest of the proposed NEF.
- Andrews County Airport is located approximately 48 kilometers (30 miles) east of the proposed NEF.

- Gaines County Airport is located approximately 48 kilometers (30 miles) northeast of the proposed NEF.
- Seminole Spraying Services (a private airport) is located approximately 48 kilometers (30 miles) northeast of the proposed NEF.

Two major international airports are located within approximately 161 kilometers (100 miles) of the proposed NEF site. The nearest is the Midland International Airport (also known as the Midland/Odessa Airport). This four-runway airport is located in Texas about 103 kilometers (64 miles) southeast of the proposed site and is owned and operated by the city of Midland. The Midland/Odessa Airport is designated Foreign Trade Zone #165 (a Foreign-Trade Zone is a Federal program that designates an area within the United States that is considered outside of the U.S. Customs territory where certain types of merchandise can be imported without going through formal Customs entry procedures or paying import duties [FTZ, 2004]). The Grantee is the city of Midland (MIA, 2004). Lubbock International Airport, located along Interstate 27 in Texas (approximately 160 kilometers [100 miles] northeast of Eunice), can also serve the site. The Lubbock International Airport is a 3-runway airport and runs about 60 inbound and outbound flights daily (LIA, 2004).

### **3.14 Public and Occupational Health**

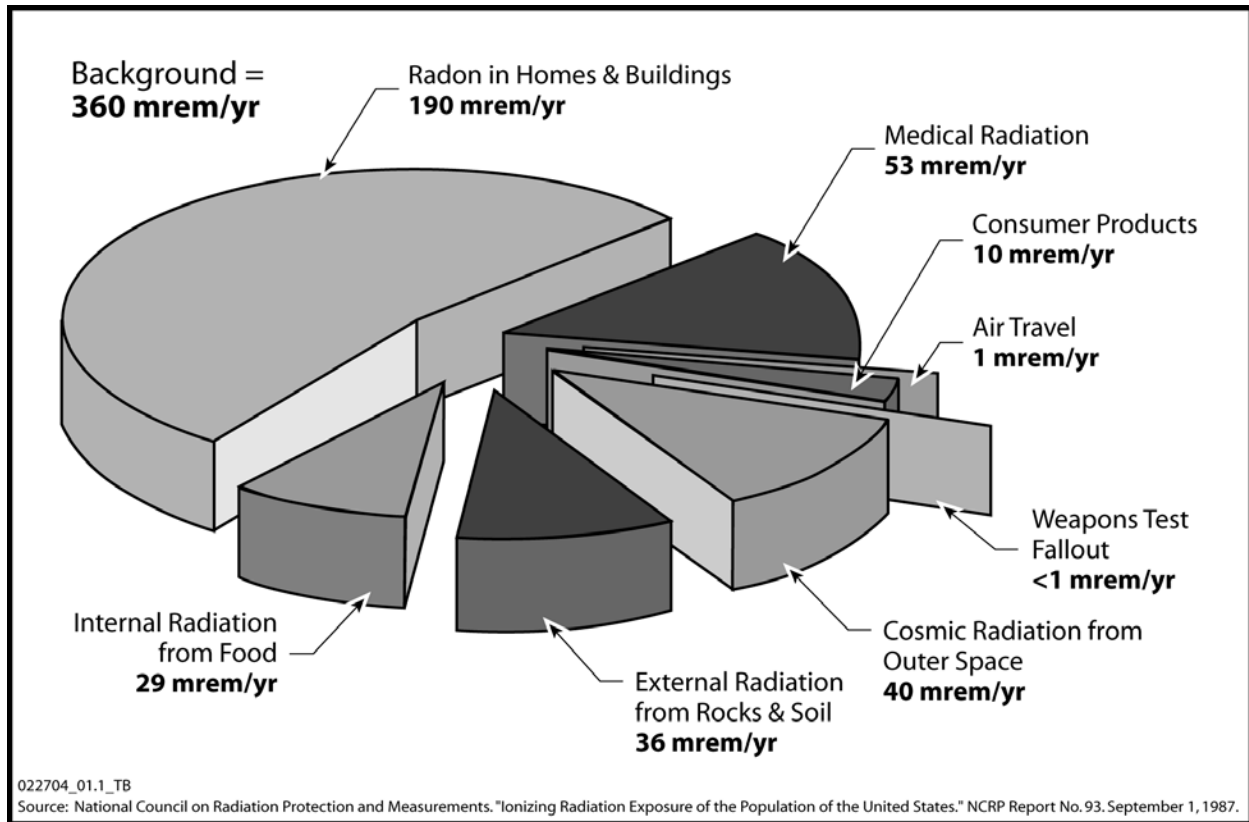
This section describes the naturally occurring sources of radiation and chemicals and the levels of exposure that may be found at the proposed NEF site.

#### **3.14.1 Background Radiological Exposure**

Humans are exposed to ionizing radiation from many sources in the environment. Radioactivity from naturally occurring elements in the environment is present in soil, rocks, and in living organisms. A major proportion of natural background radiation comes from naturally occurring airborne sources such as radon. These natural radiation sources contribute approximately 3 millisieverts (300 millirem) per year to the radiation dose that everyone receives annually.

Manmade sources also contribute to the average amount of dose a member of the U.S. population receives. These sources include x rays for medical purposes (0.53 millisieverts [53 millirem] per year) and consumer products (0.1 millisieverts [10 mrem] per year) (e.g., smoke detectors). A person living in the United States receives an average dose of about 3.6 millisieverts (360 mrem) per year (NCRP, 1987). Figure 3-32 depicts the major sources and levels of background radiation in the United States that are expected to reflect the conditions near the proposed NEF.

The U.S. Department of Energy (DOE) established radiological monitoring programs in southeastern New Mexico prior to the Waste Isolation Pilot Plant project to determine the widespread impacts of nuclear testing at the Nevada Test Site on the background radiation. DOE estimated the annual dose of approximately 0.65 millisieverts (65 millirem) is received from atmospheric particulate matter, ambient radiation, soil, surface water and sediment, groundwater, and biota (DOE, 1997). These values fall within expected ranges and do not indicate any unexpected environmental concentrations. Lea County lies in an area that is characterized by radon concentrations of 2 to 4 picocuries per liter and is defined as of moderate radon potential (EPA, 2004b). In May 2004, direct background radiation was measured to be 8 to 10 microrad per hour (LES, 2005a), which corresponds to 0.70 to 0.88 millisieverts (70 to 88 mrem) per year. The measured range falls within the average annual direct background radiation for the United States shown in Figure 3-32.



**Figure 3-32 Major Sources and Levels of Background Radiation Exposure Expected in the Proposed NEF Vicinity Based on National Data (NCRP, 1987)**

### 3.14.2 Background Chemical Characteristics

Eight soil samples taken at the proposed NEF site indicated only barium, chromium, and lead were detected above laboratory reporting limits. The concentrations of these elements in the soil were 23, 3.6, and 2.7 milligrams per kilogram, respectively (LES, 2005a). These concentrations are below health limits (NMEDHWB, 2004). Other nonradiological parameters were below the laboratory reporting limits.

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## 4 ENVIRONMENTAL IMPACTS

### 4.1 Introduction

This chapter presents the potential impacts associated with the construction, operation, and decommissioning of the proposed National Enrichment Facility (NEF). For the proposed action, this Environmental Impact Statement (EIS) considers impacts from site preparation and construction activities, normal operations, credible accidents, and cumulative impacts and resource commitments. The chapter is organized by environmentally affected areas (i.e., air, water, noise, public and occupational health, etc.). Impacts to each environmentally affected area are divided into two categories—site preparation/construction, and operation—except in those areas where the impacts occur over the entire proposed action and cannot be divided.

Section 4.2 discusses the proposed action under consideration in this EIS—namely, the site preparation, construction, and operations of the proposed NEF in Lea County, New Mexico. The decontamination and decommissioning impacts discussed in section 4.3 would only be preliminary, or estimated, for the proposed NEF. Detailed impacts from decontamination and decommissioning would be assessed at the end of the proposed NEF's operations and prior to U.S. Nuclear Regulatory Commission (NRC) approval to begin such activities. Under Title 10, “Energy,” of the *U.S. Code of Federal Regulations* (10 CFR) § 70.38, the NRC requires that LES file an application for decommissioning of the proposed NEF 12 months prior to the expiration of the license. This application would include a detailed Decommissioning Plan that would take into account the extent of radiological contamination at the site. Moreover, because decontamination and decommissioning would take place well in the future, advanced technology improving the decontamination and decommissioning process would be available.

In addition, this chapter discusses the potential cumulative impacts (section 4.4), irreversible and irretrievable commitment of resources (section 4.5), unavoidable adverse environmental impacts (section 4.6), the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity (section 4.7), and the no-action alternative (section 4.8).

Environmental impacts are separated into radiological and nonradiological areas of concern. Radiological impacts include radiation doses to the public and workers from the routine operations, transportation, potential accidents, and decommissioning and environmental impacts from potential releases in the air, soil, or water. Nonradiological impacts include chemical hazards, emissions (e.g., vehicle fumes), occupational accidents and injuries (e.g., vehicle collisions), and workplace accidents.

#### ***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.*

*Source: NRC, 2003a.*

## **4.2 Proposed Action**

As defined in Chapter 2 of this EIS, the proposed action is the construction, operation, and decontamination and decommissioning of the proposed NEF. The NRC would issue a license to Louisiana Energy Services (LES) in accordance with the requirements of 10 CFR Parts 30, 40, and 70 to possess and use source, byproduct, and special nuclear material. This section discusses impacts of construction and operation, while section 4.3 discusses decontamination and decommissioning impacts.

### **4.2.1 Land Use Impacts**

Impacts on land use are considered in terms of commitment of the land for the proposed use and its potential exclusion from other possible uses.

The State of New Mexico and Lea County have completed a land exchange that transfers ownership of the proposed site to Lea County. On December 8, 2004, LES began a 30-year lease of the proposed 220-hectares (543-acre) site from Lea County. If the proposed NEF is licensed, LES would purchase the land at the end of the lease. The transfer of the land would not conflict with any existing Federal, State, local, or Indian tribe land-use plans. Rather, the construction and operation of the proposed NEF would support a preferred land-use plan being pursued by the city of Eunice, New Mexico. The proposed NEF construction and operation would have no foreseeable conflicts with the Land and Water Conservation Fund and the Urban Park and Recreation Recovery programs in the area (NMEMN, 2004; Abousleman, 2004a). Following decontamination and decommissioning activities, long-term stewardship would be the responsibility of LES (or other entity if LES sells the property) after meeting the NRC's license termination requirements for protection of public health and safety.

#### **4.2.1.1 Site Preparation and Construction**

The most obvious land-use impact would be onsite disturbance during project construction and operation. Potential land-use impacts would be limited to about 81 hectares (200 acres) within a 220-hectare (543-acre) site. The remaining property (139 hectares or 343 acres) is expected to be left in a natural state for the duration of the license. The impacts resulting from restricting the current land use (i.e., cattle grazing) would be SMALL due to the abundance of other nearby grazing land.

The relocation of the carbon dioxide (CO<sub>2</sub>) pipeline would result in temporary disruption of CO<sub>2</sub> supplies to recipients. Because there would be no change in capacity once the relocation along the site boundaries is completed, the resultant impact would be SMALL and confined to the relocation period. The relocation activities would comply with all applicable regulations and best management practices (BMPs) to minimize any direct or indirect environmental impacts.

Installation of the necessary municipal water-supply piping, natural gas supply piping, and electrical transmission lines would also result in temporary land-use impacts (principally from the disruption of access to property along county right-of-way easements where these infrastructure projects would occur). As with the relocation of the CO<sub>2</sub> pipeline, these impacts would be SMALL and temporary. The electrical transmission lines would also be installed according to applicable regulations and BMPs within the proposed NEF site.

#### **4.2.1.2 Operations**

Operation of the proposed NEF would limit land use to those processes related to uranium enrichment. The operation of the proposed NEF would be consistent with the existing land use of the neighboring industrial facilities. Therefore, the impacts to the surrounding land use would be SMALL.

### 4.2.1.3 Mitigation Measures

Several BMPs would help minimize impacts to surrounding land use by limiting the impacts to within the proposed NEF boundaries. Construction BMPs would be used to mitigate potential short-term increases in soil erosion due to construction activities in addition to specific BMPs for relocating the CO<sub>2</sub> pipeline. A Spill Prevention Control and Countermeasures Plan would be implemented to address any potential spills that could occur within the proposed NEF site. A waste management program would be used to minimize solid waste and hazardous materials that could contaminate the surrounding soils.

### 4.2.2 Historical and Cultural Resources Impacts

This section discusses the potential impacts to the known historical and cultural resources on the proposed NEF site.

The *National Historic Preservation Act* (NHPA) as amended requires Federal agencies to take into account the potential effects of their undertakings on historic properties. Under Section 106 of the NHPA, two undertakings could create potential adverse effects to historic properties at the proposed NEF site—a Federal agency (i.e., NRC) licensing action and a State of New Mexico land-exchange process. As discussed below, impacts from both undertakings would be combined and evaluated under a single consultation process.

As indicated in section 3.1 of Chapter 3 of this EIS, a land-exchange transferred ownership of the property from the State of New Mexico to Lea County. On December 8, 2004, LES began a 30-year lease of the property from Lea County after which, if the proposed NEF is licensed, LES would purchase the land. The New Mexico State Historic Preservation Office and New Mexico State Land Office consider this land-exchange process to be an adverse effect on historic properties (NMDCA, 2004).

The cultural resources inventory (Graves, 2004) indicated the presence of seven prehistoric archaeological sites recorded in the 220-hectare (543-acre) proposed NEF site. Two (LA 149701 and LA 140702) are located in the northeast sector of the proposed facility layout and would be directly impacted during construction activities. A third (LA 140705) is situated along the proposed access road. The remaining archaeological sites are located north and northwest of the facility layout, along the northern boundary of the property.

Three sites (LA 140701, LA 140702, and LA 140703) were originally recommended by the field investigators as not retaining sufficient integrity or research value for eligibility for listing on the National Register of Historic Places. The remaining four archaeological sites, LA 140404 through LA 140707, were recommended as being either potentially eligible or eligible for listing on the National Register of Historic Places. Subsequent review of the field results by the New Mexico State Historic Preservation Office and New Mexico State Land Office officials determined that all of the seven archaeological sites were similar in nature and that buried cultural resources could be present at each one (NMDCA, 2004). Consequently, each of the seven sites is now considered eligible for listing on the National Register of Historic Places and is considered to be an historic property.

The Section 106 consultation process with regional Federally recognized Indian tribes and other organizations was initiated (see subsection 1.5.6.2 and Appendix B). This course of action yielded no information on potential traditional cultural properties or other culturally significant resources at the proposed NEF site.

Consultations between LES, the New Mexico State Historic Preservation Office, the New Mexico State Land Office, the Advisory Council on Historic Preservation, and the NRC staff led to an agreement that a single Memorandum of Agreement would be prepared to conclude the Section 106 consultation process (NRC, 2004a). The Memorandum of Agreement records the terms and conditions agreed upon between the consulting parties to resolve adverse effects to historic properties at the proposed NEF site. It includes the above parties as well as Lea County as signatories, the potentially affected Indian tribes as concurring parties, and references and incorporates an historic properties treatment plan as an appendix. Once measures outlined in the treatment plan are executed, adverse impacts to all seven of the historic properties at the proposed NEF site would be mitigated, including effects from both the licensing and land-exchange processes. Mitigative tasks in the treatment plan would be fully implemented prior to construction of the proposed NEF. The transmittal letters and the Memorandum of Agreement are included in Appendix B. The treatment plan is not publicly available due to the sensitive nature of the information contained in the plan.

Based on the successful completion of the identification of historic and archaeological sites, National Register of Historic Places evaluations, and effective treatment of potential adverse effects to historic properties, along with the existence of written procedures to provide immediate reaction and notification in the event of inadvertent discovery of cultural resources, the potential impacts on historical and cultural resources at the proposed NEF site would be expected to be SMALL.

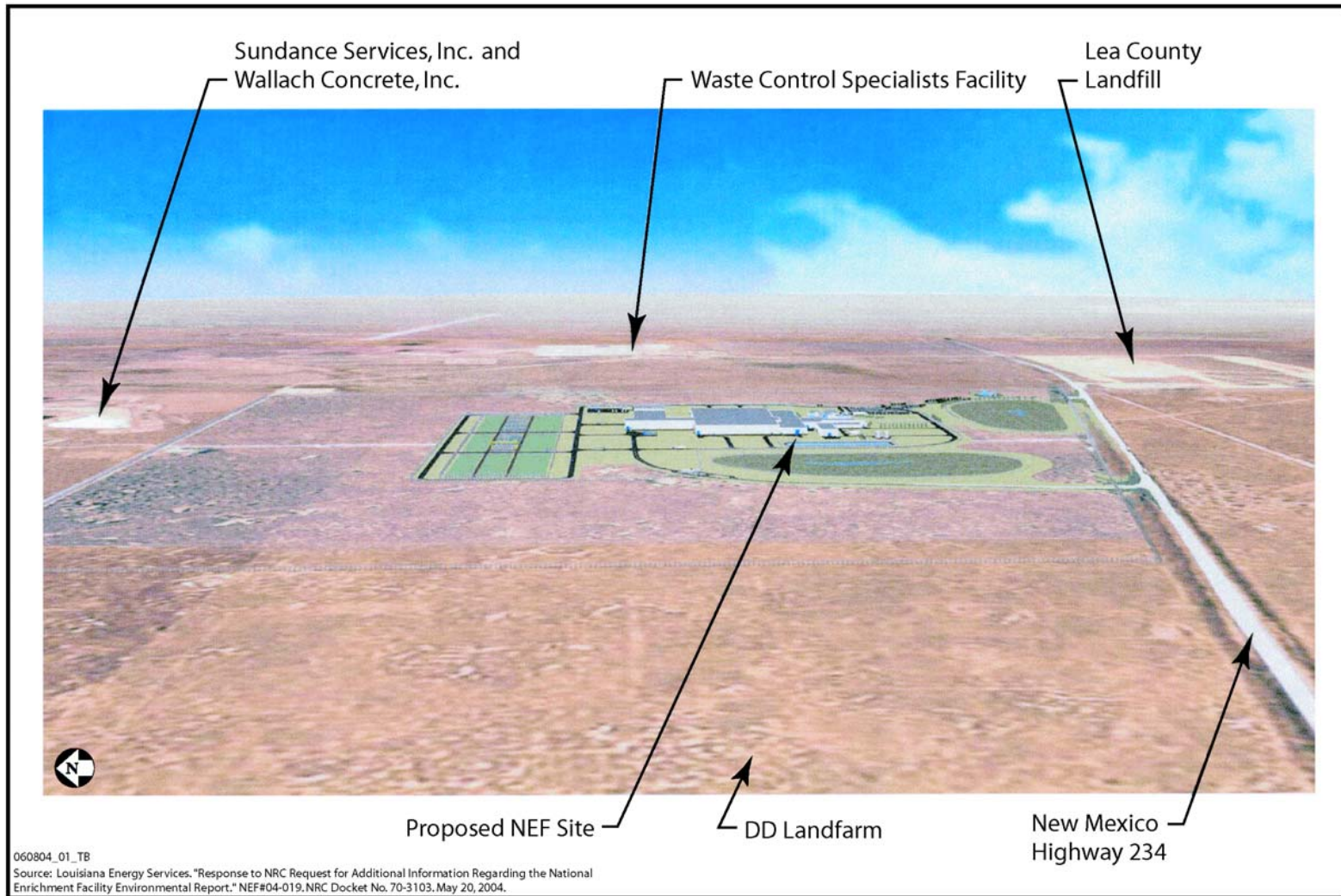
#### **4.2.2.1 Mitigation Measures**

An historic properties treatment plan has been finalized between the NRC, LES, the New Mexico State Historic Preservation Office, the New Mexico State Land Office, Lea County, and the Advisory Council on Historic Preservation with Indian tribes as concurring parties. This plan establishes the terms and conditions to resolve the potential for adverse effects to historic properties at the proposed NEF site (Proper, 2004).

The treatment plan includes several data-recovery approaches to retrieve scientific information from each of the seven archaeological sites. These approaches include mapping and collection of surface artifacts, subsurface testing of cultural features and artifact concentrations, and mechanical cross-trenching of the site areas. A geoarchaeological study would accompany the subsurface testing and trenching efforts. Analyses of the retrieved data would focus on determining the age of the sites, site function, paleoenvironmental setting, and cultural attributes associated with the site occupancy. A final written report would be prepared and all artifacts and associated data would be permanently curated at an approved archival facility.

#### **4.2.3 Visual and Scenic Resources Impacts**

Although the construction and operation of the proposed NEF would modify the visual and scenic quality of the area, it would remain compatible with the surrounding land uses (Figure 4-1). The site is bordered by Wallach Concrete, Inc., and Sundance Services, Inc., to the north; the Lea County Landfill to the south/southeast across New Mexico Highway 234; DD Landfarm to the west; and Waste Control



**Figure 4-1 Visual Impact of the Proposed NEF on Nearby Facilities (LES, 2005a)**

Specialists (WCS) to the east. In addition, the general area has been developed by the oil and gas industry with several processing facilities having flame-off towers and other processing columns (one is located in the southern portion of Eunice, New Mexico), and hundreds of oil pump jacks and associated rigs. The proposed NEF site received the lowest scenic-quality rating using the U.S. Bureau of Land Management (BLM) visual resource inventory process (LES, 2005a). With its tallest structure at no more than 40 meters (131 feet) high, the proposed NEF would not affect the BLM scenic-quality rating.

#### **4.2.3.1 Site Preparation and Construction**

Visibility impacts from construction would be limited to fugitive dust emissions. Fugitive dust would originate predominately from vehicle traffic on unpaved surfaces, earth moving, excavating and bulldozing, and to a lesser extent, wind erosion. Application of standard dust-suppression practices along with maintenance of appropriate vehicle speed controls and emission controls on diesel and gasoline motors would minimize the impact from fugitive dust emissions.

Visual impacts from construction are not significantly different from other excavation activities in the surrounding area such as building additional disposal cells at the Lea County Landfill or mining aggregate at Wallach Concrete, Inc. Because the majority of the site would remain undeveloped, the overall impacts to visual resources from the proposed NEF site construction would be SMALL.

#### **4.2.3.2 Operations**

Only taller onsite structures would be visible from existing highways. While onsite structures could be visible from nearby locations, the details of these structures would be indistinguishable from a distance.

Under low-wind-speed conditions and high relative humidity, the operation of the proposed NEF could produce fog or mist clouds from the cooling towers that might interfere with visibility. To investigate this possibility, data from hourly surface observations at the Midland-Odessa National Weather Station were analyzed in Appendix E for the ideal conditions to produce fog (i.e., high relative humidity, low wind speed, and stable weather conditions). The results of this analysis demonstrate that less than 0.5 percent of the total hours per year (i.e., 44 hours) yield favorable conditions for the cooling towers to contribute to the creation of fog.

Security lights and additional vehicle traffic to and from the proposed NEF would also create visual impacts to the surrounding land and existing facilities. The visual impacts from the security lighting at night would be less significant than those of the flame-off towers and lighting of nearby oil- and gas-processing facilities.

The impact from commuting traffic would only be for a short period of time each day. The potential visual impacts associated with the operation of the proposed NEF site on neighboring properties and the nearby oil and gas well fields would be considered SMALL.

#### **4.2.3.3 Mitigation Measures**

LES would apply a fugitive dust control program as a mitigation measure to minimize airborne dust during construction. Low-water-consumption landscaping techniques and prompt covering of bare areas would help keep the visual characteristics of the site consistent with the surrounding terrain. LES would consider down-shielding of security lights consistent with security plan requirements.

#### **4.2.4 Air-Quality Impacts**



This section discusses air-quality impacts from construction and operation of the proposed NEF and assesses potential air-quality impacts in the context of National Ambient Air Quality Standards (NAAQS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) established to protect human health and welfare with an adequate margin of safety (40 CFR Part 50).

#### 4.2.4.1 Site Preparation and Construction

Air-quality impacts from site preparation and construction activities were evaluated using emission factors and air-dispersion modeling. The Industrial Source Complex Short-Term air-dispersion model (EPA, 1995a) was used to estimate both short-term and annual average air concentrations at the facility property boundary. Hourly meteorological observations from the Midland-Odessa National Weather Service Station for the years 1987 through 1991 were used to create an input file to the Industrial Source Complex Short-Term air-dispersion model (NCDC, 1998).

Emission estimates were used in this analysis and are provided in Table 2-2 of this EIS (LES, 2005a). The emission rates of *Clean Air Act* criteria pollutants and nonmethane hydrocarbons (a precursor of ozone, a criteria pollutant) for exhaust emissions from construction vehicles and for fugitive dust were estimated using emission factors provided in AP-42, the EPA's "Compilation of Air Pollutant Emission Factors" (EPA, 1995b). Total emission rates were used to scale the output from the Industrial Source Complex Short-Term air-dispersion model (air concentrations derived using a unit source term) to estimate both short-term and annual average air concentrations at the facility property boundary. Emissions were modeled in the Industrial Source Complex Short-Term air-dispersion model as a uniform area source with unit emission rate.

A maximum of 18 hectares (45 acres) would be involved in construction work at any one time (LES, 2005a). Emissions from a rectangular box area of 427 meters by 427 meters (1,401 feet by 1,401 feet) (corresponding to 18 hectares [45 acres] total) were simulated as an area source in the Industrial Source Complex Short-Term air-dispersion model. Emissions were assumed to occur 10 hours per day (from 8 a.m. to 6 p.m) and 5 days per week (Monday through Friday) for every year from 1987 through 1991. The modeling extends 20 kilometers (12.4 miles) from each side of the proposed NEF site boundary.

As presented in Table 4-1, air concentrations of the criteria pollutants predicted for vehicle emissions would be 3 to 20 times below the NAAQS (EPA, 2003). Particulate matter emissions from fugitive dust would also be below the NAAQS.

The predicted concentrations would be located inside the property boundary and would decline with distance from the site (e.g., for  $PM_{10}$ , a  $144 \text{ ug/m}^3$  reading would result in a concentration of  $48 \text{ ug/m}^3$  at a distance of 1.0 kilometer [0.6 mile]). These are conservative estimates because fugitive dust emissions were assumed to occur throughout the year, without implementation of mitigation measures.

Particulate matter less than 10 microns ( $PM_{10}$ ) did exceed the  $PM_{10}$  limit in Hobbs, New Mexico, in 2003 (NMEDAQB, 2005). This prompted corrective actions by the State of New Mexico, as required by the NAAQS. This exceedance occurred due to a natural event—a dust storm. The impacts from the proposed NEF, however, would still be SMALL because the impacts would be localized to within the proposed NEF property boundary. Fugitive dust emissions could also occur during short time periods during construction. Mitigative measures would be employed to limit the emission of fugitive dust during construction. No fugitive dust emissions are anticipated during operations because soils would not be disturbed.

As a result of discussions between LES and the State of New Mexico, in a letter dated May 27, 2004, the New Mexico Environment Department Air Quality Bureau notified LES of its determination that a construction air quality permit under 20.2.72 NMAC is not required (LES, 2005b). The determination was based on information provided by LES in its Notice of Intent application to the New Mexico Environment Department Air Quality Bureau dated April 20, 2004.

Because the predicted air concentrations of expected vehicle emissions and fugitive dust are considerably less than the applicable NAAQS, the impacts to air quality from the construction of the proposed NEF would be considered SMALL.

**Table 4-1 Predicted Property-Boundary Air Concentrations and Applicable National Ambient Air Quality Standards**

		Max 1-hr	Max 3-hr	Max 8-hr	Max 24-hr	Annual <sup>a</sup>
<b>Vehicle Emissions (<math>\mu\text{g}/\text{m}^3</math>)</b>						
HC	Modeled	< 500	226	85	34	3
	NAAQS	---	---	---	---	---
CO	Modeled	< 4,000	1,440	540	215	18
	NAAQS	40,000 <sup>b</sup>	---	10,000 <sup>b</sup>	---	---
NO <sub>x</sub>	Modeled	< 7,500	3,000	1,125	450	38
	NAAQS	---	---	---	---	100
SO <sub>x</sub>	Modeled	< 750	300	113	45	4
	NAAQS	---	1,310 (secondary)	---	365 <sup>b</sup>	80
PM <sub>10</sub>	Modeled	< 500	220	81	33	3
	NAAQS	---	---	---	150 <sup>b</sup> (secondary)	50 <sup>c</sup>
<b>Fugitive Dust (<math>\mu\text{g}/\text{m}^3</math>)</b>						
PM <sub>10</sub>	Modeled	< 2,400	1,000	360	144	12
	NAAQS	---	---	---	150 <sup>b</sup> (secondary)	50 <sup>c</sup>

HC - hydrocarbons; CO - carbon monoxide; NO<sub>x</sub> - nitrogen dioxide; SO<sub>x</sub> - sulfur oxides; PM<sub>10</sub> - particulate matter less than 10 microns; NAAQS - National Ambient Air Quality Standards;  $\mu\text{g}/\text{m}^3$  - microgram per cubic meter; hr - hour; --- - no standard  
<sup>a</sup> Arithmetic mean.

<sup>b</sup> Not to be exceeded more than once per year.

<sup>c</sup> To attain this standard, the expected annual arithmetic mean PM<sub>10</sub> concentration at each monitor within an area must not exceed 50  $\mu\text{g}/\text{m}^3$ .

Source: EPA, 2003.

#### 4.2.4.2 Operations

The surrounding air quality would be affected by nonradioactive gaseous effluent releases during operation of the proposed NEF. Nonradioactive gaseous effluents include hydrogen fluoride and acetone. The proposed NEF would release approximately 1 kilogram (2.2 pounds) per year of hydrogen fluoride, 40 liters (11 gallons) of ethanol, and 610 liters (161 gallons) of methylene chloride per year

(LES, 2005a). The total amount of hazardous air pollutants emitted to the atmosphere would be less than 9.1 metric tons (10 tons) per year; therefore, a *Clean Air Act* Title V permit would not be required.

The following emission rates were estimated for criteria pollutants (from onsite boilers) (LES, 2005a):

- Volatile organic compounds - 0.8 metric ton (0.88 ton) per year.
- Carbon monoxide - 0.5 metric ton (0.55 ton) per year.
- Nitrogen dioxide - 5.0 metric tons (5.5 tons) per year.

The total amount is less than 91 metric tons (100 tons) per year; therefore, a *Clean Air Act* Title V permit would not be required.

In addition, there would be two diesel generators onsite for use as emergency power sources. The following emission rates from the two emergency diesel generators were estimated for criteria pollutants (LES, 2005a):

- Volatile organic compounds – 0.26 metric ton (0.29 ton) per year.
- Carbon monoxide – 0.85 metric ton (0.94 ton) per year.
- Nitrogen dioxide – 11.1 metric tons (12 tons) per year.
- Particulate matter (of less than 10 microns) – 0.1 metric ton (0.11 ton) per year.

Because the diesel generators have the potential to emit more than 91 metric tons (100 tons) per year of a regulated air pollutant, LES proposes to run these diesel generators only a limited number of hours per year for the above emission rates to avoid being classified as a *Clean Air Act* Title V source (LES, 2005a).

As a result of discussions between LES and the State of New Mexico, in a letter dated May 27, 2004, the New Mexico Environment Department Air Quality Bureau notified LES that the proposed NEF is subject to 20.2.73 NMAC, and that the application submitted by LES on April 20, 2004, will serve as the Notice of Intent in accordance with 20.2.73 NMAC (LES, 2005b). The New Mexico Environment Department Air Quality Bureau also stated that the two emergency diesel generators and surface-coating activities are exempt, provided all requirements specified in 20.2.72.202.B (3) and 20.2.202.B (6) NMAC, respectively, are met.

For the few NESHAP of concern (hydrofluoric acid, and methylene chloride) for the proposed NEF, all estimated levels are below the amounts requiring an application for permits (9.1 metric tons [10 tons] per year of a single and 22.7 metric tons [25 tons] per year of any combination of NESHAP). Therefore, the impacts to air quality from operations would be SMALL.

#### **4.2.4.3 Mitigation Measures**

Mitigation measures for air quality during construction would involve attempts to reduce the impacts from vehicle emissions. LES would maintain construction equipment and vehicles to ensure their emissions are below the NAAQS. During operation of the proposed NEF, exhaust-filtration systems would collect and clean all potentially hazardous gases prior to release into the atmosphere and use monitoring and alarm systems for all nonroutine process operations. In addition to these actions, LES would limit the number of hours per year the emergency diesel generators run, employ proper maintenance practices, and adhere to operational procedures to ensure the proposed NEF stays below applicable limits for the NESHAP of concern.

Due to the PM<sub>10</sub> exceedance in Hobbs, New Mexico, described in section 3.5.3 of this EIS, the New Mexico Environment Department Air Quality Bureau is developing a Natural Events Action Plan that would implement Best Available Control Measures (BACMs) for Lea County. LES would review Lea County BACMs as they become available and would implement those that are applicable for the proposed NEF during construction and operation to minimize dust and particulate emissions.

#### **4.2.5 Geology and Soils Impacts**

This section discusses the assessment of potential environmental impacts on geologic resources and soils during site preparation and construction and operation of the proposed NEF. Impacts could result from planned excavation activities for the proposed NEF and the consumption of commercial mineral resources for use in roadbeds and as construction materials.

There are no known nonpetroleum mineral deposits on the proposed NEF site. Chapter 3 of this EIS describes site soil uses, which are suitable as range land and have been used for cattle grazing. The soils are not well suited for farming and are typical of regional soils.

##### **4.2.5.1 Site Preparation and Construction**

Site preparation and construction activities for the proposed NEF site have the potential to impact the site soils in the construction area. Only 81 hectares (200 acres), including 8 hectares (20 acres) for contractor parking and construction lay-down areas, within the 220-hectare (543-acre) site would be disturbed. The remainder would be left in a natural state for the life of the proposed NEF. Construction activities at the site would include surface grading and excavation of the soils for utility lines and rerouting of the CO<sub>2</sub> pipeline, stormwater detention/retention basins, and building and facility foundations.

The proposed NEF would be located on an area of flat terrain; cut and fill would be required to bring the site to final grade. Onsite soils are suitable for fill, although they could require wetting to achieve adequate compaction (Mactec, 2003). Present plans are for a total of 611,000 cubic meters (797,000 cubic yards) of soil to be cut and used as fill. The resulting terrain change over 73 hectares (180 acres) from gently sloping to flat would result in SMALL impacts; numerous such areas of flat terrain exist in the region due to natural erosion processes. Only onsite soils would be used in the site grading. Approximately 55,800 cubic meters (73,000 cubic yards) of clay would be brought onto the proposed NEF site from a nearby source for use as basin liner material.

Construction activities could cause some short-term impacts such as increases in soil erosion at the proposed NEF site. Soil erosion could result from wind action and precipitation, although there is limited rainfall in the vicinity of the proposed NEF. Several mitigative measures would be taken to minimize soil erosion and control fugitive construction dust.

Preliminary site geotechnical investigations indicate that facility footings could be supported by the firm and dense sandy subsurface soils (Mactec, 2003). Although not presently foreseen, if final design studies indicate the necessity to extend footings through the sand into the Chinle Formation, then more soils would be disturbed and the clay layer could be penetrated.

These same geotechnical investigations also considered the suitability of the site subsurface soils to support a septic leach field. Two test locations were used to establish a percolation rate of 3.3 minutes per centimeter (8.4 minutes per inch). The final design would require additional percolation testing at the design leach field locations and elevations to comply with applicable State and local regulations.

Because site preparations and construction result in only short-term effects to the geology and soils, the impacts would be SMALL.

#### **4.2.5.2 Operations**

During operations of the proposed NEF, the exposed surface soils could experience the same types of impacts as the undisturbed soils in the surrounding area. The primary impact to these soils would be wind and water erosion. However, this environmental impact would be SMALL as the rate of wind and water erosion of the exposed surface soils surrounding the proposed NEF site would likely be small.

Releases to the atmosphere during normal operation of the proposed NEF could contribute to a small increase in the amount of uranium and fluorides in surrounding soils as they are transported downwind. Section 4.2.4 notes that all estimated atmospheric releases of pollutants would be below the amounts requiring permits, and the impacts to air quality from operations would be SMALL. Section 4.2.12 presents the potential human health impacts from this deposition to the surrounding soils. Based on the discussion above, the proposed NEF would be expected to result in SMALL impacts on site geologic and soil resources.

#### **4.2.5.3 Mitigation Measures**

Application of construction BMPs and a fugitive dust control plan would lessen the short-term impacts from soil erosion by wind or rain during construction. LES would comply with National Pollutant Discharge Elimination System (NPDES) general permits. To mitigate the impacts of stormwater runoff on the soils, earthen berms, dikes, and sediment fences would be used as needed during construction, and permanent structures such as culverts and ditches would be stabilized and lined with rock aggregate/riprap to reduce water-flow velocity and prohibit scouring. Stormwater detention basins would be used during construction, and detention/retention basins would be used during operation. Implementation of the Spill Prevention Control and Countermeasures Plan would reduce impacts to soil by mitigating the potential impacts from chemical spills that could occur around vehicle maintenance and fueling locations, storage tanks, and painting operations during construction and operation. Waste-management procedures would be used to minimize the impacts to the surrounding soils from solid waste and hazardous materials that would be generated during construction and operation.

#### **4.2.6 Water Resources Impacts**

This section discusses the assessment of potential environmental impacts to surface water and groundwater during construction and operation of the proposed NEF. The discussion includes the potential impact to natural drainage on and around the proposed NEF site and the effect of the proposed NEF on the regional water supply.

##### **4.2.6.1 Site Preparation and Construction**

Because construction activities would disturb over 0.4 hectares (1 acre), an NPDES Construction Stormwater General Permit from U.S. Environmental Protection Agency (EPA) Region 6 and an oversight review by the New Mexico Environment Department Water Quality Bureau would be required. Stormwater runoff and wastewater discharges would be collected in detention/retention basins. The stormwater detention basin would allow infiltration into the ground as well as evaporation. In addition, the stormwater detention basin would have an outlet structure to allow overflow drainage. The retention basins, once constructed, would allow disposition of collected stormwater by evaporation only. No flood-control measures are proposed because the site grade is above the 500-year flood elevation, which is

located in Monument Draw to the southwest of the proposed NEF site (LES, 2005a). Sanitary waste generated at the site would be handled by portable systems until such time that the site septic systems are available for use. Compliance with the permit would minimize the impacts to surface features and groundwater.

The NRC staff estimates that approximately 7,570 cubic meters (2 million gallons) of water would be used annually during the construction phase of the proposed NEF based on the design estimates for the formerly proposed Claiborne Enrichment Facility (NRC, 1994). Groundwater would be used for concrete formation, dust control, compaction of the fill, and revegetation. These usage rates are well within the excess capacities of Eunice or Hobbs water supply systems and would not affect local uses (Abousleman, 2004b; Woomer, 2004). Current capacities for the Eunice and Hobbs municipal water supply systems are about 6 million cubic meters (1.6 billion gallons) per year and 27.6 million cubic meters (7.3 billion gallons) per year, respectively. As a result, SMALL short-term impacts to the municipal water supply system would occur. In addition, a Spill Prevention Control and Countermeasures Plan would be implemented to address potential spills during construction activities.

Because there are no existing easily accessible water resources onsite and BMPs would be used to minimize the impacts of construction stormwater and wastewater within the site boundaries, the impacts to water resources during construction would be expected to be SMALL.

#### **4.2.6.2 Operations**

The proposed NEF site liquid effluent discharge rates would be relatively small. The proposed NEF wastewater flow rate from all sources would be expected to be about 29,049 cubic meters (7.6 million gallons) annually (LES, 2005a). This includes approximately 2,540 cubic meters (670,000 gallons) annually of wastewater from the liquid effluent treatment system, while domestic sewage and cooling tower and heating boiler blowdown waters constitute the remaining amount.

The liquid effluent treatment system and shower/hand wash/laundry effluents would be discharged onsite into a double-lined Treated Effluent Evaporative Basin, whereas the blowdown water from the cooling water tower and the heating boilers and Uranium Byproduct Cylinder (UBC) Storage Pad stormwater runoff would be discharged onsite to a single-lined retention basin. Runoff water from developed areas of the site other than the UBC Storage Pad would be collected in the unlined Site Stormwater Detention Basin. Domestic sewage would be discharged to onsite septic tanks and subsequently to an associated leach field system. No process waters would be discharged from the site. There is the potential for intermittent discharges of stormwater offsite. Figure 4-2 shows the onsite location of the water basins and septic tanks.

Approximately 174,000 cubic meters (46 million gallons) of stormwater would be expected to be released annually to the onsite detention/retention basins. In addition, about 617,000 cubic meters (163 million gallons) of annual runoff from the undeveloped site areas could be expected. Site drainage would be to the southwest with runoff not able to reach any natural water body before it evaporates.

##### Treated Effluent Evaporative Basin

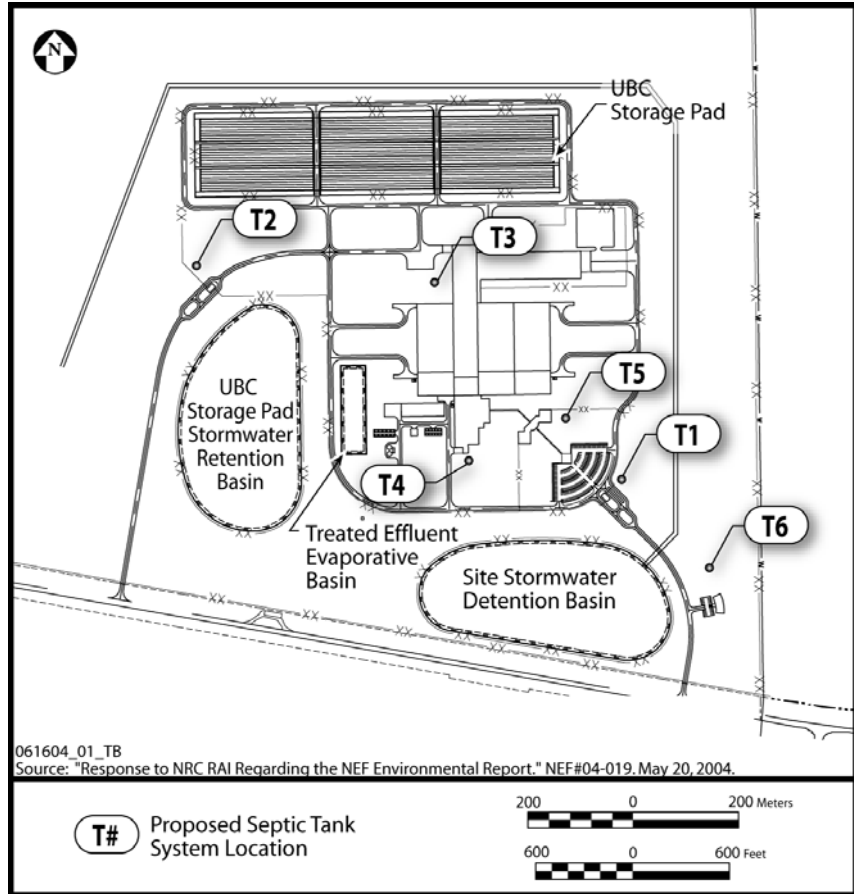
Total annual effluent discharge to the Treated Effluent Evaporative Basin would be 2,540 cubic meters (670,000 gallons). The effluent would be disposed of by evaporation of all of the water and impoundment of any remaining dry solids. A water balance of the basin, including consideration of

effluent and precipitation inflows and evaporation outflows, indicates that the basin would be dry for one to seven months of the year depending on annual precipitation rates (LES, 2005c). The volume of the basin is expected to be sufficient to contain all inflows for the life of the proposed facility. In the unlikely event of consecutive years of very high precipitation, it could become necessary for the site operators to develop strategies to prevent basin overflows. Because such an unlikely event could occur gradually over a long period of time (years), there would be sufficient time to take necessary actions.

During the proposed NEF operation, only liquids meeting site administrative limits based on prescribed standards would be discharged into the Treated Effluent Evaporative Basin. It is expected that operation of the waste treatment system would result in  $14.4 \times 10^6$  becquerels (390 microcuries) per year of uranium discharged to the Treated Effluent Evaporative Basin. These levels are small and would not impact area water resources because the basin design includes a liner. Effluents unsuitable for release to the basin could be recycled through the liquid effluent treatment system or processed into a solid and disposed of offsite in a suitable manner. The Treated Effluent Evaporative Basin would be expected to have only a SMALL impact on water resources. Section 4.2.12 describes potential impacts from atmospheric resuspension of the uranium when the basin is dry.

UBC Storage Pad Stormwater Retention Basin

Total annual effluent discharge from blowdown to the UBC Storage Pad Stormwater Retention Basin would be 19,300 cubic meters (5.1 million gallons) (LES, 2005a). The effluent would be disposed of by evaporation of all of the water with dry solids being retained in the basin. Dry solids consist principally of dissolved and suspended solids normally contained in the municipal water supplied to the operation and chemicals added to the heating boiler and cooling tower circulating water, and thus contained in the blowdown water, to assure efficient operation. A water balance of this basin, including consideration of effluent and precipitation inflows and evaporation outflows, indicates that the basin would be dry for 2 to 12 months of the year, depending on annual precipitation rates (LES, 2005c). The basin would have the capacity to hold all inflows for the life of the proposed NEF. UBCs (i.e., depleted uranium hexafluoride [DUF<sub>6</sub>]-filled Type 48Y cylinders) would be surveyed for external contamination before being placed on



**Figure 4-2 Basins and Septic Tank System Locations (LES, 2005a)**

the UBC Storage Pad and would be monitored while stored on the pad. External contamination would be removed prior to cylinder placement on the pad. Therefore, rainfall runoff to this basin would be expected to be free of radioactive contaminants and would not result in an exposure pathway. Sampling of stormwater and basin sediments, as discussed in Chapter 6, would be performed for chemicals and radioactivity. Because all of the water discharged to the lined UBC Storage Pad Stormwater Retention Basin would evaporate, the basin would have a SMALL impact on water resources.

#### Site Stormwater Detention Basin

The Site Stormwater Detention Basin would be unlined, and discharges would be through infiltration and evaporation. A water balance of this basin shows that it would be dry except during rainfall events (LES, 2005a). Most of the water discharged into the basin would seep into the ground before evaporating at an average rate of 17 centimeters (6.7 inches) per month.

Water seeping into the ground from the Site Stormwater Detention Basin could be expected to form a perched layer on top of the highly impermeable Chinle Formation clay similar to the “buffalo wallows” described in Chapter 3 of this EIS. The water would be expected to have limited downgradient transport due to the storage capacity of the soils and the upward flux to the root zone. A conservative estimate of the impact from this basin, which neglects soil storage capacity, evapotranspiration, and evaporation from the pond, results in a local groundwater velocity of the plume coming from the Site Stormwater Detention Basin of 252 meters (0.16 mile) per year. The cross-section (perpendicular to the flow direction) of this plume would be 2,850 square meters (30,700 square feet). The depth of the plume would be about 2.85 meters (9.3 feet) for a nominal plume width of 1,000 meters (3,280 feet).

The water quality of the basin discharge would be typical of runoff from building roofs and paved areas from any industrial facility. Except for small amounts of oil products and grease expected from normal onsite traffic that would readily adsorb into the soil, the plume would not be expected to contain contaminants. There are no groundwater users within 3.2 kilometers (2 miles) downgradient of the proposed NEF site, and there are no downgradient users of groundwater from the sandy soil above the Chinle Formation who could be impacted by site releases. Portions of the plume not evapotranspired and traveling downgradient could result in a minor seep at Monument Draw, approximately 4.8 kilometers (3 miles) southwest of the site. Accordingly, the Site Stormwater Detention Basin seepage would have a SMALL impact on water resources of the area.

#### Septic Tanks and Leach Fields

Water seeping into the ground from the septic systems could be expected to form a perched layer on top of the highly impermeable Chinle Formation similar to the “buffalo wallows” described in Chapter 3 of this EIS. The water can be expected to have limited downgradient transport because of the storage capacity of the soils and the upward flux to the root zone. A conservative estimate of the impact from the septic systems assumes all of the infiltrating water is transported downgradient, which neglects soil storage capacity, evapotranspiration, and evaporation. The local groundwater velocity of the plumes coming from the septic system would then be about 252 meters (0.16 mile) per year. The total cross-section (perpendicular to the flow direction) of the septic system plumes would be 116 square meters (1,250 square feet). The depth of the plumes was calculated to be about 1.16 meters (3.8 feet) for a nominal total plume width of 100 meters (328 feet).

The proposed septic systems are included in the groundwater discharge permit application filed with the New Mexico Environment Department Groundwater Quality Bureau (LES, 2005a). Sanitary wastewater discharged to the septic system would meet required levels for all contaminants stipulated in the permit



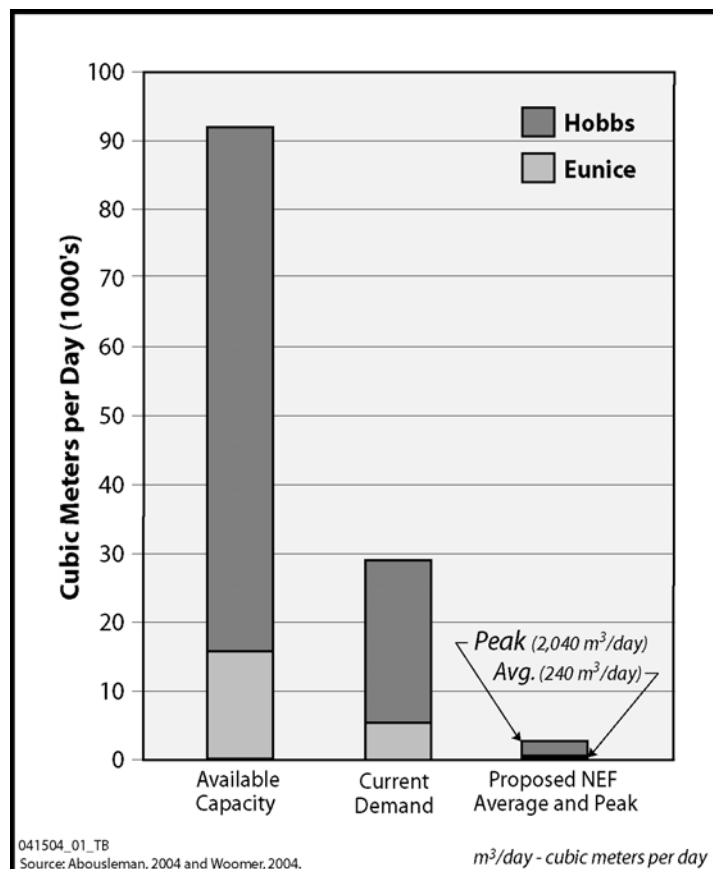
(LES, 2005a). There are no groundwater users within 3.2 kilometers (2 miles) downgradient (toward the southwest) of the proposed NEF site, and there are no downgradient users of groundwater from the sandy soil above the Chinle Formation who could be impacted by site releases. Contaminants would leach out of the septic system discharge as water is transported vertically and then downgradient. Portions of the plume not evapotranspired traveling downgradient could result in a minor seep at Monument Draw, approximately 4.8 kilometers (3 miles) southwest of the site. The septic systems would also be expected to have a SMALL impact on water resources.

#### 4.2.6.3 Water Uses During Operation

The proposed NEF water supply would be obtained from the municipal supply systems of the cities of Eunice and Hobbs, New Mexico. The proposed NEF would consume water to meet potable, sanitary, and process consumption needs. None of this water would be returned to its original source. The waters originate from the Ogallala Aquifer north of Hobbs, New Mexico (Woomer, 2004). New potable water supply lines would be approximately 8 kilometers (5 miles) in length from Eunice, New Mexico, and approximately 32 kilometers (20 miles) in length from Hobbs, New Mexico, along county right-of-way easements along New Mexico Highways 18 and 234. The impacts of such activity would be short-term and SMALL (e.g., access roads to the highway could be temporarily diverted while the easement is excavated and the pipelines are installed) (Woomer, 2004).

Eunice and Hobbs, New Mexico, have excess water capacities of 66 and 69 percent, respectively. Average and peak water requirements for the proposed NEF operation would be expected to be approximately 240 cubic meters (63,423 gallons) per day and 2,040 cubic meters (539,000 gallons) per day, respectively. These usage rates are well within the excess capacities of both water systems and would not affect local uses (Abousleman, 2004b; Woomer, 2004). The annual proposed NEF water use would be less than the daily capacity of these systems. Figure 4-3 illustrates the relationships between the proposed NEF projected water uses and Eunice and Hobbs water demand and system capacities. The average and peak water use requirements would be approximately 0.26 and 2.2 percent, respectively, of the combined potable water capacity for Eunice and Hobbs of 92,050 cubic meters (24.3 million gallons) per day.

The proposed NEF operation would be expected to use on an average approximately 87,600 cubic meters (23.1 million gallons) of water annually. For the life of the facility, the proposed NEF could use up to 2.63 million cubic meters (695 million



**Figure 4-3 Eunice and Hobbs Water Capacities in Relation to the Proposed NEF Requirements (LES, 2005a; Abousleman, 2004b; Woomer, 2004)**

gallons) of the Ogallala waters, encompassing both construction and operations use. This constitutes a small portion, 0.004 percent, of the 60 billion cubic meters (49 million acre-feet or 16 trillion gallons) of Ogallala reserves in the State of New Mexico territory (HPWD, 2004) and, therefore, the impacts to water resources would be SMALL.

The NRC staff conducted limited confirmatory groundwater modeling to evaluate further the potential impacts from the proposed NEF on regional groundwater supplies. In its evaluation, the staff used a mathematical model developed by the New Mexico Office of the State Engineer. This model has been used by the State to determine long-term usage impacts on available water in the portion of the Ogallala Aquifer within Lea County (Musharrafiieh and Chudnoff, 1999). For the purposes of its evaluation, the staff conservatively assumed that the entire projected withdrawal for the proposed NEF would be from a single location (known as a “modeling cell”) approximately 3.2 kilometers (2 miles) northeast of Hobbs in an area of local minimum saturated thickness of the Ogallala Aquifer. This was intended to simulate the proposed facility’s use of groundwater from the Eunice and Hobbs municipal water supplies. Using the parameters previously applied by the State for their simulations of long-term impacts, and adding the proposed NEF’s water withdrawals from the selected modeling location over a 30-year period (approximated as 2010-2040), a resulting 0.4 meter (1.2 feet) of additional drawdown at the selected location could be expected. This drawdown would decrease with distance so that at approximately 1.6 kilometers (1 mile) and 3.2 kilometers (2 miles) from the withdrawal location, the additional modeled drawdown would be from 0.12 to 0.15 meters (0.4 to 0.5 feet) (depending on direction) and from 0.03 to 0.09 meters (0.09 to 0.3 feet), respectively, after 30 years. At distances of approximately 13.7 to 15.3 kilometers (8.5 to 9.5 miles) from the assumed withdrawal location, the additional drawdown would be less than 0.003 meter (0.01) feet in all directions. The small potential impacts are confirmed by comparing this additional drawdown to the remaining saturated thickness, approximately 11.3 meters (37 feet), at this location at the end of the 30-year period of modeled withdrawal for LES use.

#### **4.2.6.4 Mitigation Measures**

Construction BMPs would limit the impacts from the installation of potable water supply lines and would also limit the impact of construction stormwater and wastewater to within the site boundaries. All construction activities would comply with NPDES Construction Stormwater General Permits and a groundwater discharge permit.

The Liquid Effluent Collection and Treatment System would be used throughout operations to control liquid waste within the facility including the collection, analysis, and processing of liquid wastes for disposal. Liquid effluent concentration releases to the Treated Effluent Evaporative Basin and the UBC Storage Pad Stormwater Retention Basin would be below the uncontrolled release limits set forth in 10 CFR Part 20. A Spill Prevention Control and Countermeasures Plan would minimize the impacts for infiltration of hazardous chemicals into any formation of perched water that could occur during operation. A Stormwater Pollution Prevention Plan would be implemented at the proposed NEF site. Staging areas would be established to manage waste materials, and a waste management and recycling program would be implemented to segregate and minimize industrial and hazardous waste generation.

Because the Ogallala Aquifer is being depleted and future demand for water in the region would exceed the recharge rate, the present local water supplies could be affected. The Lea County Regional Water Plan (LCWUA, 2000) includes mitigation actions to be taken to increase water supplies in the future and actions to deal with drought conditions should supplies be insufficient. Section 3.8.2 discusses the Lea County Regional Water Plan in more detail. LES would comply with any drought-related conditions that would be imposed through the Lea County Regional Water Plan or through other State or local actions. In addition, LES would use low-water-consumption landscaping techniques; low-flow toilets, sinks, and

showers; and efficient water-using equipment at the proposed NEF site. Additional mitigative measures are identified in Chapters 5 and 6 of this EIS.

#### **4.2.7 Ecological Resources Impacts**

This section discusses the potential impacts of site preparation, construction, and operation of the proposed NEF on ecological resources.

Field studies conducted by LES at the proposed NEF site indicated that no communities or habitats have been defined as rare or unique, and none support threatened or endangered species (LES, 2005a). In addition, no State- or Federal-listed threatened or endangered species have been identified during these studies at the proposed NEF site.

The U.S. Fish and Wildlife Service (FWS) listed several candidate species of concern that may be found in the Lea County, New Mexico, area (FWS, 2004). These candidate species are proposed to be added to the list of endangered and threatened species or the agency wants to ensure that their decline does not go unchecked and to avoid actions that may affect their populations (FWS, 2004).

The proposed NEF site is undeveloped and currently serves as cattle grazing. There is no surface water on the site, and appreciable groundwater reserves are deeper than 340 meters (1,115 feet). The results of LES surveys in the fall of 2003 and spring and summer of 2004 suggest that the site supports a limited diversity of wildlife. The listed candidate species, namely the lesser prairie chicken (*Tympanuchus pallidicinctus*), the sand dune lizard (*Sceloporus arenicolus*), and the black-tailed prairie dog (*Cynomys ludovicianus*), were not detected at the proposed NEF site, and it was concluded that the habitat of the proposed NEF site is unsuitable for any of these candidate species (EEI, 2004; LES, 2005a; Sias, 2004).

Two species of concern, the swift fox (*Vulpes velox*) and the western burrowing owl (*Athene cunicularia hypugea*), could be vulnerable to the proposed NEF activities (LES, 2005a). The swift fox could be vulnerable because the species' inquisitive nature allows it to adapt to areas of human activities. However, swift fox generally require 518 to 1,296 hectares (1,280 to 3,200 acres) of short- to mid-grass prairie habitat with abundant prey to support a pair. Habitat loss, rodent control programs, and other human activities that reduce the prey base could impact the viability of swift fox at the proposed NEF site (FWS, 1995).

The western burrowing owl is generally vulnerable to construction activities because of the possibility that its burrows, and possibly birds or eggs in the burrows, may be destroyed by machinery or structures. The western burrowing owl is generally tolerant of human activity provided it is not harassed. Burrowing owls are very site tenacious, and burrow fidelity is a widely recognized trait of burrowing owls. The presence of this species is strongly associated with prairie dog towns (The Nature Conservancy, 2004). The lack of evidence of the presence of prairie dog towns and western burrowing owl burrows at the proposed NEF site would negate the potential vulnerability of this species to the proposed NEF activities (LES, 2005a). Artificial burrows could not easily attract the species (Trulio, 1997). While the construction activities at the proposed NEF site could create artificial burrows (i.e., cavities within the riprap material), the lack of existing burrows and the absence of prairie dogs at the proposed NEF site would reduce the potential for burrowing owls to relocate to the new artificial burrows.

##### **4.2.7.1 Site Preparation and Construction**

Most of the potential ecological disturbances from the proposed NEF would occur during the construction phase of the site. Approximately 81 hectares (200 acres) of land would be disturbed along with 8 hectares

(20 acres) that would be used for temporary contractor parking and lay-down areas. Once the proposed NEF site construction was completed, the temporary contractor parking and lay-down areas would be restored to their natural condition and would be revegetated with native plant species and other natural, low-water-consumption landscaping to control erosion.

Construction disturbances would mostly affect the Plains Sand Scrub vegetation community. The dominant shrub species associated with this classification is shinny oak with lesser amounts of sand sage, honey mesquite, and soapweed yucca. This diversity does not create a unique habitat in the area. The community is further characterized by the presence of forbs, shrubs, and grasses that have adapted to the deep sand environment that occurs in parts of southeastern New Mexico (NRCS, 1978).

The disturbed area represents about one-third of the total site area. This allows highly mobile resident wildlife located within the disturbed areas of the proposed NEF site an opportunity to relocate to the undisturbed onsite areas (139 hectares [343 acres]). The undisturbed areas are expected to be left in a natural state for the life of the proposed NEF site. Wildlife would also be able to migrate to adjacent suitable habitat bordering the proposed NEF site. On the other hand, less mobile species, such as small reptiles and mammals, could be impacted. Due to the limited diversity of wildlife and the relatively small area disturbed, the potential impacts of the proposed NEF site to these less mobile species would be SMALL.

The municipal water-supply piping, natural-gas-supply piping, and electrical transmission lines would be installed along existing county right-of-way easements next to local highways that have been previously disturbed and followed by re-vegetation. The existing shrub species would not have the potential to grow into the electrical transmission lines. Therefore, since the affected ecology along the easement would only be temporarily affected during construction, the ecological impacts along the county right-of-way easements would be SMALL.

The proposed NEF site is presently interrupted by a single access road that is void of vegetation. Because roadway maintenance practices are currently being performed by Wallach Concrete, Inc., and Sundance Services, Inc., along the existing access road, new or significant impacts to biota are not anticipated due to the use of the access road.

LES would use herbicides and pesticides only if weed or pest intrusion is significant. None of the construction activities would permanently affect the biota of the site. Standard land-clearing methods would be used during the construction phase. Stormwater detention basins would be built prior to land clearing and used as sedimentation collection basins during construction. Once the proposed NEF site was revegetated and stabilized, the basins would be converted to detention/retention basins. After completion of construction, any eroded areas would be repaired and stabilized with native grass species, pavement, and crushed stone. Ditches would be lined with riprap, vegetation, or other suitable materials, as determined by water velocity, to control erosion. In addition, water conservation would be considered in the application of dust-suppression sprays in the construction areas.

Due to the lack of rare or unique communities, habitats, or wildlife on the proposed NEF site and the short duration of the site preparation and construction phase, the impacts to ecological resources would be SMALL during construction. In a letter to the NRC on November 1, 2004, the New Mexico Department of Game and Fish supports the conclusion of no significant adverse effects (NMGF, 2004).

#### 4.2.7.2 Operations

No additional lands beyond those disturbed during site preparation and construction would be affected by the proposed NEF operation. The undisturbed area is expected to be left in its natural state. Therefore, no additional impacts on local ecological resources beyond those described during construction would be expected during operations. The tallest proposed structure for the proposed NEF site is 40 meters (131 feet), which is lower than the height at which structures are required to be marked or lighted for aviation safety (FAA, 1992). This avoidance of lights, which attract wildlife species, and the low above-ground-level structure height, would reduce the relative potential for impacts on wild animals. Therefore, the impacts to birds would be SMALL. Due to the lack of direct discharge of water and the absence of an aquatic environment and the implementation of stormwater management practices, the impacts to aquatic systems would be SMALL.

None of the previously discussed wildlife species at the proposed NEF site discussed in section 3.9 have established migratory travel corridors because they are not migratory in this part of their range. Migratory species with potential to occur at the proposed NEF site include mule deer (*Odocoileus hemionus*) and scaled quail (*Callipepla squamata*). They are highly mobile, and their travel corridors are linked to habitat requirements such as food, water, and cover. They may change from season to season and can occur anywhere within the species home range. Mule deer and scaled quail thrive in altered habitats, and travel corridors that would potentially be blocked by the proposed NEF would easily and quickly be replaced by an existing or new travel corridor. Therefore, the impacts to migratory wildlife would be SMALL.

The level of radiological safety required for the protection of humans is adequate for other animals and plants.<sup>1</sup> Therefore, no additional mitigation efforts would be necessary beyond those required to protect humans (IAEA, 1992). Section 4.2.12 includes a discussion of these impacts. The greatest exposures would be to the personnel handling the UBCs. The potentially highest exposures to wildlife are expected to be to small animals occupying the UBC Storage Pad. Effective wildlife management practices, periodic surveys of the UBCs, and mitigation would prevent permanent nesting and lengthy stay times on the UBC Storage Pad. Thus, the impacts (radiological and nonradiological) to local wildlife would be SMALL.

#### 4.2.7.3 Mitigation Measures

LES would implement several BMPs to minimize the construction impacts to the proposed NEF site and would install appropriate barriers to minimize the impacts to wildlife during site preparation, construction, and operation. BMPs would also be instituted to control erosion and manage stormwater. The number of trenches and length of time they are open would be minimized to mitigate the effects of trenching work during construction. Other procedural steps that would be applied during trenching include digging trenches during cooler months (when possible) due to lower animal activity, keeping trenching and backfilling crews close together, ensuring trenches are not left open overnight, using escape ramps, and inspecting trenches and removing animals prior to backfilling.

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<sup>1</sup>Acute doses of 0.1 Gy (10 rad) or less are very unlikely to produce persistent, measurable deleterious changes in populations or communities of terrestrial plants or animals. In addition, there is no convincing evidence from the scientific literature that chronic radiation dose rates below 1.0 mGy/day (0.1 rad/day) will harm animal or plant populations. These conclusions are based on a population of studies that were available at the time (IAEA, 1992; DOE, 2002). The International Atomic Energy Agency is continuing to review and discuss concepts for a radiological protection framework for the environment, to include appropriate effect levels and dose limits for biota.

LES would consult with the electric utility responsible for the new electric transmission line to address as applicable the guidance from the New Mexico Department of Game and Fish and other sources. These consultations would focus on guidelines for the protection of birds to mitigate the possibility of electrical shock (LES, 2005a).

LES would mitigate the relocation of the CO<sub>2</sub> pipeline under LES's wildlife management practices (LES, 2005a). Installation of the piping would have the same mitigation measures as for open trenches.

During operation, wildlife management practices would include managing open areas, restoring disturbed areas with native grasses and shrubs for the benefit of wildlife, and installing appropriate netting or other suitable material over the Treated Effluent Evaporative Basin and animal-friendly fencing around all basins. Landscaping techniques would employ native vegetation and if necessary, LES would take appropriate actions to implement weed control (LES, 2005b). The pond netting or other suitable material would be specifically designed to ensure that migratory birds are excluded from evaporative ponds that do not meet New Mexico Water Quality Control Commission surface-water standards for wildlife usage (LES, 2005a). However, LES would consult with the New Mexico Department of Game and Fish during design of mitigating features (LES, 2005b). LES would also monitor the basin waters during plant operations to ensure the risk to birds and wildlife is minimized.

#### 4.2.8 Socioeconomic Impacts

This section presents the potential socioeconomic impacts from the construction and operation of the proposed NEF on employment and economic activity, population and housing, and public services and finances within the 120-kilometer (75-mile) region of influence. The socioeconomic impacts are estimated using data contained in the Environmental Report and Regional Input-Output Modeling System (RIMS II) multipliers obtained for the region of influence from the U.S. Bureau of Economic Analysis (LES, 2005a; BEA, 2004).

##### 4.2.8.1 Site Preparation and Construction

###### Employment and Economic Activity

Estimated employment during the 8-year construction period would average 397 jobs per year. The highest employment would occur in the second through fifth construction years with employment peaking at 800 jobs in the fourth year (LES, 2005a). Most of the construction jobs (about 75 percent) are expected to pay between \$34,000 and \$49,000 annually, and average slightly more than \$39,000 (LES,

***The size of the socioeconomic impacts are defined as follows in this EIS:***

- *Employment/economic activity* – Small is <0.1-percent increase in employment; moderate is between 0.1- and 1.0-percent increase in employment; and large is defined as >1-percent increase in employment.
- *Population/housing impacts* – Small is <0.1-percent increase in population growth and/or <20-percent of vacant housing units required; moderate is between 0.1- and 1.0-percent increase in population growth and/or between 20 and 50 percent of vacant housing units required; and large impacts are defined as >1-percent increase in population growth and/or >50 percent of vacant housing units required.
- *Public services/financing* – Small is <1-percent increase in local revenues; moderate is between 1- and 5-percent increase in local revenues large impacts are defined as >5-percent increase in local revenues.

*Sources: NRC, 1996; DOE, 1999.*

2005a). The pay for these jobs would be considerably higher than the median household income of Lea County and the region of influence. The average construction wage would be about 15 percent higher than median incomes in New Mexico and on par with household incomes in Texas.

Initial employment would consist predominately of structural trades with the majority of these workers coming from the local area. As construction progresses, there would be a gradual shift from structural trades to mechanical and electrical trades. The majority of these higher paying skilled jobs would be expected to be filled outside of the immediate area surrounding the proposed site but within the 120-kilometer (75-mile) region of influence because of the region's rural road system that would allow long-distance commuting.

The nearly 400 new construction jobs (8-year average) would represent about 19 percent of the Lea, Andrews, and Gaines Counties construction labor force and 4.4 percent of the construction labor force of the combined eight-county region.

Facility construction would take approximately 8 years to complete and cost \$1.24 billion (in 2004 dollars), excluding escalation, contingencies, and interest (LES, 2005a). LES estimates that it would spend about \$411 million locally on construction expenditures over an 8-year period—about one-third on wages and benefits and two-thirds on goods and services.

The direct spending or local purchases made by LES would generate indirect impacts in other local industries—additional output, earnings, and new jobs. Estimating these indirect impacts is typically done using a regional input-output model and multipliers. The multipliers measure the total (direct and indirect) changes in output (i.e., spending, earnings, and employment). Although there are alternative regional input-output models, the total economic impacts of constructing the proposed NEF are estimated using the U.S. Bureau of Economic Analysis RIMS II model (BEA, 1997). This model is widely used in both private and public sector applications including the NRC in licensing of nuclear-electricity-generating facilities.

According to the RIMS II analysis (in 2004 dollars), the approximate \$50.3 million in average annual construction spending would generate additional annual output of \$67.9 million and earnings of \$18.7 million for each year the facility is under construction (Appendix F). In addition, spending on goods, services, and wages would create 582 indirect jobs on average. Figure 4-4 shows the predicted distribution of jobs over the 8-year construction period. In the first year of construction, total direct and indirect jobs would be about 760, rising to nearly 2,000 in the fourth construction year and then declining rapidly as construction of the facility nears completion. The economic impacts of construction to the region of influence would be considered MODERATE.

### Population and Housing

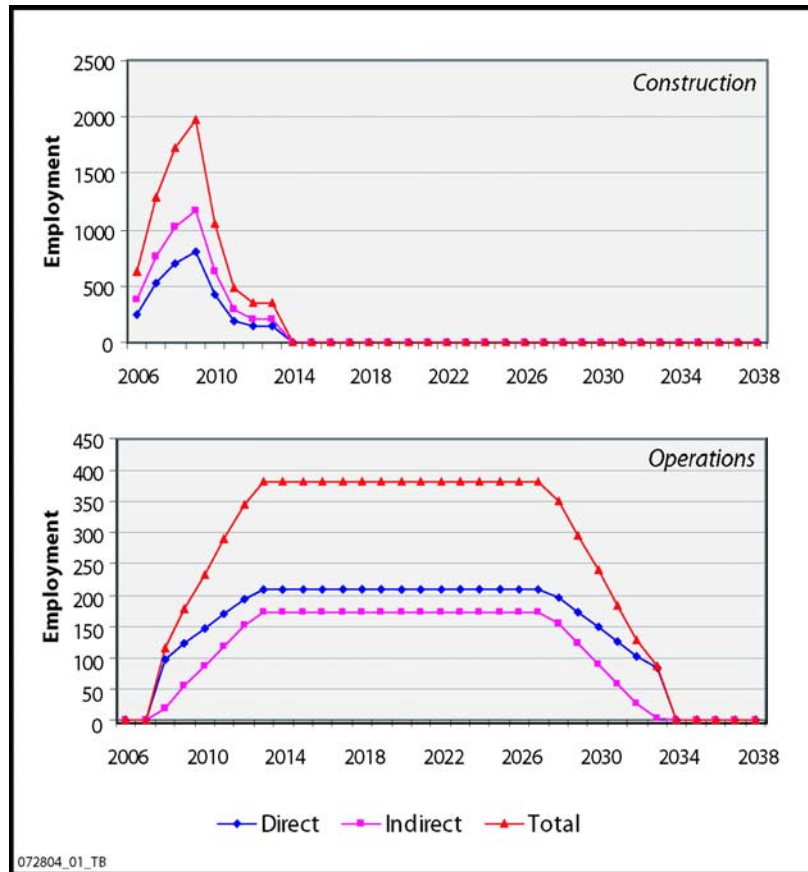
During construction of the proposed NEF, about 15 percent of the construction work force would be expected to take up residency in the surrounding community (LES, 2005a). Sixty-five percent of these workers would bring families consisting on average of a spouse and one school-age child (USCB, 2002). The total population increase in the area at peak construction would be about 280 residents and half as many on average over the 8-year construction period (LES, 2005a). In later stages of construction (i.e., the years 2012 and 2013), an increase in the local population of only 50 people would be expected. With approximately 15 percent of the housing units (owner and rental occupied) in the region of influence currently unoccupied and the relatively small number of people expected to move into the local area, there would not be any measurable impact related to demand for additional housing during facility construction. Thus, the impacts to population and housing would be SMALL.

#### Public Services and Financing

The increase in employment and population in the region of influence would require additional public services (e.g., schools, fire and police protection, medical services) and means to finance these services. The increase in numbers of school-age children would be expected to be 80 at peak construction and 40 on average. Given the number of schools in the vicinity of the proposed NEF (see Chapter 3 of this EIS), the impact to the education system would be SMALL (less than one new student per grade).

LES estimates that it would pay in 2004 dollars between \$158.4 and \$194.6 million in gross receipts, income, and property taxes to the State of New Mexico and Lea County over the 8-year construction life and the approximate 20-year operating life of the proposed NEF (LES, 2005a). Gross receipts taxes paid by local businesses could approach \$3.1 million during the eight-year construction period (LES, 2005a). Household income taxes from earnings (direct and indirect) are estimated to be about \$4.1 million annually during construction (LES, 2005a). The tax revenue impacts of site preparation and construction activities to Lea County and the city of Eunice would be MODERATE given the size of current property tax collections and gross receipts taxes received from the State of New Mexico.

#### **4.2.8.2 Operations**



**Figure 4-4 Estimated Total Employment (Direct and Indirect) over the Construction and Operation Phases of the Proposed NEF**



### Employment and Economic Activity

The proposed NEF operating work force would consist of an estimated 210 people with an average salary of approximately \$50,100 (LES, 2005a). As discussed in Chapter 3 of this EIS, this average salary compares to average household and per capita incomes in the region of influence of \$30,572 and \$14,264, respectively. Total payroll during operations in 2004 dollars would be expected to total more than \$10.9 million in salaries and wages with another \$3.3 million in benefits (LES, 2005a). Ten percent of the positions are expected to be in management, 20 percent in professional occupations, 60 percent in various skilled positions, and 10 percent in administrative positions. All positions would require at least a high school diploma plus training, which would be provided by LES in partnership with local institutions (see section 4.2.8.3) (LES, 2004a).

Local annual spending by LES on goods and services and on wages would be approximately \$9.9 million and \$10.9 million in 2004 dollars, respectively. This local spending during operations would generate indirect impacts on the local economy. The approximate \$20.8 million in annual operations spending would generate an estimated \$24 million in additional output, \$5.8 million in additional earnings, and 173 indirect jobs during peak operations (Appendix F). Figure 4-4 summarizes operations jobs over the operating life of the facility. At peak production, total operations employment due to the presence of the facility would be more than 381 jobs—210 direct and 173 indirect. The labor force in Lea, Andrews, and Gaines Counties totals over 33,000 and the labor force is well over 100,000 for the 8 counties within the region of influence. The impact on local employment during operations would be MODERATE (approximately 1 percent of the jobs in Lea, Andrews, and Gaines Counties). The number of skilled positions that would be filled by workers moving into the area from outside the region of influence is undetermined; however, with appropriate training all operations positions could eventually be filled with workers from the eight-county area.

### Population and Housing

The population increase during the operations phase would be expected to be less than that experienced during construction. Therefore, the potential impact to population and housing would be expected to be SMALL.

### Public Services and Financing

The creation of permanent jobs would lead to some additional demands for public services. However, this increase in demands would be SMALL in the region of influence given the expected level of in-migration.

During peak operations, LES would expect to pay about \$492,000 annually to the State of New Mexico and about \$127,000 to the city of Eunice and Lea County in gross receipt taxes (2004 dollars). New Mexico corporate income taxes depend on company earnings, but LES estimates that income taxes would range between \$124 and \$145 million over the facility's operating life. Payments in-lieu-of-taxes depend on the value of the property and would approach \$1 million annually at peak operations (LES, 2005a). Finally, income taxes from earnings paid (direct and indirect) would be about \$2.1 million annually during operations. Gross receipts taxes paid by local businesses could approach \$1 million annually. The tax revenue impacts of the proposed NEF operations to Lea County and the city of Eunice would be MODERATE given the size of current property tax collections and gross receipts taxes received from the State of New Mexico.

### **4.2.8.3 Mitigation Measures**

Educational programs coordinated by LES with local colleges would help develop a pool of qualified local workers (LES, 2004b). LES is on record as stating that it would provide extensive training for employees by working in partnership with local educational institutions. Discussions and planning with leaders of the public and higher education institutions in Eunice and Hobbs are ongoing (LES, 2005b). LES has partnered with the New Mexico Junior College to develop technical and other programs at the college and to sponsor scholarships for the students. Additionally, the Eunice public school system is implementing a science curriculum, and a similar curriculum is being considered by the Hobbs public school superintendent. The courses developed from the combination of partnerships could provide the basic technical training for a skilled position at the proposed NEF or for any other nuclear facility. LES would need to provide position-specific technical training appropriate for position the person qualified and was hired to fill.

### **4.2.9 Environmental Justice Impacts**

For each of the areas of technical analysis presented in this EIS, a review of impacts to the human and natural environment was conducted to determine if any minority or low-income populations could be subject to disproportionately high and adverse impacts from the proposed action. The review includes potential impacts from the construction and operation of the proposed NEF.

Through the scoping process, affected members of the African American/Black, Hispanic/Latino, and Indian tribe communities were contacted and asked to express their concerns about the project and to discuss how they perceived the construction and operation of the proposed NEF would affect them. These discussions elicited the following concerns:

- Potential loss of property values for houses owned by nearby residents.
- Potential groundwater conflicts.
- Potential radiological contamination (probably airborne given the locations involved) of persons near the proposed NEF.
- Potential transportation routes.

For each area of analysis, impacts were reviewed to determine if any potential adverse impacts to the surrounding population would occur as a result of the proposed NEF construction and operations. If potential adverse impacts were identified, a determination was made as to whether minority or low-income populations would be disproportionately affected. Table 4-2 presents a summary of the potential exceptional vulnerabilities of minority and low-income communities in the region.

Adverse impacts are defined as negative changes to the existing conditions in the physical environment (e.g., land, air, water, wildlife, vegetation, human health, etc.) or negative socioeconomic changes. Disproportionate impacts are defined as impacts that may affect minority or low-income populations at levels appreciably greater than effects on non-minority or non-low-income populations. These impacts are discussed in the following subsections.

**Table 4-2 Exceptional Circumstances Leading to Minority/Low-Income Communities Vulnerability**

<b>Exceptional Circumstances of Minority and Low-Income Communities</b>				
<b>Circumstance</b>	<b>Hispanic/Latino</b>	<b>African American/Black</b>	<b>American Indian</b>	<b>Low-Income</b>
Residences/ Locations	Possibly closest to proposed NEF, but at a minimum 4.3 km (2.6 mi) distance.	Possibly closest to proposed NEF, but at a minimum 4.3 km (2.6 mi) distance.	Possibly closest to proposed NEF, but at a minimum 4.3 km (2.6 mi) distance.	Possibly closest to proposed NEF, but at a minimum 4.3 km (2.6 mi) distance.
Use of Water	None identified (use city water).	None identified (use city water).	None identified (use city water).	None identified (use city water).
Use of Other Natural Resources	None identified.	None identified.	None identified.	None identified.
Exceptional Preexisting Health Conditions	None identified.	None identified.	None identified.	None identified.
Occupations/ Cultural Practices/ Activities	None identified.	None identified.	None conducted in area.	None identified.

km - kilometers.  
mi - miles.

**4.2.9.1 Impacts to the Land Use, Visual and Scenic, Air Quality, Geology and Soils, Ecological Resources, Noise, and Traffic**

Land disturbances and changes to land forms could result from such activities as the construction of roads and buildings at the proposed NEF site. Fugitive dust and noise emissions from such activities, if not properly controlled (and if the wind were from the east), might also be a minor issue at the nearest houses, which could have minority or low-income residents and are about 4.3 kilometers (2.6 miles) away from the proposed NEF. These impacts would be most likely to occur where most construction activity would take place, in and around the proposed NEF, which is either vacant or low-density industrial land.

Noise, dust, and other emissions associated with the construction and operation of the proposed NEF would not be expected to affect the nearest residents and would only slightly and temporarily affect wildlife. Vegetation and wildlife would be expected to be affected only within the 81-hectare (200-acre) area disturbed at the site, the access road, and the current and relocated CO<sub>2</sub> pipeline corridors crossing the site. The impacts to land use would be expected to be SMALL. The scenic qualities to neighbors of the proposed NEF site would be SMALL because the area around it is already devoted to industrial purposes and has low scenic value.

A significant increase in traffic on New Mexico Highway 234, New Mexico Highway 18, and Texas Highway 176 would occur during the initial phase of construction, and this period of inconvenience would be short. Although traffic would increase, all travelers on New Mexico Highway 234, including

those workers traveling to the site, would be affected. No disproportionate impact on minority or low-income residents would be expected.

#### **4.2.9.2 Impacts from Restrictions on Access**

Access to the proposed NEF site would be restricted once construction begins. However, the land is used for cattle grazing and zoned industrial, and has very little other productive economic, cultural, or recreational use. The restricted land area is small in size when compared to the overall size of the raw land inventory in the county and even in the local area.

Inquiries to Indian tribes with some historical ties to the area have not identified any cultural resource or service that would impact the Indian tribes. A survey of the proposed NEF site found seven archaeological sites. LES has committed to protect and avoid disturbing any cultural artifacts that might be found during construction or operations. For this reason, the impacts from restrictions on access to the proposed NEF would be SMALL.

#### **4.2.9.3 Impacts to Water Resources**

No surface-water impacts or contamination would be expected, and no groundwater conflicts between the site and the region's other water users would be anticipated. Although the facility would use up to 2.63 million cubic meters (695 million gallons) of water from the Ogallala Aquifer during its operation, this is a small portion of the 60 billion cubic meters (49 million acre-feet or 16 trillion gallons) Ogallala reserves in the New Mexico portion of the aquifer. Water requirements would be well within the excess capacities of the Eunice and Hobbs water supply systems and the impacts would be SMALL. No disproportionate impact on minority or low-income residents would be expected.

#### **4.2.9.4 Human Health Impacts from Transportation**

Section 4.2.1.1 discusses the transportation impacts of the proposed NEF. The transportation analysis found that construction impacts would be short term and would be SMALL to MODERATE. During operation, the transportation impacts would be SMALL. Minority and low-income populations are not expected to be affected any differently from others in the community. In particular, neither the construction phase nor the operations phase is expected to generate significant additional traffic congestion in the south part of Hobbs or along the Highway 18 corridor (NMDOT, 2005a, Hobbs, 2005, Lea County, 2005). Therefore, no disproportionately high and adverse effects are expected for any particular segments of the population, including minority and low-income populations that could live along the proposed transportation routes.

#### **4.2.9.5 Human Health Impacts from Operation of the Proposed NEF**

Human health impacts of the proposed NEF for normal operations are discussed in section 4.2.12 and for accidents in section 4.2.13. Although minority and possibly low-income populations live relatively near the proposed NEF site (i.e., within a 5-kilometer [3-mile] radius including the nearest residence, which is about 4.3 kilometers [2.6 miles] from the proposed NEF), it is unlikely that normal operations would affect them with radiological and nonradiological health impacts or other risks. These risks during normal operations would be small for any offsite population at any site location discussed in this EIS. Inquiries by the NRC staff to the local Hispanic/Latino and African American/Black communities, and to the States of New Mexico and Texas found no activities, resource dependencies, preexisting health conditions, or health service availability issues resulting from normal operations at the proposed NEF that would cause a health impact for the members of minority or low-income communities (either as an

individual facility or combined with the impacts of other nearby facilities). Therefore, it is unlikely that any minority or low-income population would be disproportionately and adversely affected by normal operations of the proposed NEF.

In addition, inquiries to the New Mexico and Texas Departments of Health produced no data that identified any exceptional health problems among low-income and minority residents in the Eunice-Hobbs-Andrews area. It was not possible to identify any unusual incidences of birth defects, chronic diseases, or cancer clusters in Lea or Andrews Counties, the smallest area for which published health information is available. Age-adjusted incidence of cancer is slightly lower in Lea County than in New Mexico as a whole, but it is not clear that the difference is statistically significant and the income and ethnicity of individuals with chronic diseases is not available. The same is true of Andrews County in comparison with Texas. Hispanic populations in both States show lower age-adjusted cancer incidence than the majority population, but the differences are not statistically significant in most cases. While sufficient data do not exist that show any unique health conditions among the local minority and low-income populations, there is also no evidence that the proposed NEF would compound any preexisting health problems of nearby residents or visitors in the Eunice vicinity (see Chapter 3 of this EIS).

Section 4.2.13 discusses potential accident scenarios for the proposed NEF that would result in potentially significant releases of radionuclides to air or soil, and some effects to offsite populations. NRC regulations and operating procedures for the proposed NEF are designed to ensure that the accident scenarios in section 4.2.13 would be highly unlikely. The most significant accident consequences would be those associated with the release of uranium hexafluoride ( $UF_6$ ) caused by rupturing an over-filled and/or over-heated cylinder. Such an accident would result in exposures above regulatory limits at the site boundaries and seven fatalities in the exposed population. These exposures and fatalities could happen if the wind was from the south at the time of the accident and sent the plume toward Hobbs and Lovington, New Mexico. In this scenario, minority and low-income populations would not be more obviously at risk than the majority population.

There is no mechanism for disproportionate environmental effects through accidents on minority residents near the proposed NEF. Section 4.2.13 shows that even the most severe hypothetical accident scenario would result in an exposure five times less than the 0.05 sieverts (5 rem) exposure limit for a credible intermediate-consequence accident event to any individual located outside the controlled area defined in 10 CFR § 70.61. Therefore, the risk to any population, including low-income and minority communities, would be considered SMALL.

#### **4.2.9.6 Impacts of Housing Market on Low-Income Populations**

The population in the region of influence would be expected to grow slightly due to the proposed NEF construction by as many as 280 persons during the peak construction period. Some of these persons would be expected to live in the cities of Hobbs, Eunice, or Andrews. There is a substantial vacancy rate in the local housing market; however, due to population increase and the proposed NEF-driven increase in regional purchasing power, there would be a slight increase in demand for housing in the local area. This increase should have a modest positive effect on housing demand and the nominal value of existing homes. Any negative effect on housing values would likely be offset by this increase in demand. Due to the number of workers who would be expected to move to the area, however, the impact on housing prices would be SMALL. It is likely that the 210 operations workers would want to be nearer to the proposed NEF than the construction work force.

#### 4.2.9.7 Positive Socioeconomic Impacts

The proposed NEF would cost approximately \$1.24 billion (in 2004 dollars) to build and could provide added tax income to local governments. These revenues would benefit the local community including its low-income members. The current labor force can supply some of the construction labor and services required to build the proposed NEF, but it cannot currently supply the specialized skills needed for the proposed NEF operations. However, most community members would share to some degree in the economic growth expected to be generated by the proposed NEF. No one group is likely to be disproportionately benefitted, with the possible exception of educated individuals who are currently underemployed. Targeted technical training programs could increase the pool of eligible local workers, as discussed in section 4.2.8.3.

#### 4.2.9.8 Summary

Table 4-3 summarizes the potential impacts on minority and low-income populations. 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 of the proposed NEF. In addition, no credible accident scenarios exist in which such impacts could take place. The NRC staff has concluded that no disproportionately high and adverse impacts would occur to minority and low-income populations living near the proposed NEF or along likely transportation routes into and out of the proposed NEF as a result of the proposed action. Thus, when considering the effect of the proposed NEF on environmental justice through direct environmental pathways, the impacts would be considered SMALL.

**Table 4-3 Potential Impacts of the Proposed Action on Minority and Low-Income Populations**

Potential Impact <sup>a</sup>	Potentially Affected Minority Population or Low-Income Community	Level of Impact
Land Use	Hispanic/Latino	SMALL
Historic and Cultural Resources	Indian Tribes	SMALL
Visual and Scenic Resources	Low-Income and Minority Populations near Proposed NEF Site	SMALL
Air Quality	Hispanic/Latino	SMALL
Geology and Soils	Hispanic/Latino	SMALL
Water Resources	Hispanic/Latino	SMALL
Ecological Resources	None	SMALL
Socioeconomic and Community Resources:		SMALL to MODERATE (but generally beneficial and not disproportionate)
Employment	All Minorities, Low-Income	
Population		
Housing Values		
Recreation	Low-Income and Minority Populations	SMALL
Economic Structure	Low-Income and Minority Populations	SMALL to MODERATE (and beneficial)

Potential Impact <sup>a</sup>	Potentially Affected Minority Population or Low-Income Community	Level of Impact
Noise	Low-Income and Minority Populations near Proposed NEF Site	SMALL
Transportation	Hispanic/Latino, African American/Black, Low-Income	MODERATE (but not disproportionate)
Human Health Radiological Nonradiological	Low-Income and Minority Populations near Proposed Transport Routes and Downwind of the Proposed NEF Site	SMALL

<sup>a</sup> All other potential impacts would be SMALL and not disproportionate.

#### 4.2.10 Noise Impacts

This section discusses the noise impacts from the construction and operation of the proposed NEF. The effects of noise on human health can be considered from both physiological and behavioral perspectives. Historically, physiological hearing loss was considered the most serious effect of exposure to excessive or prolonged noises, with such effects largely related to human activities in the workplace and near construction activities. Excessive noises would also repel wildlife and affect their presence. Noise levels at the proposed NEF site are generated predominately by traffic movements and, to a much lesser extent, by commercial, industrial, and across-State-line-related traffic.

##### 4.2.10.1 Site Preparation and Construction

During preparation and construction at the site, noise from earth-moving and construction activities would add to the noise environment in the immediate area. Construction activities would be expected to occur during normal daytime working hours. It should be noted that no specific Federal, State, tribal, or local standards regulate noise from daytime construction activities. Noise sources include the movement of workers and construction equipment, and the use of earth-moving heavy vehicles, compressors, loaders, concrete mixers, and cranes. Table 4-4 provides a list of construction equipment and corresponding noise levels at a reference distance of 15 meters (50 feet) and the attenuated noise levels associated with increasing distance from those sources.

**Table 4-4 Attenuated Noise Levels (Decibels A-Weighted<sup>a</sup>) Expected for Operation of Construction Equipment**

Source	Distance from Source					
	15 m (50 ft)	30 m (98 ft)	45 m (148 ft)	60 m (197 ft)	120 m (394 ft)	360 m (1,181 ft)
Heavy Truck	85	79	76	73	68	56
Dump Truck	84	78	75	72	67	55
Concrete Mixer	85	79	76	73	68	56
Jackhammer	85	79	76	73	68	56
Scraper	85	79	76	73	68	56
Dozer	85	79	76	73	68	56
Generator (< 25 KVA)	82	76	73	70	64	52
Crane	85	79	76	73	68	56
Loader	80	74	71	68	62	50
Paver	85	79	76	73	68	56
Excavator	85	79	76	73	68	56
Claw Shovel	93	87	83	81	75	66
Pile Driver	95	89	86	83	77	65

<sup>a</sup> The most common single-number measure is the A-weighted sound level, often denoted dBA. The A-weighted response simulates the sensitivity of the human ear at moderate sound levels (Bruce et al., 2003).

KVA - kilovolt amps; ft - feet; m - meters.

Source: Thalheimer, 2000.

The noise estimates are based on noise produced by single sources. Multiple sources generate additional noise, and that noise is additive but not in a simple linear way (Bruce et al., 2003). For example:

- Two 90-decibel noise sources make 93 decibels.
- Four 90-decibel noise sources make 96 decibels.
- Eight 90-decibel noise sources make 99 decibels.
- Sixteen 90-decibel noise sources make 102 decibels.
- Each doubling of identical noise sources results in a 3-decibel increase in noise.

A conservative estimate of construction site noise has been developed by assuming an average of about 20 heavy equipment items of various types operating in the same general area over a 10-hour workday. Hourly average noise levels during the active workday would average 90 to 104 decibels A-weighted at 15 meters (50 feet) from the work site. This value is consistent with the noise exposures among construction workers at industrial, commercial, and institutional construction sites. Employees who work in close proximity to the equipment would be exposed to noise levels of 81 to 108 decibels A-weighted (Sutter, 2002). For comparison, the NRC staff projected 110 decibels A-weighted for the earlier proposed LES facility near Homer, Louisiana (NRC, 1994).

Distance attenuation and atmospheric absorption would reduce construction noise levels at greater distances. Estimated noise levels would be about 86 decibels A-weighted at 120 meters (394 feet), 77 decibels A-weighted at 360 meters (1,181 feet), 64 decibels A-weighted at 1.6 kilometers (1 mile), and 59



decibels A-weighted at 2.6 kilometers (1.6 miles). Actual noise levels probably would be less than these estimates due to terrain and vegetation effects. There are no residences closer than 4.3 kilometers (2.6 miles) of the project site, and nighttime construction activity, while it could occur, is not anticipated.

The nearest manmade structures of the proposed NEF to the site boundaries, excluding the two driveways, would be the Site Stormwater Detention Basin and the Visitor's Center at the southeast corner of the site. The southern edge of the Site Stormwater Detention Basin would be approximately 15.2 meters (50 feet) from the south perimeter fence and approximately 53.3 meters (175 feet) from New Mexico Highway 234. The eastern edge of the Visitor's Center would be approximately 68.6 meters (225 feet) from the east perimeter fence (LES, 2005a).

The highest noise levels are predicted to be within the range of 84 to 98 decibels A-weighted at the south fence line during construction of the Site Stormwater Detention Basin and between 68 to 86 decibels A-weighted at the east fence line during construction of the Visitor's Center. These projected noise level ranges are within the U.S. Department of Housing and Urban Development (HUD) unacceptable sound pressure level guidelines (HUD, 2002). Noise levels exceeding 85 decibels A-weighted are considered as "clearly unacceptable" and could call for efforts to improve the conditions. However, these predicted high noise levels would be expected to occur only during the day and only during the construction phase. Also, these levels are associated with the use of specific equipment, such as claw shovels or pile drivers (Table 4-4). Because the site is bordered by a main trucking thoroughfare, a landfill, an industrial facility, and a vacant property, these intermittent noise levels would not be expected to impact any sensitive receptors surrounding the site. Noise levels at the nearest residence location (approximately 4.3 kilometers [2.6 miles] away) would be negligible.

There would be an increase in traffic noise levels from construction workers and material shipments. These short-term noise impacts would be SMALL and may be limited to workday mornings and afternoons.

#### **4.2.10.2 Operations**

The location of the enrichment facilities of the proposed NEF relative to the site boundaries and sensitive receptors would mitigate noise impacts to members of the public. Based on the Almelo Enrichment plant in the Netherlands, noise levels during operations would average 39.7 decibels A-weighted with a peak level of 47 decibels A-weighted at the site boundaries (LES, 2005a). These noise levels are below the HUD guidelines of 65 decibels A-weighted for industrial facilities with no nearby residences (HUD, 2002). The noise sources would be far enough away from offsite areas (i.e., the nearest residence is 4.3 kilometers [2.6 miles] from the site) that their contribution to offsite noise levels would be SMALL. Some noise sources (e.g., public address systems, and testing of radiation and fire alarms) could have onsite impacts. Such onsite noise sources would be intermittent and are not expected to disturb members of the public outside of facility boundaries.

Noise from traffic associated with the operation of this type of facility would likely produce a very small increase in the noise level that would be limited to daytime. The roads mostly impacted during operations would be New Mexico Highway 234 and New Mexico Highway 18. These two highways already convey varying amounts of truck traffic (NMDOT, 2005b; Hobbs, 2005), and the impacts due to the proposed NEF operation would be SMALL (LES, 2005a).

#### **4.2.10.3 Mitigation Measures**

During construction, LES would maintain noise-suppression systems in proper working condition on the construction vehicles and could limit the operation of construction equipment to daylight hours to help mitigate noise (however, construction could occur during nights and weekends, if necessary [LES, 2005a]). For the operating facility, noise generation from gas centrifuges and other processes would be primarily limited to the inside of buildings. The relative distance to the site boundaries would also mitigate noise impacts to members of the public. Both phases (construction and operation) would also adhere to Occupational Safety and Health Administration (OSHA) standards in 29 CFR § 1926.52 for occupational hearing protection (OSHA, 2004).

#### **4.2.11 Transportation Impacts**

This section discusses the potential impacts from transportation to and from the proposed NEF site. Transportation impacts would involve the movement of personnel and material during both construction and operation of the proposed NEF and includes:

- Transportation of construction materials and construction debris.
- Transportation of the construction work force.
- Transportation of the operational work force.
- Transportation of feed material (including natural UF<sub>6</sub> and supplies for the enrichment process).
- Transportation of the enriched UF<sub>6</sub> product.
- Transportation of process wastes (including radioactive wastes) and DUF<sub>6</sub> waste.

Transportation impacts are discussed below for site preparation and construction, and operations. Transportation impacts associated with decommissioning are discussed in section 4.3.11.

##### **4.2.11.1 Site Preparation and Construction**

The construction of the proposed NEF would cause an impact on the transportation network surrounding the site due to the daily commute of up to 800 construction workers during the peak years of construction (LES, 2004c). During the 8 years of construction, there would be an average of approximately 400 workers. The commute of the peak number of construction workers could increase the daily traffic on New Mexico Highway 234 from 1,823 vehicles per day (Table 3-21 of Chapter 3) to 3,423 vehicles per day (1,823 plus 2 trips for each of 800 vehicles). This increased traffic volume represents 40 to 50 percent of the design volume of New Mexico Highway 234. The design volume is approximately 6,000 vehicles per day or 1,500 to 2,000 vehicles per hour (NMDOT, 2005a). New Mexico Highway 234 has been identified as requiring maintenance improvements (i.e., resurfacing and shoulder improvements) regardless of whether the proposed NEF is constructed. Funding allocation for the maintenance improvements would be dependent on further action by the State of New Mexico.

For New Mexico Highway 18, which is a four-lane highway that intersects New Mexico Highway 234 in Eunice, New Mexico, the New Mexico Department of Transportation estimates that the current traffic volume is currently 6,000 vehicles per day. The design capacity of New Mexico Highway 18 is approximately 20,000 vehicles per day. Traffic slowdowns and delays do not typically occur except sometimes within the city of Hobbs between 3:00 pm to 4:00 pm during the school year and 4:45 pm to 5:30 pm during the week as part of rush hour. Highway 18 would act as the primary link between the

proposed NEF and the primary population centers in, and to the north of, Hobbs. Workers traveling from north of Hobbs to the proposed NEF would also have access to the South Bypass around Hobbs, which is currently lightly used. No plans are currently in place to make any upgrades to New Mexico Highway 18 (NMDOT, 2005b; Lea County, 2005; Hobbs, 2005).

Because traffic volume would remain below the design capacities of New Mexico Highways 18 and 234 and it is not anticipated that any traffic slowdowns or delays would occur except at the entrance of the proposed NEF during shift changes, the impacts to overall traffic patterns and volumes would be SMALL to MODERATE to New Mexico Highway 234 and SMALL to New Mexico Highway 18.

In addition to the increased traffic that might result from the construction along New Mexico Highway 234, there would be an increased potential for traffic accidents. Assuming a 64-kilometer (40-mile) round-trip commute (LES, 2005a) (i.e., the round trip distance between the city of Hobbs and the proposed NEF site), 800 vehicles would travel an estimated 51,500 kilometers (32,000 miles) daily for 250 days per year. This average round-trip distance was assumed because Hobbs, New Mexico, is the closest principal business center to the proposed NEF site. Based on the vehicle accident rate of 34.86 injuries and 3.02 fatalities per 100 million vehicle miles in Lea County (UNM, 2003), 3 injuries and less than 1 fatality could occur during the peak construction employment year. The increased traffic due to commuting construction workers would have a SMALL to MODERATE impact on the volume of traffic on New Mexico Highway 234.

Approximately 3,400 trucks would arrive and depart the site in each of the 3 peak years of construction (about 14 trucks per day) (LES, 2005a). Assuming an average round-trip distance of 64 kilometers (40 miles), 209,214 vehicle kilometers (130,000 vehicle miles) per year would accrue, resulting in less than one injury and less than one fatality from the construction truck traffic. The impacts from the truck traffic to and from the site would have only a SMALL impact on overall traffic.

Approximately 6,500 loads of clay using 15-metric-ton (16.5-ton) trucks from a nearby quarry could be brought to the proposed NEF site for the construction of the two lined basins. Because the round trip distance would be approximately 3.2 kilometers (2 miles) using private access roads (i.e., no public vehicular traffic), the impacts from the hauling of the clay would be from truck emissions. The risk from these truck emissions over the duration of the clay shipments would be less than  $6 \times 10^{-6}$  fatalities. Therefore, due to the very small risk for a fatality, these impacts would be SMALL.

Two construction access roadways off New Mexico Highway 234 would be built to support construction (LES, 2005a). The materials delivery construction access road would run north from New Mexico Highway 234 along the west side of the proposed NEF site. The personnel construction access road would run north from New Mexico Highway 234 along the east side of the proposed NEF site. Both roadways would eventually be converted to permanent access roads upon completion of construction. As a result, impacts from the access road construction would be SMALL.

#### **4.2.11.2 Operations**

Operation impacts could occur from the transport of personnel, nonradiological materials and radioactive material to and from the proposed NEF site. The impacts from each are discussed below.

##### Transportation of Personnel

There would be minimal impact on traffic (an increase of 10 percent) based on an operational work force of 210 workers (LES, 2005a) and assuming 1 worker per vehicle. Given this traffic volume and assuming

a round-trip distance of 64.4 kilometers (40 miles), less than one injury and less than one fatality would result from traffic accidents per year. Operations at the proposed NEF would require 21 shift changes per week to provide personnel for continuous operation. Based on 5 shifts worked per employee, approximately 4.2 employees would be required to staff each position resulting in about 50 positions per shift on an average, or 50 vehicles per shift (LES, 2005a), assuming no carpooling. This traffic would have a SMALL impact on the traffic on New Mexico Highways 18 and 234.

#### Transportation of Nonradiological Materials

The transportation impacts of nonradiological materials would include the delivery of routine supplies necessary for operation and the removal of nonradiological wastes. Supplies delivered to and waste removed from the site would require 2,800 and 149 truck trips, respectively, on an annual basis (LES, 2005a). Supplies would range from janitorial supplies to laboratory chemicals. This traffic would have a SMALL impact on the traffic on New Mexico Highway 234. Assuming a round-trip distance of 64.4 kilometers (40 miles) for the supplies and 8 kilometers (5 miles) for the waste removal, 113,000 vehicle miles per year would occur resulting in less than one injury and less than one fatality per year of operation. The 64.4-kilometer (40-mile) distance is reflective of receiving janitorial and laboratory chemical supplies from the Hobbs, New Mexico, area since this is the principal business community for Lea County, New Mexico. The 8-kilometer (5-mile) distance would be the round-trip distance from the proposed NEF site to the Lea County Landfill, the proposed destination for all of the nonhazardous and nonradioactive waste generated by the proposed NEF.

#### Transportation of Radiological Materials

Transportation of radiological materials would include shipments of feed material (natural  $UF_6$ ), product material (enriched  $UF_6$ ),  $DUF_6$ , radioactive wastes, and empty cylinders. LES did not propose rail transportation as a means of shipping radioactive material and wastes (LES, 2005a); however, the NRC staff believes that shipment by rail could be possible in the foreseeable future. Therefore, impacts of both truck and rail shipments are presented below. The transportation of the radiological materials is subject to NRC and U.S. Department of Transportation (DOT) regulations. All the materials shipped to or from the proposed NEF can be shipped in Type A containers. The product (enriched  $UF_6$ ) is considered by the NRC to be fissile material and would require additional fissile packaging considerations such as using an overpack surrounding the shipping container. However, when impacts are evaluated, the effects of the overpackage are not incorporated into the assessment and result in a set of conservative assumptions.

In addition to the potential radiological impacts from the shipment of  $UF_6$ , chemical impacts from an accident involving  $UF_6$  could affect the surrounding public. When released from a shipping cylinder,  $UF_6$  would react to the moisture in the atmosphere to form hydrofluoric acid and uranyl fluoride.

The potential impacts from these shipments, other than normal truck traffic on New Mexico Highway 234, were analyzed using two computer codes: WebTragis (ORNL, 2003) and RADTRAN 5 (Neuhauser and Kanipe, 2003). WebTragis is a web-based version of the Transportation Routing Analysis Geographic Information System (Tragis) used to calculate highway, rail, or waterway routes within the United States. RADTRAN 5 is used to calculate the potential impacts of radiological shipments using the routing information generated by WebTragis. Appendix D presents details of the methodology, calculations, and results of the analyses. The potential chemical impacts have been analyzed in previously published EISs by U.S. Department of Energy (DOE) (DOE 2004a; DOE, 2004b).

RADTRAN 5 presents results from several different types of impacts. The term "Incident-Free" includes potential impacts of transportation without a release of radioactive material from shipping. The impacts

include health impacts (fatalities) from traffic accidents, health impacts (latent cancer fatalities) from the vehicle exhaust emissions, and health impacts (latent cancer fatalities) from the direct radiation from a shipment passing by the public. These impacts were estimated based on one year of shipments and are presented for both the general public surrounding the transportation routes and the maximally exposed individual. Risks are calculated based on a population density located within 800 meters (0.5 mile) of the transportation route. The accident results contain the impacts from a range of accidents severe enough to release radioactive material to the environment and represent the risk (the impact of the accident times the probability of the accident occurring). It was conservatively assumed that the once the container is breached, the material that is released is assumed to be airborne and respirable.

The potential chemical impacts are presented in a scenario in which an accident has occurred with a fire under stable meteorological conditions (Pasquill stability Class E and F, see section 3.5.2.3 of Chapter 3 of this EIS). The impacts are categorized according to the number of persons with the potential for adverse health effects and the number of persons with the potential for irreversible adverse health effects. The impact on the maximally exposed individual is also presented.

#### Radiological Shipments by Truck

Impacts in this section include the traffic impacts from the truck traffic as well as the radiation exposure from the radiological shipments involving UF<sub>6</sub>, triuranium octaoxide (U<sub>3</sub>O<sub>8</sub>), and other low-level radioactive wastes. Figure 4-5 shows the various shipping routes assuming the shipments would follow

#### ***Latent Cancer Fatality from Exposure to Ionizing Radiation***

*A latent cancer fatality (LCF) is a death from cancer resulting from, and occurring an appreciable time after, exposure to ionizing radiation. Death from cancer induced by exposure to radiation may occur at any time after the exposure takes place. However, latent cancers would be expected to occur in a population from one year to many years after the exposure takes place. To place the significance of these additional LCF risks from exposure to radiation into context, the average individual has approximately 1 chance in 4 of dying from cancer (LCF risk of 0.25).*

*The U.S. Environmental Protection Agency has suggested (Eckerman et al., 1999) a conversion factor that for every 100 person-Sievert (10,000 person-rem) of collective dose, approximately 6 individuals would ultimately develop a radiologically induced cancer. If this conversion factor is multiplied by the individual dose, the result is the individual increased lifetime probability of developing an LCF. For example, if an individual receives a dose of 0.00033 Sieverts (0.033 rem), that individual's LCF risk over a lifetime is estimated to be  $2 \times 10^{-5}$ . This risk corresponds to a 1 in 50,000 chance of developing a LCF during that individual's lifetime. If the conversion factor is multiplied by the collective (population) dose, the result is the number of excess latent cancer fatalities.*

*Because these results are statistical estimates, values for expected latent cancer fatalities can be, and often are, less than 1.0 for cases involving low doses or small population groups. If a population group collectively receives a dose of 50 Sieverts (5,000 rem), which would be expressed as a collective dose of 50 person-Sievert (5,000 person-rem), the number of potential latent cancer fatalities experienced from within the exposure group is 3. If the number of latent cancer fatalities estimated is less than 0.5, on average, no latent cancer fatalities would be expected.*

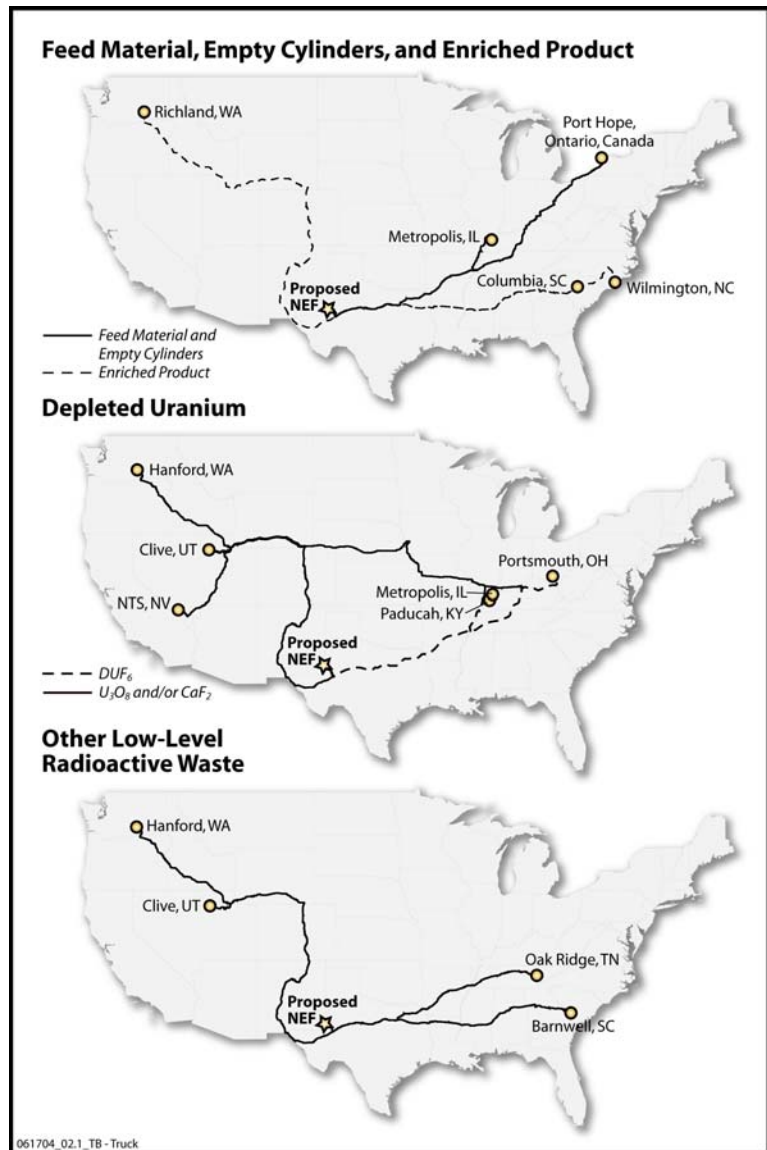
*Source: NRC, 2005a; NRC, 2004b.*

routes that are used for highway routing controlled quantities. These routes are designated by the U.S. Department of Transportation to minimize the potential impacts to the public from the transportation of radioactive materials.

The NRC staff evaluated the number of shipments of each type of material based on the amount and type of material being transported to and from the site. The feed material (natural  $UF_6$ ) would arrive onsite in up to 690 Type 48Y cylinders or 890 Type 48X cylinders per year delivered from Metropolis, Illinois, or Port Hope, Ontario, Canada (LES, 2005a). There would be one Type 48X or one 48Y cylinder per truck (up to three per day). The product (enriched  $UF_6$ ) would be shipped in 350 Type 30B cylinders to any of three fuel manufacturing plants located in Richland, Washington; Wilmington, North Carolina; or Columbia, South Carolina. Up to five Type 30B cylinders could be shipped on one truck; however, LES proposes to ship only three cylinders per truck (LES, 2005a). Therefore, 117 truck shipments per year (approximately 1 every 3 days) would leave the site.

In addition, 350 Type 30B cylinders would be brought to the site every year so that they could be filled with enriched  $UF_6$  and shipped back offsite. Assuming 12 empty cylinders per truck, 30 truck deliveries would be required per year (about 1 every 2 weeks).

The impacts of transporting the depleted uranium to a conversion facility were also analyzed. Conversion could be performed either at a DOE or a private conversion facility. Currently DOE conversion facilities are being constructed at Paducah, Kentucky, and Portsmouth, Ohio. For the purpose of this analysis, it is assumed that the private conversion facility will be located at Metropolis, Illinois. As discussed previously in section 2.1.9, LES suggested the construction of a  $DUF_6$  to  $U_3O_8$  conversion facility near Metropolis, Illinois. The existing ConverDyn plant at Metropolis, Illinois, converts natural  $U_3O_8$  (yellowcake) from mining and milling operations into  $UF_6$  feed for enrichment facilities, such as the proposed NEF, and  $UF_4$  for other uses (ConverDyn, 2004). Construction of a private  $DUF_6$  to  $U_3O_8$  conversion facility near the ConverDyn plant in Metropolis, Illinois, would allow the



**Figure 4-5 Proposed Transportation Routes via Truck for Radioactive Shipments**

hydrogen fluoride produced during the  $\text{DUF}_6$  to  $\text{U}_3\text{O}_8$  conversion process to be reused to generate more  $\text{UF}_6$  feed material while the  $\text{U}_3\text{O}_8$  would be shipped for final disposition. The NRC staff has determined that construction of a private  $\text{DUF}_6$  to  $\text{U}_3\text{O}_8$  conversion plant near Metropolis, Illinois, would have similar environmental impacts as construction of an equivalent facility anywhere in the United States. The advantage of selecting the Metropolis, Illinois, location is the proximity of the ConverDyn  $\text{U}_3\text{O}_8$  to  $\text{UF}_6$  conversion facility and, for the purposes of assessing impacts, the DOE conversion facility in nearby Paducah, Kentucky, for converting DOE-owned  $\text{DUF}_6$  to  $\text{U}_3\text{O}_8$ . Because the proposed private plant would be similar in size and the effective area would be the same as the Paducah conversion plant, the environmental impacts would be similar.

The  $\text{DUF}_6$  would be placed in Type 48Y cylinders for temporary onsite storage with eventual shipment offsite. The NRC staff estimates that approximately 627 truck shipments (one cylinder per truck) would be needed annually to transport the  $\text{DUF}_6$  to a conversion facility where the waste would be converted into  $\text{U}_3\text{O}_8$ .

If DOE performs the conversion, they could transport the  $\text{U}_3\text{O}_8$  from Paducah, Kentucky, and Portsmouth, Ohio to Envirocare near Clive, Utah, or to the Nevada Test Site for disposal. The  $\text{U}_3\text{O}_8$  from Metropolis, Illinois, could be shipped to Envirocare. If an adjacent conversion facility to the proposed NEF (i.e., outside the State of New Mexico) is used, then the  $\text{U}_3\text{O}_8$  could be shipped to Envirocare.

The hydrofluoric acid generated during the process of converting the  $\text{DUF}_6$  to  $\text{U}_3\text{O}_8$  might be reused in the process of generating  $\text{UF}_6$  or neutralized to  $\text{CaF}_2$  for potential disposal at the same site as the  $\text{U}_3\text{O}_8$ . The conversion process would generate over 6,200 metric tons (6,800 tons) of  $\text{U}_3\text{O}_8$  and 5,200 metric tons (5,700 tons) of  $\text{CaF}_2$  annually. Assuming that this material would be shipped in 11.3 metric ton (25,000 pound) capacity bulk bags, 547 bulk bags of  $\text{U}_3\text{O}_8$  and 461 bulk bags of  $\text{CaF}_2$  would annually be required to ship this waste to a disposal site, assuming one bulk bag per truck.

The empty Type 48Y cylinders that were used to transport the  $\text{DUF}_6$  to the conversion facility would be shipped back to the feed material suppliers in Metropolis, Illinois, or Port Hope, Ontario. In this analysis, the NRC staff assumed that these shipments would occur from the proposed NEF (63 empty cylinders per year) and an adjacent, private conversion facility (627 empty cylinders per year) over the same routes used for the feed materials. The empty Type 48Y cylinders would contain solid residues, or heels, that would remain after evacuating the  $\text{UF}_6$  from the cylinders. The heels would contain radioisotopic daughter products produced by the  $\text{UF}_6$ . Half the number of feed product shipments would be needed to transport the empty cylinders back to the feed material suppliers. (Full cylinders would be shipped one per truck and empty cylinders would be returned two per truck.)

Other radiological waste of approximately 87,000 kilograms (191,800 pounds) per year (LES, 2005a), would be shipped offsite requiring eight truck shipments per year to GTS-Duratek in Oak Ridge, Tennessee, for processing or to either Envirocare near Clive, Utah, or U.S. Ecology in Hanford, Washington, or Barnwell, South Carolina, for disposal. The NRC staff included the Barnwell, South Carolina, site to encompass the range of sites which could be available in the future. The resulting total number of trucks containing radiological shipments (i.e., both incoming and outgoing material) would be about six per day, which would have a minimal impact on New Mexico Highway 234 traffic.

Table 4-5 presents a summary of the potential impacts for one year of shipments via truck, calculated by RADTRAN 5. The results are presented in terms of a range of values for each type of shipment. The range represents the lowest to highest impacts for the various proposed shipping routes. For example, for the feed material, the values represent one year of shipments from both Metropolis, Illinois, and Port Hope, Ontario, Canada. If some feed materials were provided from Metropolis and the remaining from

Port Hope, the impacts would be somewhere between the low and high values (impacts could be evaluated by taking the fraction of material from Metropolis times the impacts from Metropolis plus the fraction of material from Port Hope times the impacts from Port Hope). Also included in the table are the range of impacts summed over the shipments of the feed, product, depleted uranium, waste, and empty cylinders.

For the members of the general public, the largest impacts are from the nonradiological incident-free transportation of the radioactive materials (less than 1 fatality from traffic accidents and about 2 latent cancer fatalities from the vehicle emissions.) For the radiological impacts, the risk of latent cancer fatalities from postulated accidents would be no greater than 0.3 per year. This is about two orders of magnitude higher than the direct radiation received from the incident-free transportation due to the fact that during a postulated accident, the inhalation of the radioactive material is much more significant than the direct radiation. However, due to the low total annual latent cancer fatalities values due to accidents (less than 0.5), no radiation-induced latent cancer fatalities would be expected to occur to members of the public.

### Radiological Shipments by Rail

Impacts in this section include the traffic impacts from rail traffic as well as radiation exposure from radiological shipments involving  $UF_6$ ,  $U_3O_8$ , and other low-level radioactive wastes. For rail shipments it was assumed that the contents of four trucks would be carried by one railcar (based on the analysis results presented in DOE, 2004a and DOE, 2004b). The feed material (natural  $UF_6$ ) would arrive onsite in 173 or 223 deliveries per year (see Figure 4-6). The feed material would arrive in either Type 48X or Type 48Y cylinders delivered from Metropolis, Illinois, or Port Hope, Ontario, Canada. The product (enriched  $UF_6$ ) would be shipped in 350 Type 30B cylinders to any of three fuel manufacturing plants in Richland, Washington; Wilmington, North Carolina; or Columbia, South Carolina, in 30 shipments per year. Up to 12 cylinders could be shipped in one railcar. In addition, 350 Type 30B cylinders would be brought to the site every year so that they could be filled with enriched  $UF_6$  and shipped offsite. It was assumed that one rail delivery of these cylinders would be made per year.

The  $DUF_6$  would be placed in Type 48Y cylinders for either temporary storage onsite or shipment offsite. If the  $DUF_6$  were shipped offsite, 158 rail shipments with four cylinders per railcar would be used to transport the cylinders to Paducah, Kentucky; Portsmouth, Ohio; or Metropolis, Illinois, where it would be converted into  $U_3O_8$ . After conversion, the  $U_3O_8$  would be shipped from either Paducah or Portsmouth to Envirocare in Clive, Utah, or the Nevada Test Site for disposal or it would be shipped to Envirocare from Metropolis in gondola railcars with four bulk bags per car. The hydrofluoric acid generated during the process of converting the  $DUF_6$  to  $U_3O_8$  could be reused in the process of generating  $UF_6$  or neutralized to  $CaF_2$  for potential disposal at the same site as the  $U_3O_8$ . If the  $DUF_6$  were converted to the more chemically stable form of  $U_3O_8$  at an adjacent conversion facility to the proposed



**Table 4-5 Summary of Impacts to Humans from Truck Transportation for One Year of Radioactive Shipments<sup>a</sup>**

Type of Material	Range of Impact	Incident-Free						Maximum Individual In-Transit (Increased Risk of LCF)	Accident (Risk of LCF to the General Population)
		General Population			Occupational Workers				
		Traffic Accidents (Fatalities)	LCF		Traffic Accidents (Fatalities)	LCF			
			Vehicle Emissions	Direct Radiation		Vehicle Emissions	Direct Radiation		
Feed Material	Low	1×10 <sup>-1</sup>	3×10 <sup>-1</sup>	1×10 <sup>-3</sup>	3×10 <sup>-2</sup>	4×10 <sup>-3</sup>	2×10 <sup>-3</sup>	5×10 <sup>-9</sup>	8×10 <sup>-2</sup>
	High	2×10 <sup>-1</sup>	1	3×10 <sup>-3</sup>	6×10 <sup>-2</sup>	1×10 <sup>-2</sup>	9×10 <sup>-3</sup>	7×10 <sup>-9</sup>	2×10 <sup>-1</sup>
Product	Low	2×10 <sup>-2</sup>	8×10 <sup>-2</sup>	1×10 <sup>-4</sup>	6×10 <sup>-3</sup>	9×10 <sup>-4</sup>	8×10 <sup>-4</sup>	4×10 <sup>-10</sup>	7×10 <sup>-2</sup>
	High	4×10 <sup>-2</sup>	8×10 <sup>-2</sup>	2×10 <sup>-4</sup>	1×10 <sup>-2</sup>	1×10 <sup>-3</sup>	1×10 <sup>-3</sup>	4×10 <sup>-10</sup>	8×10 <sup>-2</sup>
Disposition of Depleted uranium	Low	8×10 <sup>-2</sup>	4×10 <sup>-2</sup>	6×10 <sup>-4</sup>	2×10 <sup>-2</sup>	3×10 <sup>-3</sup>	4×10 <sup>-4</sup>	2×10 <sup>-9</sup>	9×10 <sup>-9</sup>
	High	2×10 <sup>-1</sup>	4×10 <sup>-1</sup>	2×10 <sup>-3</sup>	5×10 <sup>-2</sup>	7×10 <sup>-3</sup>	3×10 <sup>-3</sup>	5×10 <sup>-9</sup>	6×10 <sup>-2</sup>
Waste	Low	1×10 <sup>-3</sup>	5×10 <sup>-3</sup>	3×10 <sup>-7</sup>	4×10 <sup>-4</sup>	6×10 <sup>-5</sup>	1×10 <sup>-5</sup>	1×10 <sup>-12</sup>	4×10 <sup>-5</sup>
	High	3×10 <sup>-3</sup>	5×10 <sup>-3</sup>	4×10 <sup>-7</sup>	8×10 <sup>-4</sup>	1×10 <sup>-4</sup>	2×10 <sup>-5</sup>	1×10 <sup>-12</sup>	5×10 <sup>-5</sup>
Empty Cylinders	Low	6×10 <sup>-2</sup>	2×10 <sup>-1</sup>	2×10 <sup>-3</sup>	2×10 <sup>-2</sup>	2×10 <sup>-3</sup>	5×10 <sup>-3</sup>	9×10 <sup>-9</sup>	3×10 <sup>-2</sup>
	High	9×10 <sup>-2</sup>	4×10 <sup>-1</sup>	4×10 <sup>-3</sup>	2×10 <sup>-2</sup>	4×10 <sup>-3</sup>	1×10 <sup>-2</sup>	9×10 <sup>-9</sup>	9×10 <sup>-2</sup>
Total Impacts	Low	3×10 <sup>-1</sup>	6×10 <sup>-1</sup>	3×10 <sup>-3</sup>	7×10 <sup>-2</sup>	1×10 <sup>-2</sup>	8×10 <sup>-3</sup>	2×10 <sup>-8</sup>	2×10 <sup>-1</sup>
	High	6×10 <sup>-1</sup>	2	9×10 <sup>-3</sup>	2×10 <sup>-1</sup>	2×10 <sup>-2</sup>	3×10 <sup>-2</sup>	2×10 <sup>-8</sup>	5×10 <sup>-1</sup>

<sup>a</sup> Risks are calculated based on a population density located within 800 meters (0.5 mile) of the transportation route.  
LCF - latent cancer fatalities.

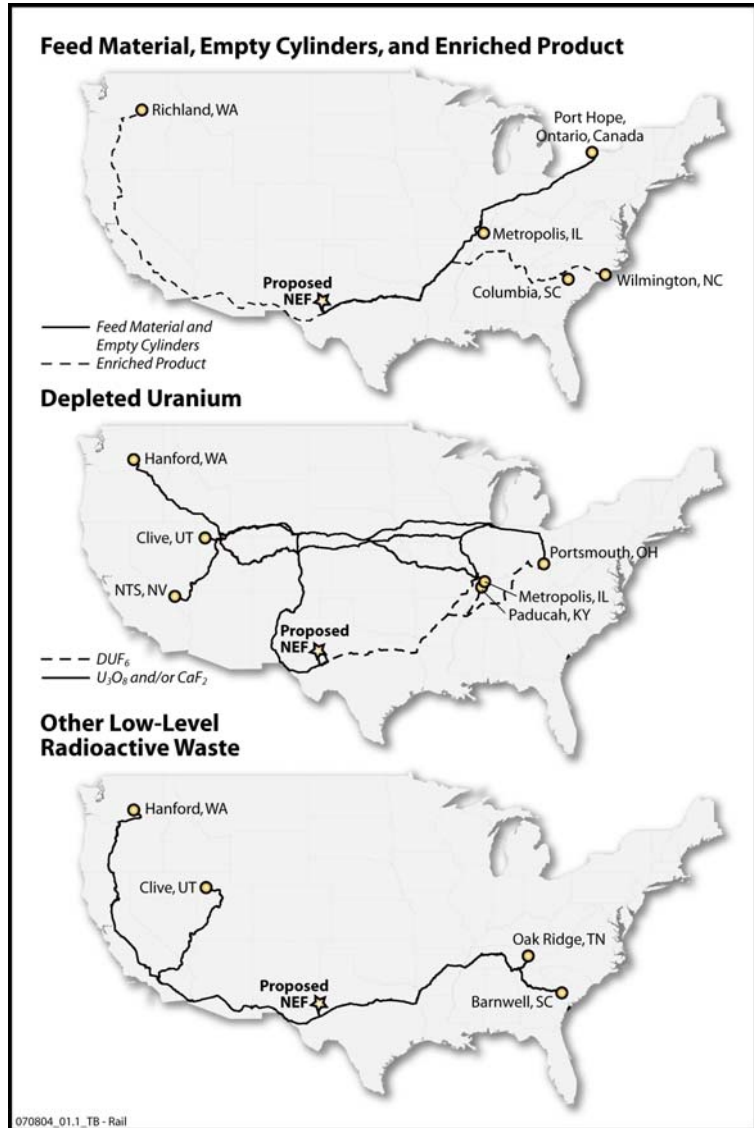
NEF, the conversion products of  $U_3O_8$  and  $CaF_2$  would be shipped to a disposal site in 137 and 116 gondola railcars, respectively.

Similar to the truck scenario, the empty Type 48Y cylinders would be shipped back to the feed material suppliers from the proposed NEF and an adjacent, private conversion facility. Half the number of feed product shipments would be needed to transport the empty cylinders back to the feed material suppliers.

Other radiological waste of approximately 87,000 kilograms (191,800 pounds) per year (LES, 2005a) would be shipped offsite requiring two rail shipments per year to either Envirocare, Barnwell, South Carolina; GTS-Duratek in Oak Ridge, Tennessee (for processing only); or U.S. Ecology in Hanford, Washington.

Table 4-6 presents a summary of the potential impacts for one year of shipments via rail, calculated by RADTRAN 5. The results are presented in terms of a range of values for each type of shipment. The range represents the potential impacts from the lowest to highest impact for the various proposed shipping routes. Also included in the table are the range of impacts summed over the shipments of the feed, product, depleted uranium, waste, and empty cylinders.

For shipments by rail, the largest impacts to the general public result from nonradiological, incident-free shipments. The impact of these rail shipments is smaller than the impact of nonradiological, incident-free truck shipments, because fewer rail shipments than truck shipments would occur. However, rail transport impacts to occupational workers would be greater than impacts from truck transport, because the number of rail workers is assumed to be greater (five workers for rail and two workers for trucks).



**Figure 4-6 Proposed Transportation Routes via Rail for Radioactive Shipments**

**Table 4-6 Summary of Impacts to Humans from Rail Transportation for One Year of Radioactive Shipments<sup>a</sup>**

Type of Material	Range of Impact	Incident-Free						Maximum Individual In-Transit (Increased Risk of LCF)	Accident (Risk of LCF to the General Population)
		General Population			Occupational Workers				
		Traffic Accidents (Fatalities)	LCF		Traffic Accidents (Fatalities)	LCF			
			Vehicle Emissions	Direct Radiation		Vehicle Emissions	Direct Radiation		
Feed Material	Low	$6 \times 10^{-2}$	$1 \times 10^{-2}$	$6 \times 10^{-2}$	$6 \times 10^{-2}$	$4 \times 10^{-4}$	$7 \times 10^{-4}$	$5 \times 10^{-9}$	$1 \times 10^{-1}$
	High	$1 \times 10^{-1}$	$4 \times 10^{-2}$	$8 \times 10^{-2}$	$1 \times 10^{-1}$	$7 \times 10^{-4}$	$1 \times 10^{-3}$	$7 \times 10^{-9}$	$3 \times 10^{-1}$
Product	Low	$1 \times 10^{-2}$	$5 \times 10^{-3}$	$1 \times 10^{-2}$	$1 \times 10^{-2}$	$8 \times 10^{-5}$	$2 \times 10^{-4}$	$9 \times 10^{-10}$	$1 \times 10^{-1}$
	High	$2 \times 10^{-2}$	$5 \times 10^{-3}$	$1 \times 10^{-2}$	$2 \times 10^{-2}$	$1 \times 10^{-4}$	$2 \times 10^{-4}$	$9 \times 10^{-10}$	$2 \times 10^{-1}$
Disposition of Depleted Uranium	Low	$3 \times 10^{-2}$	$5 \times 10^{-3}$	$6 \times 10^{-3}$	$3 \times 10^{-2}$	$2 \times 10^{-4}$	$5 \times 10^{-5}$	$5 \times 10^{-10}$	$1 \times 10^{-8}$
	High	$8 \times 10^{-2}$	$2 \times 10^{-2}$	$1 \times 10^{-2}$	$8 \times 10^{-2}$	$5 \times 10^{-4}$	$3 \times 10^{-3}$	$1 \times 10^{-9}$	$4 \times 10^{-1}$
Waste	Low	$8 \times 10^{-4}$	$2 \times 10^{-4}$	$2 \times 10^{-4}$	$8 \times 10^{-4}$	$5 \times 10^{-6}$	$4 \times 10^{-6}$	$2 \times 10^{-11}$	$4 \times 10^{-5}$
	High	$1 \times 10^{-3}$	$3 \times 10^{-4}$	$2 \times 10^{-4}$	$1 \times 10^{-3}$	$7 \times 10^{-6}$	$4 \times 10^{-6}$	$2 \times 10^{-11}$	$8 \times 10^{-5}$
Empty Cylinders	Low	$3 \times 10^{-2}$	$7 \times 10^{-3}$	$3 \times 10^{-2}$	$3 \times 10^{-2}$	$2 \times 10^{-4}$	$1 \times 10^{-3}$	$3 \times 10^{-9}$	$6 \times 10^{-2}$
	High	$5 \times 10^{-2}$	$2 \times 10^{-2}$	$3 \times 10^{-2}$	$5 \times 10^{-2}$	$3 \times 10^{-4}$	$1 \times 10^{-3}$	$3 \times 10^{-9}$	$1 \times 10^{-1}$
Total Impacts	Low	$1 \times 10^{-1}$	$3 \times 10^{-2}$	$1 \times 10^{-1}$	$1 \times 10^{-1}$	$8 \times 10^{-4}$	$2 \times 10^{-3}$	$9 \times 10^{-9}$	$3 \times 10^{-1}$
	High	$3 \times 10^{-1}$	$8 \times 10^{-2}$	$1 \times 10^{-1}$	$3 \times 10^{-1}$	$2 \times 10^{-3}$	$6 \times 10^{-3}$	$1 \times 10^{-8}$	1

<sup>a</sup> Risks are calculated based on a population density located within 800 meters (0.5 mile) of the transportation route.  
LCF - latent cancer fatalities.

### Import and Export Impacts

With the exception of Port Hope in Ontario, Canada, LES has identified only domestic locations for the transportation of feed material to and enriched uranium from the proposed NEF (LES, 2004a). Further, LES has stated that at least 70% of its production from the first 10 years of operation has been contracted with U.S. nuclear utility companies (NRC, 2005b). However, it is possible that the proposed NEF could import feed materials from overseas suppliers or export enriched product to overseas purchasers. In this case, the proposed NEF would need to comply with licensing and other requirements for import and export activities in 10 CFR Part 110. Any import or export activity would also need to be conducted in accordance with transportation security requirements in 10 CFR Part 73. Transportation security for the proposed NEF is addressed in its Physical Security Plan. The discussion below summarizes expected transportation impacts associated with potential import/export activities along routes to three possible seaports: Wilmington, North Carolina and Charleston, South Carolina for the east coast; and Seattle, Washington for the west coast.

In this EIS, the NRC staff performed analyses for the transportation of enriched uranium from the proposed NEF to fuel fabrication facilities in Wilmington, North Carolina; Columbia, South Carolina; and Richland, Washington. These analyses are representative of enriched uranium shipments from the proposed NEF to the seaports listed above, because the truck and rail routes that would be used in transporting enriched uranium to these seaports have similar distances and population densities to the routes analyzed for shipments to the three non-port locations.

The NRC staff also performed analyses for the transportation of feed material to the proposed NEF from Port Hope, Ontario, Canada and transportation of  $U_3O_8$  from the proposed NEF to Hanford, Washington. These analyses are considered representative of feed material shipments from the seaports to the proposed NEF, because the distances, population densities, and expected external radiation doses for such shipments would not be significantly different from those already analyzed.

Therefore, for shipments of both feed material and enriched uranium to or from seaports, transportation impacts (incident-free and accidents) would be SMALL and not be significantly different from transportation impacts discussed in this section.

### Chemical Impacts from Transportation Accidents

This section presents the chemical impacts from potential transportation accidents involving  $UF_6$  and  $U_3O_8$ . If  $UF_6$  is released to the atmosphere, it reacts with water vapor in the air to form hydrofluoric acid and uranyl fluoride ( $UO_2F_2$ ). These products are chemically toxic to humans. Hydrofluoric acid is extremely corrosive and can damage the lungs and cause death if inhaled at high enough concentrations. Uranium compounds, in addition to being radioactive, can have toxic chemical effects (primarily on the kidneys) if it enters by way of ingestion and/or inhalation (DOE, 2004a; DOE, 2004b).

Results from chemical impact analyses performed by DOE (DOE, 2004a; DOE, 2004b) were used to estimate the chemical impacts associated with the proposed NEF. In two EISs that assessed the construction and operation of a  $DUF_6$  conversion facility, DOE presented an evaluation of the chemical impacts resulting from transportation accidents involving  $DUF_6$ . The results are applicable because the chemical impact analysis performed by DOE is independent of the shipping route and the amount of enrichment. Chemical impacts would be only dependent on the amount of  $UF_6$  being transported and not on enrichment. In addition, the proposed NEF would use the same containers (Type 48Y cylinders) that DOE evaluated.

DOE evaluated the potential chemical impacts to the public from a hypothetical severe transportation accident (both truck and rail) that involves a fire (DOE, 2004a; DOE, 2004b). The results shown in Table 4-7 are based on the assumption that the accident occurred. The probability that the accident could happen is very remote. Since the accident location is not known, DOE evaluated the impacts for three different population densities. In addition, DOE presented the number of people that could be affected by two levels of effects (potential for adverse health effects and irreversible adverse health effects). The assumptions supporting the impacts summarized in the table are provided in Appendix D, section D.5.

**Table 4-7 Potential Chemical Consequences to the Population from Severe Transportation Accidents**

Source	Mode	Rural	Suburban	Urban
<i>Number of Persons with the Potential for Adverse Health Effects<sup>b</sup></i>				
DUF <sub>6</sub>	Truck	6	760	1,700
	Rail	110	13,000	28,000
Depleted U <sub>3</sub> O <sub>8</sub> (in bulk bags)	Truck	0	12	28
	Rail	0	47	103
<i>Number of Persons with the Potential for Irreversible Adverse Health Effects<sup>a, b</sup></i>				
DUF <sub>6</sub>	Truck	0	1	3
	Rail	0	2	4
Depleted U <sub>3</sub> O <sub>8</sub> (in bulk bags)	Truck	0	5	10
	Rail	0	17	38

<sup>a</sup> Exposure to hydrofluoric acid or uranium compounds is estimated to result in fatality to approximately 1 percent or less of those persons experiencing irreversible adverse effects.

<sup>b</sup> An adverse health effect includes respiratory irritation or skin rash associated with lower chemical concentrations. An irreversible adverse health effect generally occur at higher chemical concentrations and are permanent in nature.

Source: DOE, 2004a; DOE, 2004b.

For transporting DUF<sub>6</sub> by truck, up to 1,700 people could suffer adverse health effects, depending on where the accident occurs. Up to three people in an urban setting could suffer irreversible adverse health effects that could include death, impaired organ function (such as central nervous system or lung damage), and other effects that could impair daily functions. For transporting depleted U<sub>3</sub>O<sub>8</sub> in bulk bags from a DUF<sub>6</sub> conversion facility to a low-level radioactive waste disposal facility by truck, up to 28 people could potentially suffer adverse health effects and up to 10 people could potentially suffer irreversible adverse health effects if an accident occurs in an urban setting.

For rail, the chemical impacts of an accident would be higher than for transportation by truck because of the larger quantity of material being transported in a shipment (four times greater by rail than by truck). Up to 28,000 people could experience adverse health effects for an accident in an urban setting that involves a rail shipment of DUF<sub>6</sub>, with four additional people potentially suffering irreversible effects. When transporting depleted U<sub>3</sub>O<sub>8</sub> in bulk bags by rail (four times the quantity than by truck), up to 103 people could suffer adverse health effects with 38 people potentially suffering irreversible effects if an accident occurs in an urban setting.

Due to the range in potential impacts of chemical exposure if an accident occurs during transportation, the impacts could be from SMALL to MODERATE, depending on the location (rural, suburban, or urban).

#### **4.2.11.3 Summary of Transportation Impacts**

There is the potential for one fatality as a result of construction worker traffic to and from the site during each of the three peak years of construction. In addition, the overall traffic would almost double on New Mexico Highway 234 during the peak construction period. New Mexico Highway 18 has the available capacity to absorb additional traffic created by construction and operations related to the proposed NEF without adverse effects. Any potential traffic impacts at the entrance to the proposed NEF could be mitigated by varying the starting and quitting times of the construction workers and by incorporating additional traffic safety measures such as building turning lanes. Per NMAC, Chapter 18, Title 31 Part 6 regulations, the NMDOT could require LES and/or Lea County to perform a traffic study and coordinate with the NMDOT to determine the specific safety improvements to be taken. Therefore, the increased traffic due to commuting construction workers would have a SMALL to MODERATE impact on the volume of traffic on New Mexico Highway 234 and a SMALL impact on New Mexico Highway 18. The impacts from truck traffic to and from the site would have only a SMALL impact on the overall traffic.

Tables 4-5 and 4-6 present the various impacts from either truck or rail transport of radioactive materials on a yearly basis. There is a potential for less than one fatality to either the general public or occupational workers from traffic accidents using either truck or rail transport. The emissions of either trucks or trains could result in about two latent cancer fatalities. Incident-free direct radiation could result in less than one latent cancer fatality to either the general public or occupational workers. The accident risk was assessed to be less than one latent cancer fatality to the general public resulting from accidents involving either a truck or rail. The impacts from the truck and rail traffic to and from the site would have a SMALL to MODERATE impact on overall traffic.

Table 4-7 presents the potential chemical consequences as the result of hypothetical severe transportation accidents. By evaluating the impacts for three different population densities (i.e., rural, suburban, or urban), potential impacts due to chemical exposures as the result of a transportation accident would range from SMALL to MODERATE depending on the location of the accident.

#### **4.2.11.4 Mitigation Measures**

A dust-suppression program would be implemented to control dust that would be created from construction traffic. BMPs would be used to maintain temporary roads to minimize the risk of accidents. Bare earthen areas would be stabilized, and earthen materials would be removed from paved areas and contained during excavation activities to ensure that traffic is not impeded. Open-bodied trucks would be covered when in motion. Temporary access roads and parking areas would be upgraded to permanent structures upon completion of construction. Only approved transport vehicles, containers, and casks would be used. Equipment operators would be qualified in the equipment they would operate. Procedures would be in place for manifesting all materials that enter and exit the facility including radiological materials and wastes. To mitigate for traffic-impacts during construction, LES would implement work shifts and would encourage car pooling to minimize the impact to traffic (LES, 2005a).

The NMDOT would review any access permit application, as noted in Table 1-3. If a permit is issued, the NMDOT would likely assign mitigation measures specific to the proposed NEF (e.g., turning lanes) (NMDOT, 2005b). These NMDOT actions are predicated on the granting of an NRC license to LES for the construction, operation, and decommissioning of the proposed NEF.

#### **4.2.12 Public and Occupational Health Impacts**

Except for transportation impacts, this section presents the environmental impacts to the surrounding public and the proposed NEF site work force from site preparation and construction and operation of the facility for both radiological and nonradiological (i.e., hazardous chemical) exposures. For members of the public, this EIS considered the affected population would be within an 80-kilometer (50-mile) radius of the proposed NEF site with the primary exposure pathway being from gaseous effluents. Workers at the proposed NEF site could also be affected by airborne or gaseous releases in addition to direct chemical and radiation exposure due to handling UF<sub>6</sub> cylinders, working near the enrichment equipment, and decontaminating cylinders and equipment.

Because there is a distinct separation between the construction and operational phases for buildings processing uranium at the proposed NEF, the construction phase impacts would likely be exclusively nonradiological. Even with the overlap in time between the construction and operational phases, this segregation can still be applied for the assessment of public and occupational health impacts due to very limited similarities between the sources of the impacts during each phase. For the most part, the construction phase does not involve radioactive material or the same hazardous chemicals that are employed during the operational phase. However, near the conclusion of the construction phase, hazardous chemicals that are directly associated with the assembly and installation of the enrichment process equipment would be used, presenting similar chemical hazards as those present in the operational phase.

##### **4.2.12.1 Site Preparation and Construction**

###### Nonradiological Impacts

The proposed action involves a major construction activity with the potential for industrial accidents related to construction vehicle accidents, material-handling accidents, falls, etc., that could result in temporary injuries, long-term injuries and/or disabilities, and even fatalities. The proposed activities are not anticipated to be any more hazardous than those for a major industrial construction or demolition project.

To estimate the number of potential fatal and nonfatal occupational injuries from the proposed action, data on fatal and nonfatal occupational injuries per worker per year were collected from the U.S. Department of Labor's Bureau of Labor Statistics. Nonfatal occupational injury rates specific to New Mexico for the year 2002 and State of New Mexico fatal occupational injury rates for the year 2000 for both the construction and manufacturing industries were used to calculate each of the rates for the proposed NEF (DOL, 2004). Table 4-8 presents the rates and the estimated fatal and nonfatal injuries associated with the construction of the proposed NEF.

The expected fatal and nonfatal injuries are based on a peak labor force of 800 employees and a total work force of 3,175 person-years performing construction and excavation work over the time of site preparations and construction activities for the years of 2006 to 2013 (LES, 2005a). Nonfatal workday injuries are expected to occur for an estimated 6 percent of the work force. The expected number of fatalities that could occur in a year is estimated to be less than 1 (0.3). Over the 8-year construction period, this has the potential for approximately two fatalities. Precautions would be taken to prevent industrial injuries and fatalities including adherence to policies and worker-safety procedures.

**Table 4-8 Expected Occupational Impacts Associated with Construction of the Proposed NEF**

Category	Injury Rate (Injuries per 100 Worker per Year)	Expected Injuries per Year for All Workers	
		Peak Year	Average <sup>a</sup>
Nonfatal Injuries	6.1 <sup>b</sup>	~49	~24
Fatal Injuries	7.4×10 <sup>-4</sup>	0.6	0.3

<sup>a</sup> Construction injuries based on a total construction period from 2006 to 2013 with a total 3,175 worker-years of involvement.

<sup>b</sup> Incidence rate for entire construction or miscellaneous manufacturing industry activity in New Mexico for the year 2002.

Sources: DOL, 2004; LES, 2005a.

In addition, impacts from criteria pollutants have been considered. Criteria pollutants would result from the combustion engines used in heavy equipment. The impacts to human health from air pollutants would be SMALL as shown in section 4.2.4.

### Radiological Impacts

Construction workers building those portions of the proposed NEF next to completed Cascade Halls would have the potential of being exposed to uranium material. Segregation of the areas to prevent construction workers from entering operational areas of the facility would minimize their exposures to those of the general office staff with annual doses of less than 0.05 millisieverts (5 millirem).

#### **4.2.12.2 Operations**

This section evaluates the potential environmental impacts to members of the public and workers from the proposed NEF. The evaluation process involved applying the methodology from Appendix C and reviewing information and site-specific data provided from LES, technical reports and safety analyses related to the potential hazards, and other independent information sources.

### Nonradiological Impacts

The potential nonradiological impacts during operations of the proposed NEF are associated with the hazardous chemicals that are necessary for the operation and maintenance of the equipment as well as components of the facility's effluent releases (LES, 2005a). The hydrogen fluoride and methylene chloride are regulated under NESHAP in accordance with EPA and State of New Mexico regulations where the impacts to the public would be SMALL. Occupational exposure to the airborne release of hydrogen fluoride would be no greater than at the point of discharge with a concentration of 3.9 micrograms per cubic meter (LES, 2005a). This concentration level is significantly below the OSHA and National Institute for Occupational Safety and Health limits for an 8-hour work shift of 2.5 milligrams per cubic meter; thus the associated occupational chemical impacts would also be SMALL (DHHS, 2004).

Many of the chemicals proposed for use are common to industrial facilities and include cleaning agents (acetone, ethanol, and methylene chloride), lubricants (i.e., Fomblin® oil), maintenance fluid, and laboratory-related chemicals (i.e., anhydrous sodium carbonate). The quantity of hazardous material and resulting wastes would be low enough for the proposed NEF to be considered a small-quantity generator for solid hazardous and mixed wastes under the *Resource Conservation and Recovery Act* (RCRA).

Other nonradiological occupational impacts include potential industrial injuries and fatalities. Table 4-9 shows the occupational injury and fatality rates within the State of New Mexico based on values associated with similar manufacturing industries and, for comparison, the reported occupational injury



rates for the Capenhurst facility (LES, 2005a). Based on the past operational history of the Capenhurst and Almelo facilities, the chances of a fatality during operation of the proposed NEF are considered unlikely at  $4 \times 10^{-4}$  fatalities per year.

**Table 4-9 Expected Occupational Impacts Associated with the Operation of the Proposed NEF**

Category	Injury Rate (Injuries per 100 Worker per Year)	Injuries per Year for All Workers	
		Average <sup>b</sup>	Reported <sup>c</sup>
Nonfatal Injuries	3.8 <sup>a</sup>	~8	~5
Fatal Injuries	$1.9 \times 10^{-4}$	$\sim 4 \times 10^{-4}$	0

<sup>a</sup> Incidence rate for miscellaneous manufacturing industry activity in the State of New Mexico for the year 2002.

<sup>b</sup> Operational injuries based on a total operation period from 2008 to 2028 with a constant work force of 210 employees.

<sup>c</sup> Reported average injuries per year from Capenhurst facility for injuries at the A3, E22, and E23 plants (total of 2.96 million separative work units [SWU]) during the years 1999-2003.

Sources: DOL, 2004; LES, 2005a.

The overall nonradiological impacts resulting from the operation of the proposed NEF would be SMALL for members of the public and workers.

#### Radiological Impacts

Exposure to uranium may occur from routine operations as a result of small controlled releases to the atmosphere from the uranium enrichment process lines and decontamination and maintenance of equipment, releases of radioactive liquids to surface water as well as a result of direct radiation from the process lines, storage, and transportation of UF<sub>6</sub>. Direct radiation and skyshine (radiation reflected from the atmosphere) in offsite areas due to operations within the Separations Building would be expected to be undetectable because most of the direct radiation associated with the uranium would be almost completely absorbed by the heavy process lines, walls, equipment, and tanks that would be employed at the proposed NEF, and would have to travel a significant distance to reach the nearest member of the public.

Under the proposed action, the major source of occupational exposure would be expected to be direct radiation from the UF<sub>6</sub> with the largest exposure source being the empty Type 48Y cylinders with residual material, full Type 48Y cylinders containing either the feed material or the DUF<sub>6</sub>, Type 30B product cylinders, and various traps that help minimize UF<sub>6</sub> losses from the cascade.

Atmospheric releases would be expected to be a source of public exposure. Such releases would be primarily controlled through the Technical Services Building and Separations Building gaseous effluent vent systems. Table 4-10 shows the expected isotopic release mix resulting from the annual gaseous release of 10 grams (0.022 pounds) of uranium and for the bounding annual gaseous release of approximately  $9 \times 10^6$  becquerels (240 microcuries) of uranium (LES, 2005a). For gaseous effluents resulting from the sublimation of UF<sub>6</sub>, no significant amount of radioactive particulate material (uranium or its radioactive decay daughters) would be expected to be introduced into the process ventilation system and released to the environment after gaseous effluent vent system filtration.

**Table 4-10 Annual Effluent Releases**

Radionuclide	Estimated Releases <sup>a</sup>		Bounding Releases	
	TSB GEVS kBq/year (: Ci/year)	SB GEVS kBq/year (: Ci/year)	TSB GEVS kBq/year (: Ci/year)	SB GEVS kBq/year (: Ci/year)
<sup>234</sup> U	77.7 (2.10)	45.5 (1.23)	2,738 (74.0)	1,591 (43.0)
<sup>235</sup> U	3.59 (0.097)	2.11 (0.057)	125.8 (3.4)	74.0 (2.0)
<sup>236</sup> U	0.48 (0.013)	0.30 (0.008)	17.0 (0.46)	11.1 (0.3)
<sup>238</sup> U	77.7 (2.10)	45.5 (1.23)	2,738 (74.0)	1,591 (43.0)
Total	159.5 (4.31)	93.6 (2.53)	5,619 (151.9)	3,267 (88.3)

<sup>a</sup> Equivalent to 10 grams (0.022 pounds) of uranium.

GEVS - gaseous effluent vent system; SB - Separations Building; TSB - Technical Service Building;  
kBq - kilobecquerels; : Ci - microcuries.

Source: LES, 2005a.

### Dose Evaluation Methods

Radioactive material released to the atmosphere, surface water, and groundwater is dispersed during transport through the environment and could be transferred to humans through inhalation, ingestion, and direct exposure pathways. Therefore, evaluation of impacts requires consideration of potential receptors, source terms, environmental transport, exposure pathways, and conversion of estimates of intake to radiation dose. The dose evaluation applies the methodology, assumptions, and data presented in Appendix C to calculate the potential impacts to members of the public. A summary of the Appendix C results for public exposure follows.

### Public Exposure Impacts

Radioactive material would be released to the atmosphere from the proposed NEF site through stack releases from the Technical Service Buildings and Separations Building gaseous effluent vent systems and from the potential resuspension of contaminated soil within the Treated Effluent Evaporative Basin. While a member of the public would not be expected to spend a significant amount of time at the site boundary closest to the UBC Storage Pad, this possibility is included in this impact assessment. Thus, the analyses estimated the potential dose to a hypothetically maximally exposed individual located at the proposed NEF site boundary along with members of the public who may be present or live near the proposed NEF. The expected exposure pathways include inhalation of airborne contaminants and direct exposure from material deposited on the ground. In addition, members of the public may also consume food containing deposited radionuclides and inadvertently ingest re-suspended soil from the ground or on local food sources (e.g., leafy vegetables, carrots, potatoes, and beef from nearby grazing livestock).

Table 4-11 presents potential effective dose equivalents for the maximally exposed individuals and the general population. The general population within 80 kilometers (50 miles) of the proposed NEF would receive a collective dose of 0.00014 person-sieverts (0.014 person-rem), equivalent to  $8.4 \times 10^{-6}$  latent cancer fatalities from normal operations.

**Table 4-11 Radiological Impacts to Members of the Public Associated with Operation of the Proposed NEF**

Receptor	Location from NEF Stacks	Airborne Pathway CEDE <sup>a</sup>	Direct Radiation <sup>b</sup>	Annual Dose	LCF
Population, person-Sv (person-rem)	Within 80.5 km (50 mi) of Proposed NEF	$1.4 \times 10^{-4}$ ( $1.4 \times 10^{-2}$ )	N/A	$1.4 \times 10^{-4}$ ( $1.4 \times 10^{-2}$ )	$8.4 \times 10^{-6}$
Highest Boundary (Stack Releases), mSv (mrem)	Northern Boundary 1,010 m (0.6 mi)	$5.3 \times 10^{-5}$ ( $5.3 \times 10^{-3}$ )	0.189 (18.9)	0.189 (18.9)	$1.1 \times 10^{-5}$
Nearest Resident <sup>c</sup> , mSv (mrem)	4,300 m (2.6 mi) West	$1.3 \times 10^{-5}$ ( $1.3 \times 10^{-3}$ )	N/A	$1.3 \times 10^{-5}$ ( $1.3 \times 10^{-3}$ )	$7.9 \times 10^{-10}$
Lea County Landfill Worker, mSv (mrem)	917 m (0.57 mi) Southeast	$1.9 \times 10^{-5}$ ( $1.9 \times 10^{-3}$ )	N/A	$1.9 \times 10^{-5}$ ( $1.9 \times 10^{-3}$ )	$1.1 \times 10^{-9}$
Wallach Concrete, Inc., mSv (mrem)	1,867 m (1.16 mi) North-Northwest	$2.2 \times 10^{-5}$ ( $2.2 \times 10^{-3}$ )	0.021 (2.1)	0.021 (2.1)	$1.3 \times 10^{-6}$
Sundance Services, Inc., mSv (mrem)	1,706 m (1.06 mi) North-Northwest	$2.6 \times 10^{-5}$ ( $2.6 \times 10^{-3}$ )	0.026 (2.6)	0.026 (2.6)	$1.6 \times 10^{-6}$
WCS, mSv (mrem)	1,513 m (0.94 mi) East-Northeast	$9.3 \times 10^{-6}$ ( $9.3 \times 10^{-4}$ )	0.021 (2.1)	0.017 (1.7)	$1.0 \times 10^{-6}$

<sup>a</sup> Committed effective dose equivalent.

<sup>b</sup> Direct radiation from the maximum number of UBCs over the lifetime of the proposed NEF.

<sup>c</sup> Includes airborne contamination from the Treated Effluent Evaporative Basin.

LCF - latent cancer fatalities; m - meters; mi - miles; km - kilometers; mSv - millisieverts; Sv - sieverts; mrem - millirem.

It is possible that contaminated soil at the bottom of the Treated Effluent Evaporative Basin could be resuspended into the air. To analyze the potential for health impacts due to resuspension, the NRC staff assumed that 0.57 kilograms (1.3 pounds) per year of uranium for 30 years would settle into the Treated Effluent Evaporative Basin soil (LES, 2005a). As a result,  $27.4 \times 10^6$  becquerels (7.4 millicuries) of uranium was assumed to accumulate in the basins. The contaminated soil would have a resuspension factor of  $4 \times 10^{-6}$  per hour. This could result in an additional annual effective dose of  $1.7 \times 10^{-6}$  millisieverts ( $1.7 \times 10^{-4}$  millirem) to the nearest resident, with the largest offsite dose at the south site boundary of  $1.7 \times 10^{-5}$  millisieverts ( $1.7 \times 10^{-3}$  millirem) (LES, 2005a). The resuspension factor for soils could be as high as  $9 \times 10^{-5}$  per hour for areas that are fairly open to the prevailing winds (DOE, 1994). Because the Treated Effluent Evaporative Basin would be excavated below ground with a net or other suitable material covering the basin, the ability of prevailing winds to resuspend contaminated soils would be expected to be less than that assumed by LES, and the resulting impacts are considered conservative.

Normal operations at the proposed NEF would have SMALL impacts to public health. The total annual dose from all exposure pathways would be significantly less than the regulatory requirement of 1 millisieverts (100 millirem) (10 CFR § 20.1301). The most significant impact would be from direct radiation exposure to receptors close to the UBC Storage Pad (filled and empty Type 48Y cylinders). The results are based on very conservative assumptions, and it is anticipated that actual exposure levels would be less than those presented in Table 4-11. All exposures are significantly below the 10 CFR Part 20 regulatory limit of 1 millisieverts (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 millisieverts (1 millirem).

## Occupational Exposure Impacts

Tables 4-12 and 4-13 provide the estimated occupational dose rates and annual exposures to representative workers within the proposed NEF site.

**Table 4-12 Estimated Occupational Dose Rates for Various Locations or Buildings Within the Proposed NEF**

Location	Dose Rate, mSv per hour (mrem per hour)
Plant General Area (excluding Separations Building Modules)	< 0.0001 (< 0.01)
Separations Building Module - Cascade Halls	0.0005 (0.05)
Separations Building Module - UF <sub>6</sub> Handling Area and Process Services Area	0.001 (0.1)
Empty Used UF <sub>6</sub> Shipping Cylinder <sup>a</sup>	0.1 on Contact (10.0) 0.010 at 1 m (3.3 ft) (1.0)
Full UF <sub>6</sub> Shipping Cylinder	0.05 on Contact (5.0) 0.002 at 1 m (3.3 ft) (0.2)

<sup>a</sup> Refer to section C.3.2 for an explanation regarding why the dose rate for an empty used UF<sub>6</sub> cylinder is higher than a full UF<sub>6</sub> cylinder.

ft - feet; m - meters; mSv - millisieverts; mrem - millirem.

Source: LES, 2005a.

**Table 4-13 Estimated Occupational Annual Exposures for Various Occupations for the Proposed NEF**

Position	Annual Dose Equivalent <sup>a</sup> mSv (mrem)
General Office Staff	< 0.05 (< 5.0)
Typical Operations and Maintenance Technician	1 (100)
Typical Cylinder Handler	3 (300)

<sup>a</sup> The average worker exposure at the Urenco Capenhurst facility during the years 1998 through 2002 was approximately 0.2 millisieverts (20 mrem).

mSv - millisieverts; mrem - millirem.

Source: LES, 2005a.

The proposed NEF personnel-monitoring program would monitor for internal exposure from intake of soluble uranium (LES, 2005d). LES would also apply an annual administrative limit of 10 millisieverts (1,000 millirem) that includes external radiation sources and internal exposure from no more than 10 mg of soluble uranium in a week. Appendix C also provides historical data for past occupational exposures at U.S. and European enrichment facilities. Tables C-10, C-11, and C-12 of Appendix C demonstrate that LES estimated occupational exposures are consistent with the historical data.

The occupational exposure analysis and the historical exposure data from Capenhurst, Almelo, and U.S. enrichment facilities, demonstrate that a properly administered radiation protection program at the proposed NEF would maintain the radiological occupational impacts below the regulatory limits of 10

CFR § 20.1201. Therefore, the impacts from occupational exposure at the proposed NEF would be SMALL.

#### **4.2.12.3 Mitigation Measures**

Plant design features such as controls and processes would be incorporated into the proposed NEF to minimize the gaseous and liquid effluent releases, and to maintain the impacts to workers and the surrounding population below regulatory limits. This would include maintaining system process pressures that are sub-atmospheric, reclaiming any off-gasses to recover as much UF<sub>6</sub> as possible, and subsequently passing effluents through prefilters, high-efficiency particulate air filters, and activated carbon filters. All emissions would be monitored, and alarm systems would activate and shutdown facility systems/processes if contaminants exceed prescribed limits. Procedures would ensure that a UF<sub>6</sub> cylinder is handled only when the material is in the solid state; liquid wastes are processed through precipitation, ion exchange, and evaporation; all onsite stormwater is directed to basins within the proposed NEF boundaries; and environmental monitoring and sampling is performed to ensure compliance with regulatory discharge limits. An as-low-as-reasonably-achievable (ALARA) program would be implemented in addition to routine radiological surveys and personnel monitoring. BMPs associated with compliance with 20 CFR Part 1910 regarding OSHA standards would be implemented.

#### **4.2.13 Public and Occupational Health Impacts from Accidents During Operations**

The operation of the proposed NEF would involve risks to workers, the public, and the environment from potential accidents. The regulations in 10 CFR Part 70, Subpart H, “Additional Requirements for Certain Licensees Authorized to Possess a Critical Mass of Special Nuclear Material,” require that each applicant or licensee evaluate, in an Integrated Safety Analysis, its compliance with certain performance requirements. Appendix C of this EIS summarizes the methods and results used by the NRC to independently evaluate the consequences of potential accidents identified in LES’s Integrated Safety Analysis. The accidents evaluated are a representative selection of the types of accidents that are possible at the proposed NEF.

The analytical methods used in this consequence assessment are based on NRC guidance for analysis of nuclear fuel-cycle facility accidents (NRC, 1990; NRC, 1991; NRC, 1998; NRC, 2001). With the exception of the criticality accident, the hazards evaluated involve the release of UF<sub>6</sub> vapor from process systems that are designed to confine UF<sub>6</sub> during normal operations. As described below, UF<sub>6</sub> vapor poses a chemical and radiological risk to workers, the public, and the environment. LES has committed to various preventive and mitigative measures to significantly reduce these risks.

##### **4.2.13.1 Selection of Representative Accident Scenarios**

The Safety Analysis Report and Emergency Plan (LES, 2005d; LES, 2004c) describe potential accidents that could occur at the proposed NEF. Potential transportation accidents and consequences are discussed in section 4.2.11. Accident descriptions are provided for two groups according to the severity of the accident consequences: high consequence events and intermediate consequence events (as presented in Table C-13 of Appendix C). The accident types are summarized in the Emergency Plan as follows:

##### High Consequence Events

- Natural Phenomena.
  - Earthquake.
  - Tornado.
- Open sample manifold purge valve and blind flange.
- Pump exhaust plugged (worker).

- Flood.
- Inadvertent nuclear criticality.
- Fires propagating between areas.
- Fires involving excessive transient combustibles.
- Heater controller failure.
- Over-filled cylinder heated to ambient conditions.
- Product liquid sampling autoclave heater failure followed by reheat.
- UF<sub>6</sub> sub-sampling unit hot box heater controller failure.
- Empty UF<sub>6</sub> cold trap (UF<sub>6</sub>) release.
- Cylinder valve/connection failure during pressure test.
- Chemical dump trap failure.
- Worker evacuation.

#### Intermediate Consequence Events

- Carbon trap failure.
- Pump exhaust plugged (public).
- Spill of failed centrifuge parts.
- Dropped contaminated centrifuge.
- Fire in ventilated room.

In this EIS, a range of possible accidents was selected for detailed evaluation to bound the potential human health accidents. The representative accident scenarios selected vary in severity from high- to intermediate-consequence events and include accidents initiated by natural phenomena, operator error, and equipment failure. The accident scenarios evaluated are as follows:

- Generic inadvertent nuclear criticality.
- Hydraulic rupture of a UF<sub>6</sub> cylinder in the blending and liquid sampling area.
- Natural phenomena hazard—earthquake.
- Fire in a UF<sub>6</sub> handling area.
- Process line rupture in a product low-temperature takeoff station.

The accident analyses described in this section assume that the probability of an accident is 100 percent to maximize the environmental consequences, as shown in Table 4-14.

#### **4.2.13.2 Accident Consequences**

The five accident scenarios were analyzed using the methodology presented in Appendix C.

Table 4-14 presents the consequences from the accidents, assuming such accidents would, in fact, occur. The accident consequences vary in magnitude and include accidents initiated by natural phenomena,

**Table 4-14 Summary of Health Effects Resulting from Accidents at the Proposed NEF**

Accident	Worker <sup>a</sup>		Environment at Restricted Area Boundary	Individual at Controlled Area Boundary, SW direction		Collective Dose		
	[U] mg/m <sup>3</sup> (rem)	[HF], mg/m <sup>3</sup>	[U] mg/m <sup>3</sup>	[U] mg/m <sup>3</sup> (rem)	[HF], mg/m <sup>3</sup>	Direction	person-rem	LCFs
Inadvertent Nuclear Criticality	High <sup>b</sup>		0.66 <sup>c</sup>	(0.14 <sup>d</sup> )	---	West	44	0.03
Hydraulic Rupture of a UF <sub>6</sub> Cylinder	Low		44	250 (0.97)	86	North	12,000	7 <sup>e</sup>
Earthquake	High <sup>b</sup>		0.11	0.64 (0.0017)	0.13	North	19	0.008
Fire in a UF <sub>6</sub> Handling Area	59 (0.020)	20	0.012	0.070 (0.000072)	0.024	North	0.92	0.0006
Process Line Rupture	17 (0.022)	5.8	0.0035	0.020 (0.000078)	0.0069	North	0.97	0.0006

<sup>a</sup> Worker exits after 10 minutes.

<sup>b</sup> High consequence could lead to a fatality.

<sup>c</sup> Pursuant to 10 CFR § 70.61(c)(3), this value is the sum of the fractions of individual fission product radionuclide concentrations over 5,000 times the concentration limits that appear in 10 CFR Part 20, Appendix B, Table 2.

<sup>d</sup> The dose to the individual at the Controlled Area Boundary is the sum of internal and external doses from fission products released from the Technical Services Building gaseous effluent vent systems stack.

<sup>e</sup> Though the consequences of the rupture of a liquid-filled UF<sub>6</sub> cylinder would be HIGH, redundant heater controller trips would make this event highly unlikely to occur.

U - uranium.

HF - hydrogen fluoride.

LCF - latent cancer fatalities.

mg - milligram.

mg/m<sup>3</sup> - milligrams per cubic meter.

To convert rem to sievert, multiply by 0.01.

operator error, and equipment failure. Analytical results indicate that accidents at the proposed NEF pose acceptably low risks after incorporation of Items Relied on for Safety. Items Relied on for Safety would include such things as passive engineered controls, active controls, and administrative controls. Items Relied on for Safety are required to meet the performance requirements of 10 CFR Part 70, Subpart H. To reduce the consequence and likelihood of accidents, LES has proposed a number of mitigative and preventive measures. The most significant accident consequences are those associated with the release of UF<sub>6</sub> caused by rupturing an over-filled and/or over-heated cylinder. The proposed NEF design reduces the likelihood of this event by using redundant heater controller trips. Accidents at the proposed NEF would pose SMALL to MODERATE impacts to workers, the environment, and the public.

#### 4.2.13.3 Mitigation Measures

NRC regulations and LES's operating procedures for the proposed NEF are designed to ensure that the high and intermediate accident scenarios would be highly unlikely. The NRC staff's Safety Evaluation Report assesses the safety features and operating procedures required to reduce the risks from accidents. The combination of responses by Items Relied on for Safety that mitigate or prevent emergency conditions, and the implementation of emergency procedures and protective actions in accordance with the proposed NEF Emergency Plan, would limit the consequences and reduce the likelihood of accidents that could otherwise extend beyond the proposed NEF boundaries.

#### *DOE Role in Accepting DUF<sub>6</sub>*

*“A future decision to extend operations or expand throughput [of the proposed DOE conversion facilities] might also result from the fact that DOE could assume management responsibility for DUF<sub>6</sub> in addition to the current [DOE] inventory. Two statutory provisions make this possible. First, Sections 161v. [42 USC 2201(v)] and 1311 [42 USC 2297b-10] of the Atomic Energy Act of 1954 [P.L. 83-703], as amended, provide that DOE may supply services in support of U.S. Enrichment Corporation (USEC). In the past, these provisions were used once to transfer DUF<sub>6</sub> cylinders from USEC to DOE for disposition in accordance with DOE orders, regulations, and policies. Second, Section 3113 (a) of the USEC Privatization Act [42 USC 2297h-11(a)] requires DOE to accept low-level radioactive wastes, including depleted uranium that has been determined to be low-level radioactive wastes, for disposal upon request and reimbursement of costs by USEC or any other person licensed by the NRC to operate a uranium enrichment facility. This provision has not been invoked, and the form in which depleted uranium would be transferred to DOE...is not specified. However, DOE believes depleted uranium transferred under this order...would most likely be in the form of DUF<sub>6</sub>.”*

*Additionally, Section 311 of Public Law 108-447 amended Section 3113 of Public Law 102-486 (42 U.S.C. 2297h-11) by adding a new paragraph (4) to subsection (a). The new paragraph establishes in the event that a licensee requests DOE to accept for disposal depleted uranium pursuant to this subsection, DOE shall be required to take title to and possession of such depleted uranium at an existing DOE DUF<sub>6</sub> storage facility.*

*Sources: DOE, 2004a; DOE, 2004b; Congress, 2004.*



#### **4.2.14 Waste Management Impacts**

This section describes the analysis and evaluation of the solid, hazardous, and radioactive waste management program at the proposed NEF including impacts resulting from temporary storage, conversion, and disposal of the  $\text{DUF}_6$ . An evaluation of mixed waste is also addressed in this section because LES is required by RCRA regulations to manage mixed wastes at the proposed NEF.

Due to the nature, design, and operation of a gas centrifuge enrichment facility, the generation of waste materials can be categorized by three distinct facility operations: (1) construction, which generates typical construction wastes associated with an industrial facility; (2) enrichment process operations, which generate gaseous, liquid, and solid waste streams; and (3) generation and temporary storage of  $\text{DUF}_6$  (section 4.3 of this chapter discusses decommissioning wastes). Waste materials include radioactive waste (i.e.,  $\text{DUF}_6$  and material contaminated with  $\text{UF}_6$ ), designated hazardous materials (as defined in 40 CFR Part 261), and nonhazardous materials (any other wastes not identified as radioactive or hazardous). Hazardous materials include any fluids, equipment, and piping contaminated as defined in 40 CFR Part 261 that would be generated due to the construction, operation, and maintenance programs.

The handling and disposing of waste materials is governed by various Federal and State regulations. To satisfy the Federal and State regulations, LES must have waste management programs for the collection, removal, and proper disposal of waste materials. The LES waste management program is intended to minimize the generation of waste through reduction, reuse, or recycling (LES, 2005a). This program would assist in identifying process changes that can be made to reduce or eliminate mixed wastes, methods to minimize the volume of regulated wastes through better segregation of materials, and the substitution of nonhazardous materials as required under RCRA regulations. Based on the available information and waste data from similar facilities, the waste-management impacts are assessed for site preparation and construction, operations, and  $\text{DUF}_6$  disposition.

##### **4.2.14.1 Solid Waste Management During Site Preparation and Construction**

Solid nonhazardous wastes generated during site preparation and construction would be very similar to wastes from other construction sites of industrial facilities. These wastes would be transported offsite to an approved local landfill. Approximately 3,058 cubic meters (4,000 cubic yards) per year of packing material, paper, and scrap lumber would be generated (LES, 2005a). In addition, there would also be scrap structural steel, piping, sheet metal, etc., that would not be expected to pose any significant impacts to the surrounding environment because most could be recycled or directly placed in an offsite landfill.

Nonhazardous wastes would be transported to the Lea County Landfill for disposal. This landfill is expected to receive approximately 8,000 cubic meters (10,464 cubic yards) of uncompacted waste daily, or 2,288,000 cubic meters (2,992,591 cubic yards) annually by year 9 (2006) of its operation according to its permit application (LCSWA, 1996). The proposed NEF construction activities would begin in 2006. Therefore, the total volume of construction wastes from the proposed NEF over 8 years would be less than solid waste landfill receipts in three days of operation from all other sources.

The generation of hazardous wastes (i.e., waste oil, greases, excess paints, and other chemicals) associated with the construction of the facility due to the maintenance of construction equipment and vehicles, painting, and cleaning would be packaged and shipped offsite to licensed facilities in accordance with Federal and State environmental and occupational regulations. Table 4-15 shows the hazardous wastes that would be expected from construction of the proposed NEF. The quantity of all construction-generated hazardous and nonhazardous waste material would result in SMALL impacts that can be effectively managed.

**Table 4-15 Hazardous Waste Quantities Expected During Construction**

<b>Waste Type</b>	<b>Annual Quantity</b>
Paint, Solvents, Thinners, Organics	11,360 liters (3,000 gallons)
Petroleum Products – Oils, Lubricants	11,360 liters (3,000 gallons)
Sulfuric Acid (Batteries)	380 liters (100 gallons)
Adhesives, Resins, Sealers, Caulking	910 kilograms (2,000 pounds)
Lead (Batteries)	91 kilograms (200 pounds)
Pesticide	380 liters (100 gallons)

Source: LES, 2005d.

#### **4.2.14.2 Solid Waste Management During Operations**

Gaseous effluents, liquid effluents, and solid wastes would be generated during normal operations. Appropriate treatment systems would be established to control releases or collect the hazardous material for onsite treatment or shipment offsite. Gaseous releases would be minimized, liquid wastes would be kept onsite, and solid wastes would be appropriately packaged and shipped offsite for further processing or final disposition. The impacts from gaseous and liquid effluents are described in sections 4.2.4, 4.2.6, and 4.2.12. This section presents the onsite and offsite impacts from the management of solid wastes and cites impacts from other *National Environmental Policy Act* (NEPA) assessments when appropriate.

The operation of the proposed NEF would generate approximately 172,500 kilograms (380,400 pounds) of solid nonradioactive waste annually, including approximately 1,900 liters (500 gallons) of hazardous liquid wastes (LES, 2005a). Approximately 87,000 kilograms (191,800 pounds) of radiological and mixed waste would be generated annually, of which approximately 50 kilograms (110 pounds) would be mixed waste.

Solid wastes during operations would be segregated and processed based on whether the material can be classified as wet solid or dry solid wastes and segregated into radioactive, hazardous, or mixed-waste categories. The radioactive solid wastes would be Class A low-level radioactive wastes as defined in 10 CFR Part 61, appropriately packaged, and shipped to a commercial licensed low-level radioactive wastes disposal facility or shipped for further processing for volume reduction. The annual volume of nonradioactive solid wastes generated at the proposed NEF would be 1,184 cubic meters (1,549 cubic yards) assuming a standard container with a volume of 7.65 cubic meters (10 cubic yards) holds 553 kilograms (0.61 tons) of nonhazardous wastes (NJ, 2004). Nonhazardous wastes would be transported to the Lea County Landfill for disposal. This landfill is expected to have received uncompacted gate receipts of approximately 16,000 cubic meters (20,927 cubic yards) per day, or 4,576,000 cubic meters (5,985,182 cubic yards) per year in 2013, according to its permit application that assumes a 10-percent increase in gate receipts per year (LCSWA, 1996). The nonradioactive solid waste generation from the proposed NEF would potentially increase the volume of wastes impounded at the landfill by less than 0.03 percent. Therefore, impacts to the Lea County Landfill could be considered accounted for in the assumed 10-percent annual increase in gate receipts previously documented in the landfill's permit application. Based on the quantities of solid wastes and the application of industry-accepted procedures, the impacts from solid wastes would be SMALL.

Because over 20 years' worth of disposal space is currently available in the United States for Class A low-level radioactive wastes (GAO, 2004), the impact of low-level radioactive wastes generation would be SMALL on disposal facilities. EPA and New Mexico regulations, including 20.4.1 *New Mexico Administrative Code* 20.4.1, "Hazardous Waste Management," would be the guiding laws to manage hazardous wastes (LES, 2005a).

#### 4.2.14.3 DUF<sub>6</sub> Waste-Management Options

As discussed in Chapter 2 of this EIS, until a conversion facility is available, UBCs (i.e., DUF<sub>6</sub>-filled Type 48Y cylinders) would be temporarily stored on the UBC Storage Pad. Storage of UBCs at the proposed NEF could occur for up to 30 years during operations and before removal of DUF<sub>6</sub> from the site through one of the disposition options (see text box *DUF<sub>6</sub> Disposition Options Considered*). However, LES has committed to a disposal path outside of the State of New Mexico which would be utilized as soon as possible and would aggressively pursue economically viable paths for UBCs as soon as they become available (LES, 2005a).

##### Temporary Onsite Storage Impacts

Proper and active cylinder management, which includes routine inspections and maintaining the anti-corrosion layer on the cylinder surface, has been shown to limit exterior corrosion or mechanical damage necessary for the safe storage of DUF<sub>6</sub> (DNFSB, 1995a; DNFSB, 1995b; DNFSB, 1999). DOE has stored DUF<sub>6</sub> in Type 48Y or similar cylinders at the Paducah and Portsmouth Gaseous Diffusion Plants and the East Tennessee Technical Park in Oak Ridge, Tennessee, since approximately 1956. Cylinder leaks due to corrosion led DOE to implement a cylinder management program (ANL, 2004). Past evaluations and monitoring by the Defense Nuclear Facility Safety Board of DOE's cylinder maintenance program confirmed that DOE met all of the commitments in its cylinder maintenance implementation plan, particularly through the use of a systems engineering process to develop a workable and technically justifiable cylinder management program (DNFSB, 1999). Thus, an active cylinder maintenance program by LES would assure the integrity of the UBCs for the period of time of temporary onsite storage of DUF<sub>6</sub> on the UBC Storage Pad.

The principal impacts would be the radiological exposure resulting from the radioactive material temporarily stored in 15,727 UBCs under normal conditions and the potential release (slow or rapid) of

#### *DUF<sub>6</sub> Disposition Options Considered*

*Option 1a: Private Conversion Facility (LES Preferred Option). Transporting the UBCs from the proposed NEF to an unidentified private conversion facility outside the region of influence. After conversion to U<sub>3</sub>O<sub>8</sub>, the wastes would then be transported to a licensed disposal facility for final disposition.*

*Option 1b: Adjacent Private Conversion Facility. Transporting the UBCs from the proposed NEF to an adjacent private conversion facility. This facility is assumed to be adjacent to the site and would minimize the amount of DUF<sub>6</sub> onsite by allowing for ship-as-you-generate waste management of the converted U<sub>3</sub>O<sub>8</sub> and associated conversion byproducts (i.e., CaF<sub>2</sub>). The wastes would then be transported to a licensed disposal facility for final disposition.*

*Option 2: DOE Conversion Facility. Transporting UBCs from the proposed NEF to a DOE conversion facility. For example, the UBCs could be transported to one of the DOE conversion facilities either at Paducah, Kentucky, or Portsmouth, Ohio (DOE, 2004a; DOE, 2004b). The wastes would then be transported to a licensed disposal facility for final disposition.*

DUF<sub>6</sub> from the UBCs due to an off-normal event or accidents (operational, external, or natural hazard phenomena events). These radiation exposure pathways are analyzed in sections 4.2.12 and 4.2.13, and based on these results, the impacts from temporary storage would be SMALL to MODERATE. The annual impacts from temporary storage would continue until the UBCs are removed from the proposed NEF site.

#### Option 1a: Private Conversion Facility Impacts

Under Option 1a, the Type 48Y cylinders, or UBCs, would be transported from the proposed NEF to an unidentified private facility (potentially ConverDyn facility in Metropolis, Illinois). After being converted to U<sub>3</sub>O<sub>8</sub>, the waste would be further transported to a licensed disposal facility. The impacts of conversion at a private conversion facility or at DOE conversion facilities are similar because it is assumed that the facility design of a private conversion facility would be similar to the DOE conversion facilities.

The transportation of the Type 48Y cylinders from the proposed NEF to the conversion facility would have environmental impacts. Appendix D provides the transportation impact analysis of shipping the Type 48Y cylinders, and section 4.2.11 summarizes the impacts. The selected routes would be from Eunice, New Mexico, to Metropolis, Illinois.

If the private conversion facility cannot immediately process the Type 48Y cylinders upon arrival, potential impacts would include radiological impacts proportional to the time of temporary storage at the conversion facility. The DOE has previously assessed the impacts of temporary storage during the operation of a DUF<sub>6</sub> conversion facility (DOE, 2004a; DOE, 2004b). The proposed action is not expected to change the impacts of temporary storage of Type 48Y cylinders at the conversion facility site from that previously considered in these DOE conversion facility Final EISs. Therefore, the NRC staff has concluded that the environmental impacts of temporary storage at the private conversion facility are bounded by the environmental impacts previously evaluated in the DOE conversion facility Final EISs. At the Paducah and Portsmouth conversion facilities, the maximum collective dose to a worker would be 0.055 person-sieverts (5.5 person-rem) per year and 0.03 person-sieverts (3 person-rem) per year, respectively. There would be no exposure to noninvolved workers or the public because air emissions from the cylinder preparation and maintenance activities would be negligible (DOE, 2004a; DOE, 2004b).

Because Metropolis, Illinois, lies just across the Ohio River from the Paducah conversion facility site (within 6.4 kilometer [4 miles]), if a private conversion facility is built at Metropolis, Illinois, then the public and occupational health impacts from this conversion facility would be bounded by the impacts from the Paducah conversion facility because both conversion facilities would be located in the same area and would be approximately the same size. In addition, other impacts to resources such as land use, historic and cultural, visual, air quality, geology, water quality, ecology, noise, and waste management, would be similar to the Paducah conversion facility. Therefore, the NRC staff considers the impacts for these resources from the construction and operation of a conversion facility at Metropolis, Illinois, to be bounded by the impacts previously considered in the Paducah conversion facility Final EIS (DOE, 2004a). Because the impacts to resources discussed above and the health impacts are within regulatory requirements, the impacts from the private conversion facility would be SMALL.

#### Option 1b: Adjacent Private Conversion Facility Impacts

The conversion facility could be constructed adjacent to the proposed NEF. For the purposes of analyzing impacts, “adjacent” is defined as being within at least 6.4 kilometers (4 miles) of the proposed

NEF. Although no adjacent conversion facility site has been identified, there would be advantages (i.e., transportation and speed of processing) to having a conversion facility adjacent to the proposed NEF. With an adjacent conversion facility, transfer and conversion could be completed within days of the filling of the Type 48Y cylinder, thus minimizing the amount of DUF<sub>6</sub> onsite. Once the waste was converted to U<sub>3</sub>O<sub>8</sub>, depleted uranium and the associated waste streams would subsequently be transported to a licensed disposal facility for final disposition. Such immediate waste-management action would allow for no buildup of DUF<sub>6</sub> wastes at the proposed NEF and would remove the impacts and risks associated with the temporary storage of UBCs at the proposed NEF and the potential conversion facility.

Because the operations would be the same as for the DOE conversion facilities, the environmental impacts from normal operations of an adjacent conversion facility would be representative of the impacts of the DOE facilities (occupational) and the proposed NEF (members of the public). Therefore, the maximum occupational and member of the public annual exposures would be approximately 6.9 millisieverts (690 millirem) and  $5.3 \times 10^{-5}$  millisieverts ( $5.3 \times 10^{-3}$  millirem), respectively. The impacts due to accidents would be bounded by the proposed NEF's highest accident consequence—the hydraulic rupture of a UF<sub>6</sub> cylinder. This maximum accident impact could be a collective dose of 120 person-sieverts (12,000 person-rem) or equivalent to 7 latent cancer fatalities. Similarly as presented in section 4.2.13.3 for the proposed NEF, the combination of responses by Items Relied on for Safety that mitigate or prevent emergency conditions, and the implementation of emergency procedures and protective actions in accordance with an Emergency Plan, would limit the consequences and reduce the likelihood of accidents that could otherwise extend beyond an adjacent private conversion facility boundaries.

Based on water use at the existing conversion facility at Portsmouth, Ohio (DOE, 2004b), and allowing for the decreased throughput of a facility built to handle only the proposed NEF's output, such a facility's operational water needs could be approximately 200 cubic meters per day (19 million gallons per year), approximately 82 percent of the water use of the proposed NEF. If such a facility were built in nearby Andrews County, Texas, the water would be withdrawn from the Ogallala Aquifer. Therefore, the water resource impacts would be SMALL.

Other impacts to resources such as land use, historic and cultural, visual and scenic, geology, ecology, socioeconomics, and environmental justice would be similar to the proposed NEF because they would be located in the same area and would be approximately the same size. Therefore, the NRC staff considers the impacts for these resources from the construction and operation of an adjacent conversion facility to be bounded by the impacts considered in this EIS for the proposed NEF. Based on the description and design parameters of the Portsmouth DOE conversion facility, the adjacent conversion facility would likely affect a similar area of land, employ a similar number of workers, and involve a building of a similar size. Due to similar construction methods and design, impacts to resources at the adjacent conversion facility, such as air quality, water quality, noise, and waste management, would be similar to the Portsmouth conversion facility (DOE, 2004b). Because the radiological impacts are within regulatory requirements, the impacts from an adjacent conversion facility would be SMALL.

#### Option 2: DOE Conversion Facilities Impacts

Under option 2, the Type 48Y cylinders would be transported from the proposed NEF to either of the DOE's conversion facilities (Paducah, Kentucky, or Portsmouth, Ohio). After being converted to U<sub>3</sub>O<sub>8</sub>, the waste would be further transported to a licensed disposal facility. The transportation of the Type 48Y cylinders from the proposed NEF to the conversion facility would have environmental impacts. Appendix D provides the transportation impact analysis of shipping the Type 48Y cylinders, and section 4.2.11 summarizes the impacts. The selected routes are from Eunice, New Mexico, to Paducah, Kentucky, and Portsmouth, Ohio.

If the DOE conversion facility could not immediately process the UBCs upon arrival, potential impacts would include radiological impacts proportional to the time of temporary storage at the conversion facility. The DOE has previously assessed the impacts of UBC storage during the operation of a DUF<sub>6</sub> conversion facility (DOE, 2004a; DOE, 2004b) and bound the impacts of temporary storage of LES's UBCs at the conversion facility site. At the Paducah and Portsmouth conversion facilities, the maximum collective dose to a worker (i.e., a worker at the cylinder yard) would be 0.055 person-sieverts (5.5 person-rem) per year and 0.03 person-sieverts (3 person-rem) per year, respectively. There would be no exposure to noninvolved workers or the public because air emissions from the cylinder preparation and maintenance activities would be negligible (DOE, 2004a; DOE, 2004b).

To assess the impacts of the proposed NEF generated DUF<sub>6</sub> on the DOE's conversion facilities, one must understand the relative amount of additional material as compared to the DOE's existing DUF<sub>6</sub> inventory. The Paducah conversion facility would operate for approximately 25 years beginning in 2006 to process 436,400 metric tons (481,000 tons) (DOE, 2004a). The Portsmouth conversion facility would operate for 18 years also beginning in 2006 to process 243,000 metric tons (268,000 tons) (DOE, 2004b). Based on the projected maximum amount of DUF<sub>6</sub> generated by the proposed NEF (197,000 metric tons [217,000 tons]), this would represent 81 percent of the Portsmouth (243,000 metric tons [268,000 tons]) and 45 percent of the Paducah (436,400 metric tons [481,000 tons]) existing inventories. The proposed NEF would produce approximately 7,800 metric tons (8,600 tons) of DUF<sub>6</sub> per year at full production capacity (LES 2005a). This value represents 43 percent of the annual conversion capacity of the Paducah facility (18,000 metric tons [20,000 tons] per year) and 58 percent of the Portsmouth facility (13,500 metric tons [15,000 tons] per year). The proposed NEF maximum DUF<sub>6</sub> inventory could extend the time of operation by approximately 11 years for the Paducah conversion facility or 15 years for the Portsmouth conversion facility.

With routine facility and equipment maintenance, and periodic equipment replacements or upgrades, DOE indicates that the conversion facilities could be operated safely beyond this time period to process the DUF<sub>6</sub> such as that originating at the proposed NEF. In addition, DOE indicates the estimated impacts that would occur from prior conversion facility operations would remain the same when processing DUF<sub>6</sub> such as the proposed NEF wastes. The overall cumulative impacts from the operation of the conversion facility would increase proportionately with the increased life of the facility (DOE, 2004a; DOE, 2004b).

Table 4-16 presents a summary of the potential treatment and disposition pathways for the Paducah and Portsmouth conversion facilities that could also be appropriate for conversion of the DUF<sub>6</sub> originating at the proposed NEF. Based on the above assumptions and data, Tables 4-17 and 4-18 show the environmental impacts from the conversion of the DUF<sub>6</sub> from the proposed NEF at an offsite location such as Portsmouth or Paducah. The additional impacts for converting the proposed NEF DUF<sub>6</sub> at these conversion facilities would be SMALL.

**Table 4-16 Conversion Waste Streams, Potential Treatments, and Disposition Paths**

Conversion Product	Annual Waste Stream		Treatment	Proposed Disposition	Optional Disposition
	Portsmouth	Paducah			
Depleted U <sub>3</sub> O <sub>8</sub>	10,800 MT (11,800 tons)	14,300 MT (15,800 tons)	Loaded into bulk bags and loaded into rail or truck <sup>a</sup> .	Envirocare.	Nevada Test Site <sup>a</sup> .
CaF <sub>2</sub>	18 MT (20 tons)	24 MT (26 tons)	Similar to depleted U <sub>3</sub> O <sub>8</sub> .	Sale to commercial CaF <sub>2</sub> supplier.	Envirocare <sup>a</sup> .

Conversion Product	Annual Waste Stream		Treatment	Proposed Disposition	Optional Disposition
	Portsmouth	Paducah			
70% HF Acid	2,500 MT (2,800 tons)	3,300 MT (3,600 tons)	HF acid should be commercial grade.	Sale to commercial HF acid supplier.	Neutralization by CaF <sub>2</sub> .
49% HF Acid	5,800 MT (6,300 tons)	7,700 MT (8,500 tons)	HF acid should be commercial grade.	Sale to commercial HF acid supplier.	Neutralization by CaF <sub>2</sub> .
Type 48Y Cylinders <sup>b</sup>	~1,000 cylinders 1,777 MT (1,300 tons)	~1,100 cylinders 1,980 MT (2,200 tons)	Emptied cylinders would have a stabilizing agent added to neutralize residual fluorine, be stored for 4 months, crushed to reduce size, sectioned, and packaged in intermodal containers.	Envirocare.	Nevada Test Site <sup>c</sup> .

<sup>a</sup> U<sub>3</sub>O<sub>8</sub> would be loaded into bulk bags (lift liners, 25,000-pound [11,340-kilogram] capacity) and loaded into gondola railcars (8 to 9 bags per car, depending on the car selected) or on a commercial truck (one bag per truck).

<sup>b</sup> Empty cylinders to be disposed if not used as U<sub>3</sub>O<sub>8</sub> disposal containers.

<sup>c</sup> For DUF<sub>6</sub> converted at DOE facilities, final disposition at the Nevada Test Site is an option.

HF - hydrogen fluoride; MT - metric ton.

Sources: DOE, 2004a; DOE, 2004b.

**Table 4-17 Radiological Impacts from an Offsite DUF<sub>6</sub> Conversion Facility During Normal Operations**

Radiation Doses	Occupational		Members of the Public	
	Dose, mSv per year (mrem per year)	Collective Dose, person-Sv per year (person-rem per year)	MEI Dose, mSv per year (mrem per year)	Collective Dose, person-Sv per year (person-rem per year)
Portsmouth Conversion Facility	0.75 (75)	0.101 (10.1)	<2.1×10 <sup>-7</sup> (<2.1×10 <sup>-5</sup> )	6.2×10 <sup>-7</sup> (6.2×10 <sup>-5</sup> )
Portsmouth Cylinder Yard	5.10-6.00 (510-600)	0.026-0.030 (2.6-3.0)	N/A	N/A
Paducah Conversion Facility	0.75 (75)	0.107 (10.7)	<3.9×10 <sup>-7</sup> (<3.9×10 <sup>-5</sup> )	4.7×10 <sup>-7</sup> (4.7×10 <sup>-5</sup> )
Paducah Cylinder Yard	4.30-6.90 (430-690)	0.034-0.055 (3.4-5.5)	N/A	N/A
Cancer Risks	Average Risk <sup>a</sup> (LCF per year)	Collective Risk <sup>a</sup> (LCF per year)	MEI Risk <sup>a</sup> (LCF per year)	Collective Risk <sup>a</sup> (LCF per year)
Portsmouth Conversion Facility	5×10 <sup>-5</sup>	6×10 <sup>-3</sup>	1×10 <sup>-11</sup>	4×10 <sup>-8</sup>

Portsmouth Cylinder Yard	$3 \times 10^{-4} - 4 \times 10^{-4}$	$2 \times 10^{-3}$	N/A	N/A
Paducah Conversion Facility	$5 \times 10^{-5}$	$6 \times 10^{-3}$	$2 \times 10^{-11}$	$3 \times 10^{-8}$
Paducah Cylinder Yard	$3 \times 10^{-4} - 4 \times 10^{-4}$	$2 \times 10^{-3} - 3 \times 10^{-3}$	N/A	N/A

<sup>a</sup> DOE risk values adjusted for a conversion factor of  $6 \times 10^{-4}$  LCF per person-rem.  
LCF - latent cancer fatalities; Sv - sieverts; mSv - millisieverts; mrem - millirem; MEI - maximally exposed individual.  
Sources: DOE, 2004a; DOE, 2004b.

**Table 4-18 Radiological Impacts from an Offsite DUF<sub>6</sub> Conversion Facility Under Accident Conditions**

Accident	Frequency (per year)	Onsite Worker		Members of the Public	
		MEI Dose, Sv (rem) PORTS/PGDP	Population, person-Sv (person-rem) PORTS/PGDP	MEI Dose, Sv (rem) PORTS/PGDP	Population, person-Sv (person-rem) PORTS/PGDP
Corroded Cylinder	$>1.0 \times 10^{-2}$	0.00078 / 0.00078 (0.078/0.078)	0.014 / 0.024 (1.4 / 2.4)	0.00078 / 0.00078 (0.078/0.078)	0.0012 / 0.0024 (0.12 / 0.24)
Failure of U <sub>3</sub> O <sub>8</sub> Container While in Transit	$>1.0 \times 10^{-2}$	0.0053 / 0.0053 (0.53 / 0.53)	0.096 / 0.17 (9.6 / 17)	0.0053 / 0.0053 (0.53 / 0.53)	0.0051 / 0.01 (0.51 / 1.0)
Earthquake	$1.0 \times 10^{-4}$ to $1.0 \times 10^{-6}$	0.30 / 0.40 (30 / 40)	5.3 / 12.7 (530 / 1,270)	0.30 / 0.40 (30 / 40)	0.30 / 0.73 (30 / 73)
Rupture of UBC – Fire	$1.0 \times 10^{-4}$ to $1.0 \times 10^{-6}$	0.0002 / 0.0002 (0.02 / 0.02)	0.051 / 0.080 (5.1 / 8.0)	0.0002 / 0.0002 (0.02 / 0.02)	0.23 / 0.21 (23 / 21)
Tornado	$1.0 \times 10^{-4}$ to $1.0 \times 10^{-6}$	0.075 / 0.075 (7.5 / 7.5)	1.3 / 2.3 (130 / 230)	0.075 / 0.075 (7.5 / 7.5)	0.17 / 0.34 (17 / 34)

Sv - sieverts; MEI - maximally exposed individual; PORTS - Portsmouth Gaseous Diffusion Plant; PGDP - Paducah Gaseous Diffusion Plant.  
Sources: DOE, 2004a; DOE, 2004b.

#### 4.2.14.4 Impacts from Disposal of the Converted Waste

Under option 1a or 1b, once converted to U<sub>3</sub>O<sub>8</sub>, the waste would subsequently be transported to a licensed commercial disposal facility for final disposition, as discussed in section 2.1.9 of this EIS. Section 4.2.11 of this chapter discusses the impacts of transporting the waste to a licensed disposal facility for final disposition. The impacts due to transportation would be SMALL.



The environmental impacts at the shallow disposal sites considered for disposition of low-level radioactive wastes would have been assessed at the time of the initial license approvals of these disposal facilities or as a part of any subsequent amendments to the license. For example, under its Radioactive Materials License issued by the State of Utah, the Envirocare disposal facility is authorized to accept depleted uranium for disposal with no volume restrictions (Envirocare, 2004). Several site-specific factors contribute to the acceptability of depleted uranium disposal at the Envirocare site, including highly saline groundwater that makes it unsuitable for use in irrigation and for human or animal consumption, saline soils unsuitable for agriculture, and low annual precipitation (NRC, 2005c). As Utah is an NRC Agreement State and Envirocare has met Utah's low-level radioactive waste licensing requirements, which are compatible with 10 CFR Part 61, the impacts from the disposal of depleted uranium generated by the proposed NEF at the Envirocare facility would be SMALL.

The quantity of depleted uranium generated as a result of the proposed NEF's operations would also affect the available disposal capacity for such material. Since the depleted  $U_3O_8$  to be generated by the conversion of the proposed NEF's depleted tails would be a Class A low-level radioactive waste, it would need to be disposed of in a facility licensed to accept Class A waste. In a June 2004 report, the Government Accountability Office reported that sufficient disposal capacity exists at currently licensed low-level radioactive waste disposal facilities for Class A low-level radioactive wastes generated for more than the next 20 years (GAO, 2004). Therefore, the potential impact on national disposal space that would be incurred due to the proposed NEF's operations would be considered SMALL.

In addition to shallow disposal, LES also presented the potential for disposition in an abandoned mine as a geologic disposal site. Although no existing mine is currently licensed to receive or dispose of low-level radioactive waste nor has any application been made to license such a facility, the postulated radiological impacts from such a disposal site are also presented in this section. The analysis of the radiological impacts from the disposal of the converted wastes as  $U_3O_8$  in a geologic disposal site was previously presented in the EIS for the Claiborne Enrichment Center (NRC, 1994). Two postulated geologic disposal sites (i.e., an abandoned mine in granite or in sandstone/basalt) were evaluated for impacts from contaminated well or river water. The pathways included drinking the water or the consumption of crops irrigated by the well water or of fish from a contaminated river. The potential impacts from the disposal of the proposed NEF-generated  $U_3O_8$  for similar geologic disposal sites would be proportional to the quantity of material postulated from the Claiborne Enrichment Center enrichment facility. In the year of maximum exposure, the estimated doses for both scenarios and for both potential mine sites for the proposed NEF-generated  $U_3O_8$  are presented in Table 4-19. All estimated impacts for either geologic disposal site would not result in an annual dose exceeding an equivalent of 0.25 millisieverts (25 millirem) to the whole body provided in 10 CFR § 61.41; thus, the overall disposal impacts would be SMALL.

**Table 4-19 Maximum Annual Exposure from Postulated Geologic Disposal Sites<sup>a</sup>**

Scenario	Pathway	Granite Site		Sandstone/Basalt Site	
		millisieverts	millirem	millisieverts	millirem
Well	Drinking Water	$3 \times 10^{-4}$	$3 \times 10^{-2}$	$2 \times 10^{-7}$	$2 \times 10^{-5}$
	Agriculture	$4 \times 10^{-3}$	$4 \times 10^{-1}$	$3 \times 10^{-6}$	$3 \times 10^{-4}$
River	Drinking Water	$9 \times 10^{-13}$	$9 \times 10^{-11}$	$3 \times 10^{-11}$	$3 \times 10^{-9}$
	Fish Ingestion	$2 \times 10^{-12}$	$2 \times 10^{-10}$	$5 \times 10^{-11}$	$5 \times 10^{-9}$

<sup>a</sup> Values based on models and analysis presented in Appendix A of NRC, 1994.

#### 4.2.14.5 Mitigation Measures

LES would implement a materials waste recycling plan to limit the amount of nonhazardous waste generation. LES would perform a waste assessment to determine waste-reduction opportunities and what materials would best be recycled. Employee training would be performed regarding the materials to be recycled and the use of recycling bins and containers. For low-level radioactive wastes, the cost of disposal necessitates the need for a waste-minimization program that includes decontamination and reuse of these materials when practicable. The use of chemical solutions for decontamination processes would be limited to minimize the volume of mixed waste that would be generated (LES, 2005a). An active DUF<sub>6</sub> cylinder management program would maintain “optimum storage conditions” to mitigate the potential for adverse events. Surveys of the UBC Storage Pad would be regularly conducted to inspect parameters that are outlined in Table 5-2 of Chapter 5 of this EIS.

### 4.3 Decontamination and Decommissioning Impacts

This section summarizes the potential environmental impacts of decontamination and decommissioning of the site through comparison with normal operational impacts. Decontamination and decommissioning involves the removal and disposal of all operating equipment while leaving the structures and most support equipment decontaminated to free release levels in accordance with 10 CFR Part 20. Decommissioning activities are generally described in section 2.1.8 of this EIS based on the information provided by LES in the Safety Analysis Report (LES, 2005d). However, a complete description of actions taken to decommission the proposed NEF at the expiration of its NRC license period cannot be fully determined at this time. In accordance with 10 CFR § 70.38, LES must prepare and submit a Decommissioning Plan to the NRC at least 12 months prior to the expiration of the NRC license for the proposed NEF. LES would submit a final decommissioning plan to the NRC prior to the start of decommissioning. This plan would be the subject of further NEPA review, as appropriate, at the time the Decommissioning Plan is submitted to the NRC. Decontamination and decommissioning activities would be conducted to comply with all applicable Federal and State regulations in effect at the time of these activities.

The Cascade Halls would undergo decontamination and decommissioning sequentially over a nine-year period (LES, 2005d). Cascade Halls 1 and 2 in Separations Building Module 1 are scheduled to be the first enrichment cascades to operate and would be the first to undergo decontamination and decommissioning. Cascade Halls 3 through 6 would follow in turn. Once all the UF<sub>6</sub> containment and processing equipment was removed, the building and generic support equipment would be decontaminated to free release levels and abandoned in place.

Decontamination and decommissioning activities would be accomplished in three phases over nine years. The first phase would require about two years and include:

- Characterization of the proposed NEF site.
- Development of the Decommissioning Plan.
- NRC review and approval of the Decommissioning Plan.
- Installation of decontamination and decommissioning equipment on the site of the proposed NEF.

The primary environmental impacts of the decontamination and decommissioning of the proposed NEF site include changes in releases to the atmosphere and surrounding environment, and disposal of industrial trash and decontaminated equipment. The types of impacts that may occur during decontamination and decommissioning would be similar to many of those that would occur during the initial construction of the facility. Some impacts, such as water usage and the number of truck trips, could increase during the decontamination and disposal phase of the decommissioning but would be less than the construction phase, thus bounded by the impacts in sections 4.2.4 through 4.2.11.

During the first phase of the decontamination and decommissioning period, electrical and water use would decrease as enrichment activities are terminated and preparations for decontamination and decommissioning are implemented. Environmental impacts of this phase are expected to be SMALL as normal operational releases have stopped. During the second phase of the decontamination and decommissioning process, water use would increase and aluminum and low-level radioactive wastes would be produced. Contaminated decontamination and decommissioning solutions would be treated in a liquid waste disposal system that would be managed as during normal operations.

A significant amount of scrap aluminum, along with smaller amounts of steel, copper, and other metals, would be recovered during the decontamination and decommissioning process. For security and convenience, the uncontaminated materials would likely be smelted to standard ingots and, if possible, sold at market price. The contaminated materials would be disposed of as low-level radioactive wastes after appropriate destruction for Confidential and Secret Restricted Data components. No credit is taken for any salvage value that might be realized from the sale of potential assets during or after decommissioning.

Low-level radioactive wastes produced during the decontamination and decommissioning process would consist of the remains of crushed centrifuge rotors, trash, citric cake, sludge from the liquid effluent treatment system, and contaminated soils from the Treated Effluent Evaporative Basin. The total volume of radioactive waste generated during the decontamination and decommissioning period would be estimated to be 5,000 cubic meters (6,600 cubic yards). This waste would be disposed of in a licensed low-level waste disposal facility. Releases to the atmosphere would be expected to be minimal compared to the small normal operational releases. The final step in the decontamination and decommissioning process, the radiation surveys, does not involve adverse environmental impacts. The proposed NEF site would then be released for unrestricted use as defined in 10 CFR § 20.1402

#### **4.3.1 Land Use**

Because the site of the proposed NEF is located in a sparsely populated semi-arid area of New Mexico surrounded by several industrial installations, the site would most likely retain its industrial status, and it is unlikely that any changes would be made during decommissioning for other purposes after the closure and decommissioning of the facility. Therefore, the impacts would be SMALL.

#### **4.3.2 Historical and Cultural Resources**

Because no further disturbance of land surface would accompany decommissioning activities, there would be no impact on cultural resources. Mitigation measures established by the historic properties treatment plan would remain in effect or be renegotiated prior to decontamination and decommissioning. The impacts would remain SMALL.

#### **4.3.3 Visual and Scenic Resources**

If the buildings and structures of the proposed NEF were allowed to remain, then the scenic qualities of the area would remain the same as described in section 4.2.3 of this chapter. Any cleared areas could be revegetated with natural species after decommissioning is complete. The impacts would remain SMALL.

#### **4.3.4 Air Quality**

During the decontamination phase of the facility, transportation and heavy vehicles would produce exhaust emissions and dust as they move on the road and around the proposed NEF site. The exhaust emissions would be minimal and would not cause any noticeable change in air quality in the area. Dust from the heavy equipment used for decommissioning and from re-entrainment of dust and dirt that is carried or deposited on the road by vehicles hauling trash and recycled material would have the most significant impact on air quality. Fugitive dust should be less than that generated during construction because the buildings and stormwater detention/retention basins would remain. The use of BMPs during the decontamination and decommissioning of the facility would ensure that proper dust control and mitigation measures are implemented.

The current state-of-the-art technologies in decontamination and decommissioning of radiologically contaminated equipment require the use of a limited amount of solvents to fully clean some metallic and nonmetallic equipment. The quantity of solvents required has been dramatically reduced in recent years and, assuming a similar trend, would be further reduced when the proposed NEF undergoes decontamination and decommissioning. Nevertheless, there is the potential for emission of solvents during the decontamination phase if solvent cleaning methods are employed. These emissions would be of short duration (i.e., a few weeks) and expected to be below the levels requiring an application for a Clean Air Act Title V permit for a single NESHAP of concern (9.1 metric tons [10 tons]) and any combination of NESHAP (22.7 metric tons [25 tons]). Gaseous effluent volume that occurs during decontamination and decommissioning would be slightly reduced because the operational process off-gas inputs to the stack would be shut down. The BMP dust-control measures are expected to be similar to measures taken during construction, and the air-quality impacts due to decontamination and decommissioning activities should be equal to or less than the SMALL air-quality impacts from construction and operation of the proposed NEF site.

#### **4.3.5 Geology and Soils**

The proposed NEF site terrain would remain after license termination. There would be no impacts to the geology and soils from decontamination and decommissioning activities other than the potential to use a portion of the site for equipment laydown and disassembly. This could require the removal of existing vegetation from this area; however, less land clearing would be expected than during construction. Therefore, the impacts would be SMALL.

#### **4.3.6 Water Resources**

Potable water use is expected to vary during the decommissioning phase, particularly during the middle of the 9-year decommissioning program. This would be caused by the increased use of water for equipment decontamination and rinsing. Liquid effluents from decontamination operations during decommissioning would be higher than liquid effluents from decontamination operations during normal operations. These effluents would include the spent citric acid solution used to decontaminate equipment and recover uranium and other metals. Spent citric acid solution would be treated through the liquid effluent treatment system and removed from the waste stream before discharge to the Treated Effluent Evaporative Basin during the operation phase of the proposed NEF. Water use during decontamination and decommissioning would be less than or equal to the water consumption during operations.

The site has no permanent surface water. Runoff from the buildings, roads, and parking areas would be routed to two stormwater detention/retention basins for evaporation. During decontamination and decommissioning, the mud or soil in the bottom of the detention/retention basins would be sampled for contamination and properly disposed of, if it is found to contain contaminants in excess of regulatory limits. The basin excavations and berms would be leveled to restore the land to a natural contour (LES, 2005a).

The Treated Effluent Evaporative Basin would remain in operation throughout most of the decontamination phase. Liquids used to clean and decontaminate buildings and equipment would be treated in the liquid effluent treatment system before being discharged to the Treated Effluent Evaporative Basin. Upon completion of the large-scale decontamination, the Treated Effluent Evaporative Basin would be isolated and allowed to evaporate. The sludge and soil in the bottom of the Treated Effluent Evaporative Basin would be tested and disposed of in accordance with regulatory requirements such that the area would be released for unrestricted use as defined in 10 CFR § 20.1402. Therefore, the water resources during decommissioning would not be affected any differently than during operations, the impacts to water resources would remain SMALL.

#### **4.3.7 Ecological Resources**

After operation, the site ecology would have adapted to the existence of the proposed NEF. Decommissioning the facility would remove vegetation and temporarily displace animals close to the structures. As is the case during operations, the basins could not support permanent aquatic communities, because they do not permanently hold water. Direct impacts on vegetation during decontamination and decommissioning of the proposed NEF would include removal of existing vegetation from the area required for equipment laydown and disassembly. This disturbed area would be significantly less than the 81 hectares (200 acres) disturbed during construction, and such decontamination and decommissioning impacts would be bounded by the construction activities. Replanting the disturbed areas with native species after completion of the decontamination and decommissioning activities would restore the site to a condition similar to the preconstruction condition. For these reasons, the impacts on the local ecology would continue to be SMALL during decontamination and decommissioning of the proposed NEF.

Because the Decommissioning Plan would restore the basins to a natural contour and leave the buildings and adjacent land the same as during operation of the proposed NEF, this would result in permanent elimination of a small percentage of wildlife habitat from the area (about 73 hectares [180 acres] of the 220-hectare [543-acre] site). This would have a SMALL impact on the wildlife population in the general area due to the extensive open range land surrounding the proposed NEF.

#### **4.3.8 Socioeconomics**

The cost for decontamination and decommissioning of the proposed NEF would be approximately \$941.6 million in 2004 dollars. The majority of this cost estimate (\$778 million) is the fee for disposal of the DUF<sub>6</sub> generated during operation assuming the DUF<sub>6</sub> would not be disposed of prior to decommissioning.

As operations cease, some operational personnel would gradually migrate to decommissioning activities. These workers would require additional training before such work begins. Approximately 10 percent of the operations work force would be transferred to decontamination and decommissioning activities (LES, 2004a). Removal, decontamination, and disposal of the enrichment equipment, while labor intensive, is not a difficult operation and would not require the same highly skilled labor as operation of the enrichment cascade. Thus, the pay scale of the decommissioning crew would be lower on average than that planned for the full operation of the proposed NEF. As the enrichment cascades are shutdown, the skilled operator and technicians would be replaced with construction crews skilled in dismantling and decontaminating the systems. Since no additional employment would be expected, the economic impact of decontamination and decommissioning would be expected to be SMALL.

At the conclusion of both the operations phase and the decontamination and decommissioning phase, the reduction in direct and indirect employment at the proposed NEF would impose socioeconomic dislocations in the immediate area surrounding the region of influence. The extent of such impacts (small, moderate, or large) would depend on other businesses in the area and whether or not a stable, continuing community existed at the time of decommissioning. For example, if the proposed NEF becomes the major employer in the Eunice, New Mexico, area, its closure could have a SMALL to MODERATE impact. If, however, alternative businesses are located in the area, the loss of an estimated 210 jobs would have only a SMALL impact on the local community. Similarly, the loss of tax revenue would have a SMALL to MODERATE economic impact.

#### **4.3.9 Environmental Justice**

The NRC staff's review of environmental and socioeconomic impacts during decommissioning show that all environmental impacts (sections 4.3.1 through 4.3.7 and sections 4.3.10 through 4.3.13) are less than or equal to the level that would be experienced during construction and operations and would be SMALL. In particular, the impact of traffic during decommissioning would be slightly greater than during operations, but less than during construction, which would result in a SMALL impact of transportation on minority and low-income communities in the region. A staff review of the locations, practices, and previous health conditions of the minority and low income populations within 80 kilometers (50 miles) of the proposed NEF site provides no indication that any of these environmental impacts would fall disproportionately on low-income or minority populations, so the environmental impacts on them also would be SMALL. If the proposed NEF becomes the major employer in the Eunice, New Mexico, area, its closure could have a SMALL to MODERATE impact. The NRC staff's review of socioeconomic impacts during decommissioning (section 4.3.8) states if alternative businesses are located in the area, the loss of an estimated 210 jobs would have only a SMALL impact on the local community. However, even in the former case there is no reason to believe that low-income and minority populations would be disproportionately represented among the proposed NEF personnel or businesses dependent on them, so there is no reason to believe that low-income and minority populations would be disproportionately affected.

#### **4.3.10 Noise**

Noise during decommissioning would be generated by heavy construction equipment, the movement of large pieces of scrap metal, and the destruction of classified equipment. The noise levels would be similar to those experienced during the construction of the plant. Levels of 110 decibels within the fenced area

and around 70 decibels immediately offsite would be expected. The activity would be expected to occur during daytime and would be intermittent during decommissioning. Nighttime noise levels would drop to preconstruction levels due to the reduction in nighttime traffic volume related to worker shift changes. The maximally exposed individuals would be workers operating the equipment and they would be provided with suitable hearing protection. The overall noise impacts would be similar to or less than the SMALL noise impacts from the construction of the proposed NEF site.

#### **4.3.11 Transportation**

Traffic during the initial portion of the decontamination and decommissioning activities would be slightly greater than traffic during normal operations, but not as great as during construction. Vehicular traffic would be less than the amount experienced during either the construction or the operational phase of the plant. The roads would be able to sustain the traffic volume easily; however, the number of heavy trucks would be substantial for brief periods of time as waste materials were removed and, therefore, transportation impacts for construction are bounding.

If the  $\text{DUF}_6$  has not been removed previously, it would be shipped offsite during decommissioning. As shown in Table 2-5 of Chapter 2 of this EIS, the operation of the proposed NEF would generate up to 15,727 Type 48Y cylinders of  $\text{DUF}_6$  during its operation. Type 48Y cylinders would be shipped with one cylinder per truck or four cylinders per railcar.

Assuming that all of the material is shipped during the first eight years of decommissioning (the final radiation survey and decontamination would occur during year nine), the proposed NEF would ship approximately 1,966 trucks per year. If the trucks are limited to weekday, nonholiday shipments, approximately 10 trucks or 2-1/2 railcars per day would leave the site for the  $\text{DUF}_6$  conversion facility. Section 4.2.11 of this chapter presents the impacts of shipping  $\text{DUF}_6$  to the conversion facility, which would be considered SMALL.

#### **4.3.12 Public and Occupational Health**

The current decontamination and decommissioning plans call for cleaning the structures and selected facilities to free-release levels and allowing them to remain in place for future use. Allowing the buildings to remain in place would reduce the potential number of workers required for decommissioning, which would reduce the number of injured workers. If residual contamination is discovered, it would be decontaminated to free-release levels or removed from the site and disposed of in a low-level radioactive wastes facility. Occupational exposures during decontamination and decommissioning would be bounded by the potential exposures during operation (approximately 3.0 millisieverts [300 millirem] per year) because standard quantities of uranium material (i.e.,  $\text{UF}_6$  in Type 48Y cylinders) could be handled, at least during the portion of the decontamination and decommissioning operations that purges the gaseous centrifuge cascades of  $\text{UF}_6$ . Once this decontamination operation is completed, the quantity of  $\text{UF}_6$  would be residual amounts and significantly less than handled during operations. Because systems containing residual  $\text{UF}_6$  would be opened, decontaminated (with the removed radioactive material processed and packaged for disposal), and dismantled, an active environmental monitoring and dosimetry (external and internal) program would be conducted to maintain ALARA doses and doses to individual members of the public as required by 10 CFR Part 20. Therefore, the impacts to public and occupational health would be SMALL.

#### **4.3.13 Waste Management**

The waste management and recycling programs used during operations would apply to decontamination and decommissioning. Materials eligible for recycling would be sampled or surveyed to ensure that contaminant levels would be below release limits. Staging and laydown areas would be segregated and managed to prevent contamination of the environment and creation of additional wastes. Therefore, the impacts would be SMALL.

#### **4.3.14 Summary**

The adverse environmental impacts of decontamination and decommissioning of the proposed NEF site could be SMALL to MODERATE on the order of the construction and operations impacts. The mitigating environmental impacts include release of the facilities and land for unrestricted use, termination of releases to the environment, discontinuation of a large portion of water and electrical power consumption, and reduction in vehicular traffic. Decommissioning impacts would be localized in the immediate proposed NEF developed site. No disposal of waste, including radioactive waste, would occur at the proposed NEF site.

#### **4.4 Cumulative Impacts**

The Council on Environmental Quality regulations implementing the NEPA define cumulative effects as “the impact on the environment which results from the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR § 1508.7). Cumulative impacts are presented below for areas in which there are anticipated changes related to other activities that may arise from single or multiple actions and may result in additive or interactive effects (e.g., WCS application for a low-level radioactive wastes disposal license). Areas in which cumulative impacts are not addressed in this section include:

- Cultural and historical resources.
- Visual/scenic resources.
- Ecological resources.
- Noise.
- Waste management.

There would be no cumulative adverse impacts to cultural or historical resources. For visual/scenic resources, the analysis in section 4.2.3 includes cumulative impacts from other nearby operations. There would be no cumulative adverse impacts to ecological resources as the impacts from the proposed NEF would be restricted to the site, and the proposed NEF site takes up a negligible percentage of the habitat surrounding the site, thereby not noticeably changing the cumulative impacts already existing from other local and regional activities. There would be no cumulative noise impacts because noise from activities at the proposed NEF site would not impact any sensitive offsite receptors. Waste management impacts related to cumulative impacts of the proposed NEF are addressed in section 4.2.14.

##### **4.4.1 Land Use**

As described in sections 4.2.1 and 4.3.1 of this chapter, the proposed NEF site is located in a sparsely populated area surrounded by several industrial installations. Land further to the north, south, and west of the proposed NEF site has been mostly developed by the oil and gas industry with hundreds of oil pump jacks and associated rigs. Range cattle are also raised on this land. WCS submitted a license application for disposal of low-level radioactive wastes approximately 1.6 kilometers (1 mile) east of the proposed NEF (WCS, 2004). Of the 582 hectares (1,438 acres) of the land owned by WCS, 81 hectares (200 acres) are occupied by the existing disposal and waste storage facilities and the proposed disposal cells would



occupy an additional 81 hectares (200 acres) (WCS, 2004). This would be in addition to a sanitary landfill, several land farms, and disposal facilities for oil industry wastes operated by others in the area. The construction and operation of the proposed NEF would not substantially change the land use in the region other than the small displacement of grazing land from the proposed NEF site. Therefore, the impacts would be SMALL.

#### **4.4.2 Geology and Soils**

The proposed NEF site is located in a region where there has been contamination of soils and ground-water aquifers from activities related to the oil and gas industry. The contamination has not been quantified on a regional scale but potential contaminants from such activities would be in the form of hydrocarbons. Any contamination resulting from the proposed NEF operations would most likely be radioactive in nature. However, the proposed NEF operations would not result in soil contamination that could not be cleaned up through mitigation measures such as those described in the Spill Prevention Control and Countermeasures Plan. WCS's operations (the storage of radioactive material), on the other hand, are passive in nature and are not expected to result in the release of a similar mix of radioactive contaminants to the soils. The WCS application for the proposed disposal cells would require excavations that extend to a maximum depth of 36.6 meters (120 feet) below the surface (WCS, 2004). Surface soils from the proposed WCS disposal cells would be stockpiled for later use in construction of the cover system. The disposal cells would also have to meet the State of Texas regulations to ensure the materials within the disposal cells would not contaminate the surrounding geology and soils. WCS would also employ BMPs to reduce the potential for both water and wind erosion (WCS, 2004). Therefore, cumulative impacts to soils would be considered SMALL.

#### **4.4.3 Water Resources**

There has been regional groundwater contamination from the oil and gas industry activities. Sundance Services, Inc., has a ground-water monitoring well network to monitor for possible future offsite contamination resulting from its own operations. As with potential soil contamination, potential groundwater contaminants from its activities would be in the form of hydrocarbons. Any contamination resulting from the proposed NEF operations would most likely be radioactive in nature. However, implementation of the Spill Prevention Control and Countermeasure Plan would result in the cleaning of soil contamination prior to such releases affecting groundwater.

The impacts of nearby facilities on water resources is accounted for through consideration of the Eunice and Hobbs municipal water-supply systems. The proposed NEF water use would be a small percentage of the systems' capacity. Forecasts predict that future regional water demand, if unrestrained, would deplete current regional supplies and, if required, the proposed NEF would be expected to comply with the Lea County Drought Management Plan.

WCS estimates that the construction of the two proposed disposal cells (i.e., a Federal disposal cell and a Texas compact disposal cell) would require approximately 3,785 cubic meters (1 million gallons) of water to be obtained either from the onsite well or would be brought in from offsite (WCS, 2004). During operation of the proposed disposal cells, WCS projects that there would be no changes in water use.

A privately owned casino/hotel/racetrack is under construction in Hobbs, New Mexico (Valdez, 2004). Non-resort casinos typically use approximately 34 cubic meters per day (10 acre-feet per year) of water (Dornbusch, 1999). Therefore, this casino would be expected to require about 14 percent of the water use of the proposed NEF. This increase in water use would still be well within the capacity of the local municipal water supply systems. The cumulative impacts to local water resources would be SMALL.

#### 4.4.4 Air Quality

Despite the presence of the oil and gas industry, the EPA declared that both Lea County, New Mexico, and Andrews County, Texas, are in attainment for all of the criteria pollutants (EPA, 2004). For example, Table 4-20 presents a comparison of the emissions from WCS and the proposed NEF to the total of all point sources in Lea County, New Mexico, and Andrews County, Texas.

WCS's annual emissions are generally less than those expected from the proposed NEF (except for volatile organic compounds) and significantly less than 1 percent of the total point source contribution for all criteria pollutants. The construction of the proposed disposal cells would add some fugitive dust emissions and the emissions of criteria pollutants but would be well below the NAAQS values (WCS, 2004), as for the proposed NEF. Therefore, WCS's cumulative impacts to the surrounding area would also be SMALL. In addition, no other foreseeable point-source activity can be identified that would cumulatively impact the air quality.

**Table 4-20 Comparison of the Total Annual Emissions (Tons Per Year) of Criteria Air Pollutants for the Area of the Proposed NEF<sup>a</sup>**

County, State	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
Lea County, New Mexico	6,713	38,160	31,185	16,096	5,188	28,548
Proposed NEF	1.0	4.3	5.5	0.04	N/A	0.37
Andrews County, Texas	2,873	3,259	6,680	1,398	440	1,577
WCS	1.93	0.34	0.05	0.02	0.01	0.11
Gaines County, Texas	2,696	2,791	7,709	735	1,825	8,650

<sup>a</sup> A ton is equal to 0.9078 metric ton.

VOC - volatile organic compounds; NO<sub>x</sub> - nitrogen oxides; CO - carbon monoxide; SO<sub>2</sub> - sulphur dioxide; PM<sub>2.5</sub> - particulate matter less than 2.5 microns; PM<sub>10</sub> - particulate matter less than 10 microns; N/A - no data available.

Sources: EPA, 2003; LES, 2005a; TCEQ, 2004. Latest available data is from 1999 for the counties and 2002 for WCS.

#### **4.4.5 Socioeconomics**

At the time of this EIS, a privately owned casino was developed in Hobbs, New Mexico. An adjacent racetrack is currently under construction with completion scheduled for the fall of 2005 (Hobbs, 2005). Following completion of the racetrack, an adjacent hotel and restaurant(s) are planned for construction in the next several years, and additional employment impacts are expected at that time. The casino and racetrack, excluding the hotel and restaurant(s), could be expected to employ up to 400 workers during the September to December racing season and 275 to 300 workers during the off season (Valdez, 2004). This would mean about a 1-percent increase in direct and indirect jobs for the three principal counties in the region of influence. The full-time casino jobs and the seasonal racetrack jobs would be low-paying positions for largely unskilled workers as compared to the proposed NEF. The casino project would obtain workers from a different pool of workers than the proposed NEF.

The proposed WCS disposal facility would have a peak construction force of about 40 full-time workers with an expected range of 30 to 50 persons and operations would have approximately 38 workers (WCS, 2004). The source of employees would likely be filled by residents in the region. The slight population increases predicted by WCS from constructing and operating the proposed disposal cells would have SMALL impacts to the housing and community services in the region of influence.

No other large-scale projects are anticipated in the near future that would significantly impact the socioeconomics of Lea County, New Mexico, or Andrews and Gaines Counties, Texas. Therefore, cumulative impacts would be MODERATE. Impacts from the impending casino/hotel/racetrack and WCS disposal (provided the WCS is granted a license amendment) would be added to the cumulative impacts.

#### **4.4.6 Environmental Justice**

Environmental justice analysis performed on the potential cumulative impacts concluded there would be no disproportionately high-minority and low-income populations that exist warranting further examination of environmental impacts to those populations (WCS, 2004). It is unlikely that minority and low-income persons would be disproportionately affected by adjacent activities at WCS and Lea County Landfill. Any impacts from traffic during construction of the proposed disposal cells by WCS would be short termed and SMALL.

#### **4.4.7 Transportation**

The construction, operation, and decommissioning of the proposed NEF would result in SMALL to MODERATE impact due to increased traffic from commuting construction workers and no highway upgrades are required other than possibly some safety enhancements, such as the addition of turning lanes. With the implementation of all current and planned or proposed future actions within the vicinity of the proposed NEF (e.g., construction and operation of the proposed WCS and operation at Lea County Landfill), traffic volumes would contribute to cumulative impacts. However, no changes are anticipated in the SMALL to MODERATE cumulative effects concerns for transportation.

#### **4.4.8 Public and Occupational Health**

Currently, the only reasonably foreseeable radiological actions in the area not related to the proposed NEF is the application by WCS to seek and obtain a low-level radioactive wastes disposal site license through the State of Texas (an NRC Agreement State) (WCS, 2004). The existing WCS license only allows for the storage of radioactive material (BRC, 2003). This radioactive material is packaged and

stored such that it would not contribute to the annual dose for members of the public. For the WCS application for a low-level radioactive waste disposal site, the impacts to members of the public were analyzed at the site boundary and for the nearest resident, the same nearest resident as for the proposed NEF (WCS, 2004). The annual doses for normal operations would be  $4.9 \times 10^{-4}$  millisieverts ( $4.9 \times 10^{-2}$  millirem) at the site boundary and  $1.9 \times 10^{-6}$  millisieverts ( $1.9 \times 10^{-4}$  millirem) for the nearest resident. The largest potential accident impact could be from a truck fire with doses of 0.49 millisieverts (49 millirem) and  $7.7 \times 10^{-4}$  millisieverts ( $7.7 \times 10^{-2}$  millirem) for the site boundary and the nearest resident, respectively. When added to the maximally exposed individual airborne dose of  $5.3 \times 10^{-5}$  millisieverts ( $5.3 \times 10^{-3}$  millirem) per year projected for the proposed NEF, this cumulative dose would still be considered SMALL.

The cumulative collective radiological impacts to the offsite population, from all sources, would be SMALL by being below the 1 millisieverts (100 millirem) per year dose limit (10 CFR Part 20) to the offsite maximally exposed individual during the time of the construction, operation, and decommissioning of the proposed NEF.

#### **4.5 Irreversible and Irretrievable Commitment of Resources**

Irreversible and irretrievable commitment of resources for the proposed NEF would include the commitment of land, water, energy, raw materials, and other natural and manmade resources for construction. The impacts from such commitment of resources would be SMALL (see box on page 4-1 for definition).

About 81 hectares (200 acres) within a 220-hectare (543-acre) site would be used for the construction and operation of the proposed NEF. Following decommissioning, all parts of the plant and site will be unrestricted to any specific type of use (LES, 2005a). Therefore, if the license is granted, the 81 hectares (200 acres) parcel of land would likely remain industrial beyond license termination.

The construction and operation of the proposed NEF would use up to 2.63 million cubic meters (695 million gallons) per year of groundwater resources from the Eunice and/or Hobbs municipal water-supply systems. The proposed NEF is a consumptive water-use facility, meaning all water would be used and none would be returned to its original source. Although the amount of water that would be used from the Ogallala Aquifer by the proposed NEF represents a small percentage of the total capacity of the two municipalities, this water would be lost in three ways. The water would evaporate from the Treated Effluent Evaporative Basin and UBC Storage Pad Stormwater Retention Basin; it would evaporate or infiltrate into the ground from the Site Stormwater Detention Basin and septic leach fields; and infiltrated groundwater would undergo evapotranspiration. It is unlikely that any of the water used by the proposed NEF would replenish the Ogallala Aquifer.

Energy expended would be in the form of fuel for equipment and vehicles, electricity for facility operations, and natural gas for steam generation used for heating. Operation of the proposed NEF would consume approximately 236 cubic meters (62,350 gallons) of gasoline and diesel fuel annually for operation of vehicles and the emergency diesel generators. The electrical energy requirement represents a small increase in electrical energy demand of the area. Improvements in the local area's electrical power capacity to support the proposed NEF, namely the addition of transmission lines, transmission towers, and two onsite transformers, would contribute to a slight increase in the irreversible and irretrievable commitment of resources due to the dedication of a small portion of land (i.e., access of county right-of-way next to New Mexico Highway 234) and material necessary for such improvements and expansion of services. During normal operation, the average and peak electrical power requirements of the proposed NEF would be approximately 30.3 million volt-amperes and 32 million volt-amperes, respectively (LES,

2005a). Based on the relationship that the generation of one separative work unit (SWU) would require approximately 40 kilowatt-hours of electrical energy (Urenco, 2004), the proposed NEF's centrifuge equipment would use approximately 120 million kilowatt-hours annually during the 30-year license of the facility. The annual consumption of natural gas for the proposed NEF would be approximately 3.1 million cubic meters (110 million cubic feet) based on plant requirements of approximately 354 cubic meters (12,500 cubic feet) per hour (LES, 2005b).

Resources that would be committed irreversibly or irretrievably during construction and operation of the proposed NEF include materials that could not be recovered or recycled and materials that would be consumed or reduced to unrecoverable forms. It is expected that about 60,000 cubic meters (2.1 million cubic feet) of concrete, 80,000 square meters (861,000 square feet) of asphalt, 288,000 square meters (3.1 million square feet) of crushed stone, more than 500 metric tons (551 tons) of steel products and about 55,800 cubic meters (73,000 cubic yards) of clay would be committed to the construction of the proposed NEF. The proposed NEF would generate during operations a small amount of nonrecyclable waste streams, such as hazardous wastes that are subject to RCRA regulations and radiological waste. Generation of these waste streams would represent an irreversible and irretrievable commitment of material resources. However, during decommissioning, certain materials and former operational equipment of the proposed NEF could be recycled after completing decontamination and dismantling.

Chemical additives would be used during operation to control bacteria and corrosion. Approximately 8,000 kilograms (17,637 pounds) of corrosion inhibitors and 1,800 kilograms (3,968 pounds) of bio-growth inhibitors may be used annually. Table 4-21 lists process chemicals and gases that would be irreversibly and irretrievably committed.

**Table 4-21 Process Chemicals and Gases Used at the Proposed NEF**

<b>Chemical</b>	<b>Form<sup>a</sup></b>	<b>Quantity</b>
Acetone	L	27 liters
Acetylene	G	6 m <sup>3</sup>
Activated Carbon	S	730 kg
Aluminum Oxide	S	1,312 kg
Argon	G	380 m <sup>3</sup>
Carbon Fibers	S	classified
Carbon/Potassium Carbonate	S	only states as filter
Citric Acid	L (5-10%), S (crystalline)	800 liters
Cutting Oil	L	2.4 liters
Degreaser Solvent, SS25	L	2.4 liters
Detergent	L	205 liters
Diatomaceous Earth	S	10 kg
Diesel Fuel (Outdoors)	L	37,854 liters
Ethanol	L	85 liters
Filters, Radioactive and Industrial	S	37,044 kg
Helium	G	440 m <sup>3</sup>
Hydrogen	G	Standard cylinder

<b>Chemical</b>	<b>Form<sup>a</sup></b>	<b>Quantity</b>
Ion Exchange Resin	S	1.6 m <sup>3</sup>
Metals (Aluminum)	S	classified
Methylene Chloride	L	670 liters
Nitric Acid (65%)	L	26 liters
Nitrogen	L, G	37,858 liters
Oil	L	1 kg
Organic Chemicals	L	50 liters
Oxygen	G	11 m <sup>3</sup>
Paint	L	12 liters
Papers, Wipes, Gloves, etc.	S	1 m <sup>3</sup>
Penetrating Oil	L	0.44 liter
Peroxide	L	4 liters
Petroleum Ether	L	10 liters
PFPE (Fomblin®) Oil	L	20 liters
PFPE (Tyreno®) Oil	L	120 liters
Phosphoric Acid	L	44 liters
Potassium or Sodium Hydroxide	L	210 liters
Primus Gas	G	0.5 kg
Propane	G	0.68 kg
R23 Trifluoromethane	L, G	42.5 kg
R404A Fluoroethane blend	L, G	375 kg
R507 Penta/tri Fluoroethane	L, G	1,590 kg
Sandblasting Sand	S	50 kg
Shot Blasting Media	S	1 bag
Silicone Oil	L	1,750 liters
Sodium Carbonate	S	10 kg
Sodium Fluoride	S	14,500 kg
Sodium Hydroxide (0.1N)	L	5 liters
Sulfuric Acid	L	10 liters
Toluene	L	2 liters

<sup>a</sup> L - liquid; G - gas; and S - solid.

m<sup>3</sup> - cubic meter.

kg - kilogram.

To convert from kilograms to pounds, multiply by 2.2.

To convert from cubic meters to cubic feet, multiply by 35.3.

To convert from liters to gallons, multiply by 0.26.

Source: LES, 2005a.

#### **4.6 Unavoidable Adverse Environmental Impacts**

Implementing the proposed action would result in unavoidable adverse impacts on the environment. These impacts would result from the proposed NEF site preparation, construction, and operation. Generally, these impacts are SMALL.

Site preparation and construction of the proposed NEF would use at least one-third of the 220-hectare (543-acre) proposed NEF site. This construction area would be cleared of vegetation and graded by filling approximately 611,000 cubic meters (797,000 cubic yards) of soil and caliche. In addition, construction activities to relocate the CO<sub>2</sub> pipeline would be performed. The impact from the loss of grazing lands from the proposed NEF site would be minimal due to the abundance of other nearby grazing areas. These activities would also lead to the displacement of some local wildlife populations to nearby habitat. In addition, there would be temporary impacts from the construction of new facilities associated with the proposed NEF site. These impacts would consist of increased fugitive dust, increased potential for soil erosion and stormwater pollution, and increased construction vehicle traffic and emissions.

Water consumption during the site preparation and construction phase would be less than that required during operations. The proposed NEF site water supply would be obtained from the cities of Eunice and Hobbs, which obtain their water from wells positioned in the most productive portion of the Ogallala Aquifer in New Mexico. The total water use for the 30-year life of this facility is projected to exceed 2.63 million cubic meters (695 million gallons) from the Ogallala Aquifer. This is relatively low compared to the total pumping capacity of the Eunice and Hobbs municipalities.

During operations, workers and members of the public would face unavoidable exposure to radiation and chemicals. Workers would be exposed to radiation and chemicals associated with operating the proposed NEF and handling and transporting radioactive material and waste. The public would be exposed to low levels of radioactive contaminants released to the air and through limited exposure to radioactive materials, including waste, that would be transported to the final disposal sites. Small quantities of hydrofluoric acid and uranium would be released to the air with the potential for chemical exposure.

#### **4.7 Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity**

Consistent with the Council on Environmental Quality's definition as well as the definition provided in section 5.8 of NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs," this EIS defines short-term uses and long-term productivity as follows:

- Short-term uses generally affect the present quality of life for the public (i.e., this is the 30-year license period for the proposed NEF).
- Long-term productivity affects the quality of life for future generations based on environmental sustainability (i.e., this is the period after license termination for the proposed NEF).

The construction and operation of the proposed NEF would necessitate short-term commitments of resources and would permanently commit certain other resources (such as energy and water). The short-term use of resources would result in potential long-term socioeconomic benefits to the local area and the region. The short-term commitments of resources would include the use of materials required to construct new buildings, the commitment of new operations support facilities, transportation, and other disposal resources and materials for the proposed NEF operations.

Workers, the public, and the environment would be exposed to increased amounts of hazardous and radioactive materials over the short term from the operations of the proposed NEF and the associated materials, including process emissions and the handling of waste and  $\text{DUF}_6$  cylinders. Construction and operation of the proposed NEF would require a long-term commitment of terrestrial resources, such as land, water, and energy. Short-term impacts would be minimized with the application of proper mitigation measures and resource management. Upon the closure of the proposed NEF, LES would decontaminate and decommission the buildings and equipment and restore them for unrestricted use. This would make the site available for future use.

Continued employment, expenditures, and tax revenues generated during the implementation of the proposed action would directly benefit the local, regional, and State economies.

#### **4.8 No-Action Alternative**

As presented in section 2.2.1, the no-action alternative would be to not construct, operate, and decommission the proposed NEF in Lea County, New Mexico. Utility customers would continue to depend on uranium enrichment services needs through existing suppliers (e.g., existing uranium enrichment facilities, foreign sources and from the “Megatons to Megawatts” program). Current U.S. contract commitments for low-enriched uranium total about 12 million SWU annually (EIA, 2004). U.S. Enrichment Corporation (USEC) is currently the only domestic supplier of enrichment services. USEC currently sells enriched uranium to both domestic and foreign users. The existing activities would include the continued operation of the aging Paducah Gaseous Diffusion Plant, the downblending of highly enriched uranium covered under the “Megatons to Megawatts” program that is managed by USEC and scheduled to expire in 2013, and the importation of foreign enrichment product. By combining its domestic enrichment facilities and the downblending of foreign highly enriched uranium, USEC can provide for approximately 56 percent of the U.S. enrichment market needs (USEC, 2004a) while foreign suppliers provide the remaining 44 percent.

On January 12, 2004, USEC announced plans to build and operate a uranium enrichment plant (known as the American Centrifuge Plant) in Piketon, Ohio (USEC, 2004b). This plant would cost up to \$1.5 billion, employ up to 500 people, and reach an initial annual production level of 3.5 million SWUs by 2010 (USEC, 2004a). Completion of the American Centrifuge Plant would allow for the replacement of the enrichment services provided by the Paducah Gaseous Diffusion Plant with subsequent closure, decontamination, and decommissioning. The efforts by USEC for the research and development of their own gaseous centrifuge technology, licensing, construction, and operation of the American Centrifuge Plant is an unrelated action to the proposed NEF.

Under the no-action alternative, there is only one remaining domestic enrichment facility, the Paducah Gaseous Diffusion Facility, which could continue to serve as a source of low-enriched uranium into the foreseeable future or until replaced by the American Centrifuge Plant. The “Megaton to Megawatts” program managed by USEC would continue to provide low-enriched uranium until 2013 under the current program. After the cessation of this program in 2013 if not renewed by the United States and Russia, the availability of low-enriched uranium through the downblending of highly enriched uranium is uncertain. Reliance on only one domestic source for enrichment services could result in disruptions to the supply of low-enriched uranium, and consequently to reliable operation of U.S. nuclear energy production, should there be any disruptions to foreign supplies and/or the operations of the domestic supplier (i.e., failure of USEC to construct and operate the American Centrifuge Plant and if the “Megaton to Megawatts” program is not extended beyond 2013).



The need for generating capacity within the United States is expected to increase, so that by 2020 nuclear-generating capacity is expected to increase by more than 5 gigawatts (5,000 megawatts), the equivalent of adding about five large nuclear power reactors. In the short term, any excess demand can be accommodated by depleting existing inventories at USEC, commercial utilities, and the Federal Government. In the long term, this could lead to more reliance on foreign suppliers for enrichment services unless other new domestic suppliers are constructed and operated.

The likelihood that low-enriched uranium would be available from foreign suppliers in the long term is also subject to uncertainty. The current world enrichment demand is about 35 million SWU per year, and world production capacity is about 38 million SWU (Lenders, 2001). There could also be large, long-term uncertainty concerning the impacts from potential future changes in world-wide supplies of low-enriched uranium. Therefore, the fading of the downblending “Megaton to Megawatts” program could lead to excess world-wide demand. Foreign sources of enrichment services would continue to provide commercial nuclear reactors with their fuel supplies.

The impacts experienced today from the existing uranium fuel cycle activities in the United States would continue if the proposed NEF is not constructed, operated or decommissioned. To the extent that the failure to construct and operate the proposed NEF maintains or increases reliance on foreign sources for low-enriched uranium, foreign countries would experience the associated environmental impacts. This assumes foreign uranium enrichment services would be available in the future to supply U.S. market demand for the market share that would have been provided by the proposed NEF.

The following section discusses additional environmental impacts from not constructing, operating, and decommissioning the proposed NEF. Additional domestic enrichment facilities in the future could be constructed with impacts to be determined in their associated NEPA documentation. The above-mentioned existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring.

#### **4.8.1 Land Use Impacts**

Under the no-action alternative, no local impact would occur because the proposed NEF would not be constructed or operated. The land use of cattle grazing would continue and the property would be available for alternative use. There would also be no land disturbances. Impacts to local land use would be expected to be SMALL.

Additional domestic enrichment facilities could be constructed in the future and would have land use impacts that would be similar to those of the proposed action, depending on site conditions either at a new location or an existing industrial site. Impacts to land use would be expected to be SMALL.

#### **4.8.2 Historical and Cultural Resources Impacts**

Under the no-action alternative, the land would continue to be used for cattle grazing and historical and cultural resources would remain in place unaffected by the proposed action. Without the proposed treatment plan and its mitigation measures, historical sites identified at the proposed NEF site could be exposed to the possibility of human intrusion and continued weathering. Local impacts to historical and cultural resources would be expected to be SMALL, providing that requirements included in applicable Federal and State historic preservation laws and regulations are followed or could be MODERATE if not followed.

Additional domestic enrichment facilities could be constructed in the future and could have potential impacts to cultural resources if at a new location. The impacts would be expected to be SMALL if built and operated at an existing industrial site. The impacts could be SMALL to MODERATE if additional domestic enrichment facilities were located at a new site, depending on the specific site conditions.

#### **4.8.3 Visual/Scenic Resources Impacts**

Under the no-action alternative, the visual and scenic resources would remain the same as described in the affected environment section. Local impacts to visual and scenic resources would be expected to be SMALL.

Additional domestic enrichment facilities could be constructed in the future and would have visual and scenic resources impacts that would be similar to those of the proposed action, depending on site conditions either at a new location or an existing industrial site. Impacts to visual and scenic resources would be expected to be SMALL.

#### **4.8.4 Air Quality Impacts**

Under the no-action alternative, air quality in the general area would remain at its current levels described in the affected environment section. Impacts to air quality would be expected to be SMALL.

Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods and design of these facilities, the likely impact on air quality would be similar to the proposed action. Impacts to air quality would be expected to be SMALL.

#### **4.8.5 Geology and Soils Impacts**

Under the no-action alternative, the land would continue to be used for cattle grazing. The geology and soils on the proposed site would remain unaffected because no land disturbance would occur. Natural events such as wind and water erosion would remain as the most significant variable associated with the geology and soils of the site. Impacts to geology and soils would be expected to be SMALL.

Additional domestic enrichment facilities could be constructed in the future and would have geology and soils impacts that would be similar to those of the proposed action, depending on site conditions either at a new location or an existing industrial site. Impacts to geology and soils would be expected to be SMALL.

#### **4.8.6 Water Resources Impacts**

Under the no-action alternative, water resources would remain the same as described in the affected environment section. Water supply demand would continue at the current rate. The natural surface flow of stormwater on the site would continue, and potential groundwater contamination could occur due to surrounding operations related to the oil industry. Impacts to water resources local to Lea County would be expected to be SMALL.

Additional domestic enrichment facilities could be constructed in the future. Depending on the design, location of these facilities and local water resources, the likely impact on water resources (including water usage) would be similar to the proposed action. Impacts to water resources would be expected to be SMALL.

#### **4.8.7 Ecological Resources Impacts**

Under the no-action alternative, the land would continue to be used for cattle grazing and the ecological resources would remain the same as described in the affected environmental section. Local land disturbances would also be avoided. Impacts to ecological resources would be expected to be SMALL.

Additional domestic enrichment facilities could be constructed in the future and would have ecological resources impacts that would be similar to those of the proposed action, depending on the site conditions either at a new location or an existing industrial site. Impacts to ecological resources would be expected to be SMALL.

#### **4.8.8 Socioeconomic Impacts**

Under the no-action alternative, socioeconomics in the local area would continue as described in the affected environmental section. The socioeconomic impacts would be SMALL.

Additional domestic enrichment facilities in the future could be constructed. Depending on the construction methods, design of these facilities and local demographics, the likely socioeconomic impact would be similar to the proposed action. Socioeconomic impacts would be expected to be SMALL to MODERATE.

#### **4.8.9 Environmental Justice Impacts**

Under the no-action alternative, no changes to environmental justice issues other than those that may already exist in the community would occur. No disproportionately high or adverse impacts would be expected. Environmental justice impacts would be expected to be SMALL.

Additional domestic enrichment facilities in the future could be constructed, with site-specific impacts on environmental justice. The impacts could be similar to the proposed action if the location has a similar population distribution or at a site with a similar industrial process. Environmental justice impacts would be expected to be SMALL under most likely circumstances.

#### **4.8.10 Noise Impacts**

Under the no-action alternative, there would be no construction or operational activities or processes that would generate noise. Noise levels would remain as is currently observed at the site. Noise impacts would be expected to be SMALL.

Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods, design of these facilities, and surrounding land uses, the likely noise impact would be similar to the proposed action. Noise impacts would be expected to be SMALL.

#### **4.8.11 Transportation Impacts**

Under the no-action alternative, traffic volumes and patterns would remain the same as described in the affected environment section. The current volume of radioactive material and chemical shipments would not increase. Transportation impacts would be expected to be SMALL.

Additional domestic enrichment facilities in the future could be constructed and would have transportation impacts that would be similar to those of the proposed action, depending on site conditions either at a new location or an existing industrial facility. Impacts to transportation would be expected to be SMALL to MODERATE.

#### **4.8.12 Public and Occupational Health Impacts**

Under the no-action alternative, the public health would remain the same as described in the affected environment section. No radiological exposures are estimated to the general public other than from background radiation levels. Local public and occupational health impacts would be expected to remain SMALL.

Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods and design of these facilities, the likely public and occupational health impacts from normal operations and accidents would be similar to the proposed action. Public and occupational health impacts for additional domestic enrichment facilities would be expected to be SMALL to MODERATE.

#### **4.8.13 Waste Management Impacts**

Under the no-action alternative, new wastes including sanitary, hazardous, low-level radioactive wastes, or mixed wastes would not be generated that would require disposition. Local impacts from waste management would be expected to remain SMALL.

Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods, design of these facilities, and the status of DUF<sub>6</sub> conversion facilities, the likely waste management impacts would be similar to the proposed action. For additional domestic enrichment facilities, impacts from waste management would be expected to be SMALL to MODERATE.

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## 5 MITIGATION MEASURES

Mitigation measures are those actions or processes (e.g., process controls and management plans) that would be implemented to control and minimize potential impacts from construction and operation activities. These measures are in addition to actions taken to comply with applicable laws and regulations (including permits). This chapter summarizes the mitigation measures that were proposed by Louisiana Energy Services (LES) for the proposed National Enrichment Facility (NEF). The proposed mitigation measures provided in this chapter do not include environmental monitoring activities. Environmental monitoring activities are described in Chapter 6 of this Environmental Impact Statement.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the mitigation measures proposed by LES for the proposed NEF and has concluded that no additional mitigation measures other than those proposed by LES are required. The NRC staff has determined that additional mitigation measures are not likely to be sufficiently beneficial to warrant implementation.

### 5.1 Mitigation Measures Proposed by LES

LES identified mitigation measures in the Environmental Report and in responses to requests for additional information that would reduce the environmental impacts associated with the proposed action (LES, 2005; Krich, 2005). Tables 5-1 and 5-2 list the mitigation measures impact areas. LES did not identify mitigation measures for the impact areas of socioeconomics and environmental justice during construction and operations. This does not preclude additional mitigation measures that may be considered by LES based upon consultations with regulatory agencies other than NRC.

**Table 5-1 Summary of Potential Mitigation Measures Proposed by LES for Construction**

Impact Area	Activity	Proposed Mitigation Measures
Land Use	Land disturbance	<p>Use best management practices (BMPs) to develop the smallest area of the site as practicable and use water spray on roads to suppress dust.</p> <p>Limit site slopes to a horizontal-vertical ratio of three to one or less.</p> <p>Use sedimentation detention basins.</p> <p>Protect undisturbed areas with silt fencing and straw bales as appropriate.</p> <p>Use site stabilization practices such as placing crushed stone on top of disturbed soil in areas of concentrated runoff.</p>
Geology and Soil	Soil disturbance	<p>Use construction BMPs and comply with a fugitive dust control plan and a Spill Prevention, Control, and Countermeasures Plan. BMPs include:</p> <ul style="list-style-type: none"> <li>• Minimize construction footprint.</li> <li>• Use water to control dust.</li> <li>• Promptly stabilize or cover bare areas once earthmoving activities are completed.</li> </ul> <p>Use earthen berms, dikes, and sediment fences as necessary to</p>

<b>Impact Area</b>	<b>Activity</b>	<b>Proposed Mitigation Measures</b>
Geology and Soil <i>(continued)</i>		limit suspended solids in runoff. Stabilize and line drainage culverts and ditches with rock aggregate/riprap to reduce flow velocity and prohibit scouring.
Water Resources	Runoff	Use BMPs for dust control, fill operations, erosion control measures, maintenance of equipment, stormwater runoff, and erosion controls.  Use staging areas for materials and wastes and retention/detention basins to control runoff.  Implement a Spill Prevention, Control, and Countermeasures Plan and a site Stormwater Pollution Prevention Plan.  Berm all aboveground diesel storage tanks.
	Water use	Use low-water-consumptive landscaping techniques and install low-flow toilets, sinks, and showers and other efficient water-using equipment.  Implement a waste management and recycling program to segregate and minimize industrial and hazardous waste.
Ecological Resources	Disturbance of habitats	Use construction BMPs to minimize the construction footprint and to control erosion, and manage stormwater including those associated with the construction of the water supply pipeline, construction of the natural gas pipeline, relocation of the carbon dioxide pipeline, and construction of the electric transmission lines.  Use native, low-water-consumptive vegetation in restored and landscaped areas.  Consult with New Mexico Department of Game and Fish on the design and use of animal-friendly fencing and netting or other suitable material over basins to prevent use by migratory birds.  Consult with water supply utilities on the New Mexico Department of Game and Fish wildlife protection guidance.  Minimize the number of open trenches at any given time and keep trenching and backfilling crews close together.  Trench during the cooler months (when possible).  Avoid leaving trenches open overnight. Construct escape ramps at least every 90 meters (295 feet) and make the slope of the ramps less than 45 degrees. Inspect trenches that are left open overnight and remove animals prior to backfilling.  Consult with the electric utility responsible for the construction of the new transmission line to address New Mexico Department of Game and Fish and Edison Electric Institute guidance for the protection of birds.
Ecological		Consider down-shielding of security lights consistent with

<b>Impact Area</b>	<b>Activity</b>	<b>Proposed Mitigation Measures</b>
Resources (continued)		<p>security plan requirements.</p> <p>Implement pest management controls for mosquitoes if significant population develops.</p> <p>Implement weed control if a significant intrusion develops.</p>
Historical and Cultural Resources	Disturbance of prehistoric archaeological sites and sites eligible for listing on the National Register of Historic Places	Implement treatment plan developed in coordination with the NRC, the New Mexico State Historic Preservation Office, the State Land Office, Lea County, the Advisory Council on Historic Preservation, and affected Indian tribes for the sites eligible for listing on the National Register of Historic Places.
Air Quality	Fugitive dust and construction equipment emissions	<p>Use BMPs for fugitive dust and for maintenance of vehicles and equipment to minimize air emissions.</p> <p>Implement “best available control measures” (identified in the Natural Events Action Plan being prepared by the New Mexico Environment Department Air Quality Bureau) as appropriate to the proposed NEF.</p> <p>In addition to those mitigative measures identified in Geology and Soil above:</p> <ul style="list-style-type: none"> <li>• Use covers over load beds of open-bodied trucks.</li> <li>• Promptly remove earthen material on paved roads.</li> </ul>
Public and Occupational Health	Nonradiological effects from construction activities	Use BMPs and management programs associated with promoting safe construction practices.
Transportation	Traffic volume	<p>Use construction BMPs to suppress dust by watering down roads as necessary and maintain temporary roads.</p> <p>Convert the temporary access roads into permanent access roads upon completion of the construction.</p> <p>Cover open-bodied trucks when in motion, stabilize or cover bare earthen areas, ensure prompt removal of earthen materials from paved areas, and use containment methods during excavation activities.</p> <p>Use shift work during construction, operation, and decommissioning to reduce traffic on roadways.</p> <p>Encourage car pooling to reduce the number of workers’ cars on the road.</p>
Waste Management	Generation of industrial and	<p>Use waste-staging areas to segregate and store wastes.</p> <p>Use BMPs that minimize the generation of solid waste.</p>

<b>Impact Area</b>	<b>Activity</b>	<b>Proposed Mitigation Measures</b>
	hazardous wastes (air and liquid emissions in “Air Quality” and “Water Resources,” above)	Perform a waste assessment and develop and use a waste recycling plan for nonhazardous materials. Conduct employee training on the recycling program.
Visual and Scenic Resources	Potential visual intrusions in the existing landscape character	Use accepted natural, low-water-consumption landscaping techniques. Consider down-shielding of security lights consistent with security plan requirements. Conduct prompt revegetation or covering of bare areas.
Noise	Exposure of workers and the public to noise	Maintain in proper working condition the noise-suppression systems on construction vehicles. Promote use of hearing protection for workers.

**Table 5-2 Summary of Potential Mitigation Measures Proposed by LES for Operations**

<b>Impact Area</b>	<b>Activity</b>	<b>Proposed Mitigation Measures</b>
Land Use	Land disturbance	Stabilize bare areas with natural, low-water-maintenance landscaping and pavement.
Geology and Soil	Soil disturbance	Implement a Spill Prevention, Control, and Countermeasures Plan. Use water to control dust. Use permanent retention/detention basins to collect stormwater and process water. Stabilize bare areas with natural, low-water-maintenance landscaping and pavement.
Water Resources	Runoff	Use staging areas for materials and wastes and retention/detention basins to control runoff. Implement a Spill Prevention, Control, and Countermeasure Plan and a site Stormwater Pollution Prevention Plan during operation. Perform visual inspections of the basins on a sufficient basis for high water levels and to verify proper functioning. Implement corrective actions for high water levels as needed to prevent overflowing. Use low-water-consumptive landscaping techniques.
Water Resources (continued)	Water use	Building and maintenance practices designed to reduce water consumption.



<b>Impact Area</b>	<b>Activity</b>	<b>Proposed Mitigation Measures</b>
		Use closed-loop cooling systems.
Ecological Resources	Disturbance of habitats	<p>Manage unused open areas (i.e., leave undisturbed), including areas of native grasses and shrubs for the benefit of wildlife.</p> <p>Conduct pest management and weed control if the presence of pest or weed intrusion is significant.</p> <p>Use native, low-water-consumptive vegetation in restored and landscaped areas.</p> <p>Use animal-friendly fencing and netting or other suitable material over basins to prevent use by migratory birds.</p>
Historical and Cultural Resources	Disturbance of prehistoric archaeological sites and sites eligible for listing on the National Register of Historic Places	Implement treatment plan developed in coordination among the NRC, the New Mexico State Historic Preservation Office, the State Land Office, Lea County, the Advisory Council on Historic Preservation, and affected Indian tribes for the sites eligible for listing on the National Register of Historic Places.
Air Quality	Fugitive dust and construction equipment emissions	Implement “best available control measures” (identified in the Natural Events Action Plan being prepared by the New Mexico Environment Department Air Quality Bureau) as appropriate to the proposed NEF.
Waste Management	Generation of industrial, hazardous, radiological, and mixed wastes (air emissions are addressed under “Air Quality” on page 5-2, and liquid emissions are addressed under “Water Resources” on page 5-4)	<p>Use a storage array that permits easy visual inspection of all cylinders, with uranium byproduct cylinders (UBCs) stacked no more than two high.</p> <p>Segregate the storage pad areas from the rest of the enrichment facility by barriers (e.g., vehicle guardrails).</p> <p>Prior to placing the UBCs on the UBC Storage Pad or transporting them offsite, inspect the cylinders for external contamination (a “wipe test”) using a maximum level of removable surface contamination allowable on the external surface of the cylinder of no greater than 0.4 becquerel per square centimeter (22 disintegrations per minute per square centimeter) (beta, gamma, alpha) on accessible surfaces averaged over 300 square centimeters (46.5 square inches).</p> <p>Take steps to ensure that UBCs are not equipped with defective valves (identified in NRC Bulletin 2003-03, “Potentially Defective 1-Inch Valves for Uranium Hexafluoride Cylinders”) (NRC, 2003).</p>
Waste Management		Allow only designated vehicles with less than 280 liters (74 gallons) of fuel in the UBC Storage Pad area.
(continued)		Allow only trained and qualified personnel to operate vehicles on the UBC Storage Pad area.

Impact Area	Activity	Proposed Mitigation Measures
		<p>Inspect cylinders of UF<sub>6</sub> prior to placing a filled cylinder on the UBC Storage Pad and annually inspect UBCs for damage or surface coating defects. Inspections would ensure:</p> <ul style="list-style-type: none"> <li>• Lifting points are free from distortion and cracking.</li> <li>• Cylinder skirts and stiffener rings are free from distortion and cracking.</li> <li>• Cylinder surfaces are free from bulges, dents, gouges, cracks, or significant corrosion.</li> <li>• Cylinder valves are fitted with the correct protector and cap.</li> <li>• Cylinder valves are straight and not distorted, two to six threads are visible, and the square head of the valve stem is undamaged.</li> <li>• Cylinder plugs are undamaged and not leaking.</li> </ul> <p>If inspection of a UBC reveals significant deterioration or other conditions that may affect the safe use of the cylinder, the contents of the affected cylinder shall be transferred to another cylinder and the defective cylinder shall be discarded. The root cause of any significant deterioration would be determined, and if necessary, additional inspections of cylinders shall be made.</p> <p>Monitor all site detention/retention basins.</p> <p>Use waste-staging areas to segregate and store wastes and volume reduce/minimize wastes through a waste management program and associated procedures.</p> <p>Use operating practices that minimize the generation of solid wastes, liquid wastes, liquid effluents, and gaseous effluents and that minimize energy consumption.</p> <p>Perform a waste assessment and develop and use a waste recycling plan for nonhazardous materials.</p> <p>Conduct employee training on the waste recycling program.</p> <p>Implement as-low-as-reasonably-achievable concepts and waste minimization and reuse techniques to minimize radioactive waste generation.</p> <p>Implement a Spill Prevention, Control, and Countermeasures Plan.</p>

<b>Impact Area</b>	<b>Activity</b>	<b>Proposed Mitigation Measures</b>
Visual and Scenic Resources	Potential visual intrusions in the existing landscape character	Use accepted natural, low-water-consumption landscaping techniques.
		Consider down-shielding of security lights consistent with security plan requirements.
		Conduct prompt revegetation or covering of bare areas.
Noise	Exposure of workers and the public to noise	Maintain in proper working condition the noise-suppression systems on vehicles and any outdoor equipment.
		Promote use of hearing protection for workers.

## 5.2 References

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## 6 ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

This chapter describes the proposed monitoring program used to characterize and evaluate the environment, to provide data on measurable levels of radiation and radioactivity, and to provide data on principal pathways of exposure to the public at the proposed National Enrichment Facility (NEF) site in Lea County, New Mexico. The monitoring program is described in terms of radiological and physiochemical (i.e., chemical and meteorological properties that affect measurements) gaseous and liquid effluents, and ecological impacts from the proposed NEF operations.

Figure 6-1 shows the following proposed sampling and monitoring locations for gaseous and liquid effluents and groundwater (LES, 2005a):

- Sixteen thermoluminescent dosimeters along the site perimeter fence in the north, south, east, and west.
- Eight soil-sampling and vegetation-sampling locations along the site perimeter fence (north, south, east, and west).
- Three water/sediment-sampling locations:
  - ! The Site Stormwater Detention Basin.
  - ! The Uranium Byproduct Cylinder (UBC) Storage Pad Stormwater Retention Basin.
  - ! The Treated Effluent Evaporative Basin.
- Seven continuous airborne-particulate sampling locations:
  - ! Two samplers on the south side of the fenceline.
  - ! Sampler on the east side of the fenceline.
  - ! Sampler to the west at the nearest residential area.
  - ! Sampler to the north at the sand/aggregate quarry.
  - ! Sampler adjacent to the Treated Effluent Evaporative Basin.
  - ! Control sampler 16 kilometers (10 miles) to the southeast.
- Five groundwater monitoring wells:
  - ! Background groundwater monitoring well located on the northern boundary of the site.
  - ! Two monitoring wells located on the southern edge of the UBC Storage Pad.
  - ! Monitoring well located on the south side of the UBC Storage Pad Stormwater Retention Basin.
  - ! Monitoring well located on the southeastern corner of the Site Stormwater Detention Basin.

Radiological, physiochemical, and ecological monitoring may not occur at all of the locations shown in Figure 6-1, and sampling locations may change based on meteorological conditions and operations. The following sections describe the monitoring programs more fully.

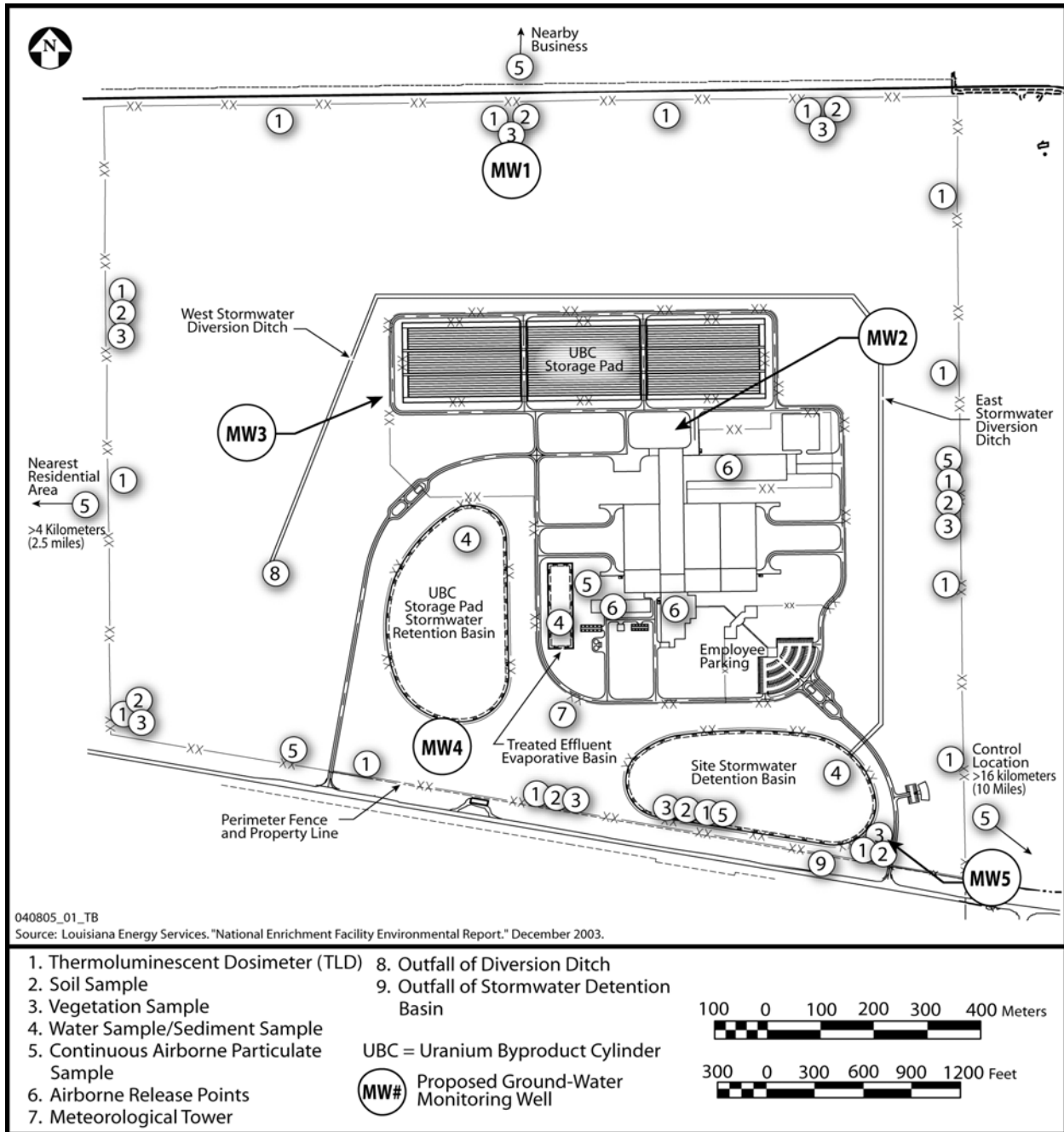


Figure 6-1 Proposed Sampling Stations and Monitoring Locations (LES, 2005a)

## 6.1 Radiological Monitoring

The proposed NEF would address radiological monitoring through two programs: the Effluent Monitoring Program and the Radiological Environmental Monitoring Program. The Effluent Monitoring Program would address the monitoring, recording, and reporting of data for radiological contaminants being emitted from specific emission points such as an airborne release stack or liquid waste outfall. The Radiological Environmental Monitoring Program would address the monitoring of the general

environmental impacts (i.e., soil, sediment, groundwater, ecology, and air) within and outside the proposed NEF site boundary. The following subsections provide information on the two radiological monitoring programs.

### 6.1.1 Effluent Monitoring Program

The U.S. Nuclear Regulatory Commission (NRC) requires that a radiological monitoring program be established by the proposed NEF to monitor and report the release of radiological air and liquid effluents to the environment. Table 6-1 lists the guidance documents that apply to the radiological monitoring program.

**Table 6-1 Guidance Documents that Apply to the Radiological Monitoring Program**

Document	Applicable Guidance
Regulatory Guide 4.15 <sup>1</sup>	“Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment.” This guide describes a method acceptable to the NRC for designing a program to ensure the quality of the results of measurements for radioactive materials in the effluents and the environment outside of nuclear facilities during normal operations.
Regulatory Guide 4.16 <sup>2</sup>	“Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants.” This guide describes a method acceptable to the NRC for submitting semiannual reports that specify the quantity of each principal radionuclide released to unrestricted areas to estimate the maximum potential annual dose to the public resulting from effluent releases.

<sup>1</sup> NRC, 1979.

<sup>2</sup> NRC, 1985.

Public exposure to radiation from routine operations at the proposed NEF could occur due to the following releases (LES, 2005a):

- Controlled releases of liquid and gaseous effluents from stacks and evaporation ponds.
- Uncontrolled liquid and gaseous releases due to accidents.
- Controlled liquid and gaseous releases from the uranium enrichment equipment during decontamination and maintenance of equipment.
- Transportation and temporary storage of uranium hexafluoride (UF<sub>6</sub>) feed cylinders, product cylinders, and UBCs.

Of these potential release pathways, discharge of gaseous effluents would be considered the principal release pathway. Chapter 4 of this Environmental Impact Statement (EIS) presents the impacts from the assessment of the potential release pathways.

Compliance with Title 10, “Energy,” of the *U.S. Code of Federal Regulations* (10 CFR) § 20.1301 would be demonstrated using a calculation of the total effective dose equivalent (TEDE) to the individual who would be likely to receive the highest dose in accordance with 10 CFR § 20.1302(b)(1). Regulatory Guide 1.109 (NRC, 1977) describes the methodology to be used for determining the TEDE. The dose

conversion factors used in the models would be obtained from Federal Guidance Report 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 would 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 would 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 effluent discharged from the facility would comply with regulatory release criteria.

Compliance with action levels would be demonstrated through effluent and environmental sampling data. If an accidental release of uranium would occur, then routine operational effluent data and environmental data would be used to assess the extent of the release. Processes would be designed to include, when practical, provisions for automatic shutdown in the event action levels were exceeded. In other cases, manual shutdown could be necessary as specified in the proposed NEF operating procedures.

The NEF Quality Assurance Program would oversee the Effluent Monitoring Program and audits would be conducted on a regular basis. Written procedures would be in place to ensure the collection of representative samples; use of appropriate sampling methods and equipment; establishment of proper locations for sampling points; and proper handling, storage, transport, and analyses of effluent samples. The NEF's written procedures would address the maintenance and calibration of sampling and measuring equipment, including ancillary equipment such as airflow meters at regular intervals. The Effluent Monitoring Program procedures would also address functional testing and routine checks to demonstrate that monitoring and measuring instruments are in working condition. Employees involved in implementing this program would be trained in the program procedures (LES, 2005a).

#### **6.1.1.1 Gaseous Effluent Monitoring**

All potentially radioactive effluents from the proposed NEF would be discharged through monitored pathways. As required by 10 CFR Part 70, effluent sampling procedures would be designed in a manner that allows determination of the quantities and concentrations of radionuclides discharged to the environment. The uranium isotopes uranium-238 ( $^{238}\text{U}$ ), uranium-236 ( $^{236}\text{U}$ ), uranium-235 ( $^{235}\text{U}$ ), and uranium-234 ( $^{234}\text{U}$ ) would be expected to be the prominent radionuclides in the gaseous effluent. The annual uranium source term for routine gaseous effluent releases from the proposed NEF would be 8.9 megabecquerels (240 microcuries) per year. This value (8,886 kilobecquerels per year, or 240 microcuries per year) would be conservative because it is approximately 35 times larger than the expected gaseous source term of 253.1 kilobecquerels per year (6.84 microcuries per year) as identified in Table 4-10 of this EIS.

Representative samples would be collected from each release point of the proposed NEF. Uranium compounds expected in the proposed NEF gaseous effluent could include depleted hexavalent uranium, triuranium octaoxide ( $\text{U}_3\text{O}_8$ ), and uranyl fluoride ( $\text{UO}_2\text{F}_2$ ). Effluent data would be maintained, reviewed, and assessed by the NEF Radiation Protection Manager to ensure that gaseous effluent discharges comply with regulatory release criteria for uranium. Table 6-2 provides an overview of the Gaseous Effluent Sampling Program (LES, 2005a).



**Table 6-2 Gaseous Effluent Sampling Program**

<b>Location</b>	<b>Sampling and Collection Frequency</b>	<b>Type of Analysis</b>
Separations Building GEVS Stack TSB GEVS Stack TSB HVAC Stack CAB Stack	Continuous Air Particulate Filter	Gross Beta/Gross Alpha - Weekly Isotopic Analysis <sup>a</sup> - Quarterly
Process Areas <sup>b</sup>	Continuous Air Particulate Filter <sup>b</sup>	Isotopic Analysis <sup>a</sup>
Nonprocess Areas <sup>b</sup>	Continuous Air Particulate Filter <sup>b</sup>	Isotopic Analysis <sup>a</sup>

<sup>a</sup> Isotopic analysis for <sup>234</sup>U, <sup>235</sup>U, <sup>236</sup>U, and <sup>238</sup>U.

<sup>b</sup> As required to complement the bioassay program.

CAB - Centrifuge Assembly Building.

GEVS - Gaseous Effluent Vent System.

TSB - Technical Services Building.

HVAC - Heating Ventilation and Air Conditioning.

Source: LES, 2005a.

When sampling particulate matter within ducts with moving airstreams, sampling conditions within the sample probe would be maintained to simulate as closely as possible the conditions in the duct. The applicable criteria for sampling airborne effluents would be conducted in accordance with ANSI/HPS N13.1-1999 (ANSI/HPS, 1999), as required by 40 CFR § 60.107. These criteria include approaches to ensure that representative samples are obtained (LES, 2005b).

Particle size distributions would be determined from process knowledge or measured to estimate and compensate for sample line losses and momentary conditions not reflective of airflow characteristics in the duct. Sampling equipment (pumps, pressure gages, and airflow calibrators) would be calibrated by qualified individuals. All airflow and pressure-drop calibration devices (e.g., rotometers) would be calibrated periodically using primary or secondary airflow calibrators (wet test meters, dry gas meters, or displacement bellows). Secondary airflow calibrators would be calibrated annually by the manufacturer(s). Air-sampling train flow rates would be verified and/or calibrated with tertiary airflow calibrators (rotometers) each time a filter is replaced or a sampling train component is replaced or modified. Sampling equipment and lines would be inspected for defects, obstructions, and cleanliness. Calibration intervals would be developed based on applicable standards (LES, 2005a; LES, 2005b).

Gaseous effluent from the proposed NEF that has the potential for airborne radioactivity would be discharged from the following facilities (LES, 2005a; LES, 2005c):

- *The Separations Building Gaseous Effluent Vent System.* This system would discharge to a stack on the Technical Services Building roof. The Separations Building Gaseous Effluent Vent System would provide for continuous monitoring and periodic sampling of the gaseous effluents in the exhaust stack. The stack-sampling system would provide the required samples. The exhaust stack would be equipped with monitors for alpha radiation. In addition, gamma monitors would be used within the Gaseous Effluent Vent System to monitor the accumulation of <sup>235</sup>U. The alpha/gamma monitors and their specifications would be selected in the final design.

- *The Technical Services Building Gaseous Effluent Vent System.* This system would be used to monitor gaseous effluents from the Chemical Laboratory, the Mass Spectroscopy Laboratory, and the Vacuum Pump Rebuild Workshop. The Technical Services Building Gaseous Effluent Vent System would provide filtered exhaust for potentially hazardous contaminants via fume hoods for these facilities. The gaseous effluent would include argon effluent from an inductively coupled plasma-mass spectrometer that would be used to analyze for uranium in liquid samples. The Technical Services Building Gaseous Effluent Vent System would discharge to an exhaust stack on the Technical Services Building roof and would provide for continuous monitoring and periodic sampling of the gaseous effluent in the exhaust stack. This stack-sampling system would provide the required samples. The exhaust stack would contain monitors for alpha radiation (LES, 2005a). In addition, gamma monitors would be used within the Gaseous Effluent Vent System to monitor the accumulation of  $^{235}\text{U}$ .
- *The Centrifuge Test and Postmortem Facilities Exhaust Filtration System.* This system would discharge through a stack on the Centrifuge Assembly Building. The Centrifuge Test and Postmortem Facilities Exhaust Filtration stack-sampling system would provide for continuous monitoring and periodic sampling of the gaseous effluent in the exhaust stack. The exhaust stack would contain monitors for alpha radiation.
- *Portions of the Technical Services Building Heating, Ventilating, and Air-Conditioning System.* For the portions of the Technical Services Building Heating, Ventilating, and Air-Conditioning System that provide the confinement ventilation function for areas of the Technical Services Building with the potential for contamination (i.e., Decontamination Workshop, Cylinder Preparation Room, and the Ventilated Room), this system would maintain the room temperature in various areas of the Technical Services Building, including some potentially contaminated areas. The confinement ventilation function of the Technical Services Building heating, ventilating, and air-conditioning system would maintain a negative pressure in the above rooms and would discharge the gaseous effluent to an exhaust stack on the Technical Services Building roof near the Gaseous Effluent Vent System. The stack-sampling system would provide for continuous monitoring and periodic sampling of gaseous effluents from the rooms served by the Technical Services Building heating, ventilating, and air-conditioning confinement ventilation function.
- *The Environmental Laboratory in the Technical Services Building and the Cylinder Receipt and Dispatch Building.* Gaseous effluent from these two facilities would be expected to be very low and would not be removed and filtered through vent/exhaust systems. Quarterly samples would be taken from these facilities to demonstrate that these grab samples would be representative of actual releases from the proposed NEF, in accordance with Regulatory Guide 4.16.
- *The Mechanical, Electrical, and Instrumentation Workshop in the Technical Services Building.* This workshop is designed to provide space for the normal maintenance of uncontaminated plant equipment and would contain no process confinement systems and no radioactive material in dispersable form. However, during the final design phase, Louisiana Energy Services (LES) would evaluate the workshop using Regulatory Guide 4.16 (NRC, 1985).

During the final design phase for the proposed NEF, facilities would be evaluated in accordance with Regulatory Guide 4.16 (NRC, 1985). Using the results of this evaluation, periodic sampling or continuous sampling provisions, as appropriate, would be implemented in accordance with Regulatory Guide 4.16 (LES, 2005c).

A minimum detectable concentration of  $3.7 \times 10^{-11}$  becquerels per milliliter ( $1.0 \times 10^{-15}$  microcuries per milliliter) would be required (NRC, 2002) for all gross alpha analyses performed on gaseous effluent samples. This value would represent less than 2 percent of the limit for any uranium isotope (the regulatory requirement is less than 5 percent of the limit for any uranium isotope as stated in 10 CFR Part 20) (LES, 2005a). Table 6-3 summarizes detection requirements for gaseous effluent sample analyses. Minimum detectable concentration values would be less than administrative action levels.

**Table 6-3 Minimum Detectable Concentration Values for Gaseous Effluents**

Nuclide	Minimum Detectable Concentration bequerels per milliliter (microcuries per milliliter)
$^{234}\text{U}$	$3.7 \times 10^{-13}$ ( $1.0 \times 10^{-17}$ )
$^{235}\text{U}$	$3.7 \times 10^{-13}$ ( $1.0 \times 10^{-17}$ )
$^{236}\text{U}$	$3.7 \times 10^{-13}$ ( $1.0 \times 10^{-17}$ )
$^{238}\text{U}$	$3.7 \times 10^{-11}$ ( $1.0 \times 10^{-15}$ )
Gross Alpha	$3.7 \times 10^{-11}$ ( $1.0 \times 10^{-15}$ )

Source: LES, 2005a.

### 6.1.1.2 Liquid Effluent Monitoring

LES would perform periodic visual inspections of the proposed NEF basins to identify high water levels and verify proper functioning. The visual inspections would be performed on a frequency sufficient to allow for identification of basin high-water-level conditions and implementation of corrective actions to restore the water level of the applicable basin(s) prior to potential overflowing. Liquid effluents to be generated at the proposed NEF would contain low concentrations of radioactive material consisting mainly of spent decontamination solutions, floor washings, liquid from the laundry, and evaporator flushes. Table 6-4 provides estimates of the expected annual volume and radioactive material content in liquid effluents by source prior to processing.

Potentially contaminated liquid effluent would be routed to the Liquid Effluent Collection and Treatment System for treatment. Most of the radioactive material would be removed from wastewater in the Liquid Effluent Collection and Treatment System through a combination of precipitation, evaporation, and ion exchange. Post-treatment liquid wastewater would be sampled and undergo isotopic analysis prior to discharge to ensure that the released concentrations were below the concentration limits established in Table 3 of Appendix B to 10 CFR Part 20.

After treatment, the effluent would be released to the double-lined Treated Effluent Evaporative Basin, which would have a leak-detection monitoring system comprised of leak-detection piping located between the two liners. The piping would lead to a sump that would be equipped with a level monitor that would alert staff if water levels in the sump indicate a possible leak (LES, 2005a). Chapter 2 of this EIS describes the leak-detection system in more detail. Concentrated radioactive solids generated by the liquid treatment processes at the proposed NEF would be handled and disposed of as low-level radioactive waste.

**Table 6-4 Estimated Uranium in Pre-Treated Liquid Waste from Various Sources**

<b>Source</b>	<b>Typical Annual Quantities cubic meters (gallons)</b>	<b>Typical Annual Uranic Content kilograms (pounds)*</b>
Laboratory/Floor Washings/ Miscellaneous Condensates	23 (6,112)	16 (35)
Degreaser Water	4 (980)	18.5 (41)
Citric Acid	3 (719)	22 (49)
Laundry Effluent Water	406 (107,213)	0.2 (0.44)
Hand Wash and Shower Water	2,100 (554,820)	N/A
<b>Total</b>	<b>2,535 (669,844)</b>	<b>56.7 (125)</b>

\* Uranic quantity before treatment. After treatment, approximately 1 percent, or 0.57 kilogram (1.26 pounds), of uranic material would be expected to be discharged into the Treated Effluent Evaporative Basin. Source: LES, 2005a.

The amount of uranium in routine liquid effluent discharge to the Treated Effluent Evaporative Basin would be 14.4 megabecquerels (389 microcuries) per year. Release of liquid radiological effluents to unrestricted areas would not occur (LES, 2005a).

Representative liquid samples would be collected from each liquid batch and analyzed prior to any transfer to the Treated Effluent Evaporative Basin. Isotopic analysis would be performed prior to discharge. Table 6-5 shows the minimum detectable concentrations for analysis of liquid effluent. Tank agitators and recirculation lines would be used to help ensure the sample would be representative of the batch. All collection tanks would be sampled before the contents would be sent through any treatment process. Treated water would be collected in monitoring tanks that would be sampled before discharge to the Treated Effluent Evaporative Basin (LES, 2005a).

**Table 6-5 Minimum Detectable Concentration Values for Liquid Effluents**

<b>Nuclide</b>	<b>Minimum Detectable Concentration bequerels per milliliter (microcuries per milliliter)</b>
<sup>234</sup> U	1.4×10 <sup>-4</sup> (3.0×10 <sup>-9</sup> )
<sup>235</sup> U	1.4×10 <sup>-4</sup> (3.0×10 <sup>-9</sup> )
<sup>236</sup> U	1.4×10 <sup>-4</sup> (3.0×10 <sup>-9</sup> )
<sup>238</sup> U	1.4×10 <sup>-4</sup> (3.0×10 <sup>-9</sup> )

Source: LES, 2005a.

In addition, each of the six septic tanks that would process sanitary wastes would be sampled (prior to pumping to the leach field) and analyzed for isotopic uranium. While no plant-process-related effluents

would be introduced into the septic systems, sampling of the septic systems would help mitigate any unexpected release of isotopic uranium to the soils (LES, 2005a).

NRC Information Notice 94-07 describes the method for determining solubility of discharged radioactive materials (NRC, 1994). At the proposed NEF, insoluble uranium would be removed from liquid effluents as part of the treatment process. Releases would be in accordance with the as low as reasonably achievable (ALARA) principle (LES, 2005a).

General site stormwater runoff would be routed to the Site Stormwater Detention Basin. The UBC Storage Pad Stormwater Retention Basin would collect rainwater from the UBC Storage Pad as well as cooling tower and heating boiler blowdown water. The two basins would be expected to collect approximately 174,100 cubic meters (46 million gallons) of stormwater each year, and both would be included in the site's Radiological Environmental Monitoring Program as described below (LES, 2005a).

### **6.1.2 Radiological Environmental Monitoring Program**

The Radiological Environmental Monitoring Program would provide an additional monitoring system to the effluent monitoring program to perform the following activities:

- Establish a process for collecting data for assessing radiological impacts on the environment.
- Estimate the potential impacts to the public.
- Support the demonstration of compliance with applicable radiation protection standards and guidelines.

During the course of proposed NEF operations, revisions to the Radiological Environmental Monitoring Program (including changes to sampling locations) could be necessary and appropriate to ensure reliable sampling and collection of environmental data. The proposed NEF would document the rationale and actions behind such revisions to the program and report the changes to the appropriate regulatory agency as required by the NRC license. Radiological Environmental Monitoring Program sampling would focus on locations within 4.8 kilometers (3 miles) of the proposed NEF. Control sites at distant locations would also be monitored, such as one for particulate air concentrations (LES, 2005a). Sampling locations would be based on NRC guidance found in NUREG-1302, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors" (NRC, 1990); meteorological information; and current land use.

#### **6.1.2.1 Sampling Program**

Representative samples from various environmental media would be collected and analyzed for the presence of radioactivity associated with the proposed NEF operations. Table 6-6 summarizes the types and frequency of sampling and analyses (Table 6-2 shows the sampling protocol for airborne particulates). Environmental media identified for sampling would consist of ambient air, groundwater, soil/sediment, and vegetation. All environmental samples would be analyzed onsite or shipped to a qualified independent laboratory for analyses.

Table 6-7 shows the minimum detectable concentrations for gross alpha and isotopic uranium in various environmental media that would be required.

The Radiological Environmental Monitoring Program would include the collection of data during pre-operational years to establish baseline radiological information that would be used to determine and evaluate impacts from operations at the proposed NEF on the local environment. The Radiological Environmental Monitoring Program would be initiated at least two years prior to the proposed NEF operations to develop a baseline. Radionuclides in environmental media would be identified using technically appropriate, accurate, and sensitive analytical instruments. Data collected during the operational years would be compared to the baseline generated by the pre-operational data. Such comparisons would provide a means of assessing the magnitude of potential radiological impacts on members of the public and the environment and in demonstrating compliance with applicable radiation protection standards (LES, 2005a).

**Table 6-6 Radiological Sampling and Analysis Program**

<b>Sample Type</b>	<b>Location</b>	<b>Sampling and Collection Frequency</b>	<b>Type of Analysis</b>
Continuous Airborne Particulate	Seven locations along fenceline and in the region of influence.	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/Soil Analyses	Eight locations along fenceline.	For each vegetation and soil sample, 1 to 2 kilograms (2.2 to 4.4 pounds).  Samples collected semiannually.	Isotopic analysis <sup>a</sup> .
Groundwater	Five wells.	Samples (4 liters [1.1 gallons]) collected semiannually.	Isotopic analysis <sup>a</sup> .
Thermoluminescent Dosimeters	Sixteen locations along fenceline.	Samples collected quarterly.	Gamma and neutron dose equivalent.
Stormwater	<ul style="list-style-type: none"> <li>• Site Stormwater Detention Basin</li> <li>• UBC Storage Pad Stormwater Retention Basin</li> <li>• Treated Effluent Evaporative Basin</li> </ul>	Water sample 4 liters (1.1 gallons). Sediment samples 1 to 2 kilograms (2.2 to 4.4 pounds). Samples collected quarterly.	Isotopic analysis <sup>a</sup> .
Septic Tanks	One from each affected tank.	1 to 2 kg (2.2 to 4.4 lbs) sludge samples collected from each affected tank prior to pumping sludge from the tanks.	Isotopic analysis <sup>a</sup> .

<sup>a</sup> Isotopic Analysis for <sup>234</sup>U, <sup>235</sup>U, <sup>236</sup>U, and <sup>238</sup>U.  
Source: LES, 2005a.

**Table 6-7 Required Minimum Detectable Concentrations  
for Environmental Sample Analyses**

<b>Medium</b>	<b>Analysis</b>	<b>Minimum Detectable Concentrations becquerels per milliliter (microcuries per milliliter)</b>
Ambient air	Gross alpha	$3.7 \times 10^{-14}$ ( $1.0 \times 10^{-18}$ )
Vegetation	Isotopic uranium	$3.7 \times 10^{-6}$ ( $1.0 \times 10^{-10}$ )
Soil/sediment	Isotopic uranium	$1.1 \times 10^{-2}$ ( $3.0 \times 10^{-7}$ )
Groundwater	Isotopic uranium	$3.7 \times 10^{-8}$ ( $1.0 \times 10^{-12}$ )

Source: LES, 2005a.

Atmospheric radioactivity monitoring would be based on plant-design data, demographic and geologic data, meteorological data, and land use data. Because operational releases would be very low and subject to rapid dilution via dispersion, distinguishing plant-related uranium from background uranium already present in the site environment would be difficult. The gaseous effluent would be released from either rooftop discharge points or from the Treated Effluent Evaporative Basin as resuspended airborne particles that would result in ground-level releases. A characteristic of ground-level plumes would be that plume concentrations decrease continually as the distance from the release point increases; therefore, the impact at locations close to the release point would be greater than at more distant locations. The concentrations of radioactive material in gaseous effluents from the proposed NEF would be very low concentrations of uranium because of process and effluent controls. Air samples collected at locations close to the proposed NEF site would provide the best opportunity to detect and identify plant-related radioactivity in the ambient air; therefore, air monitoring would be performed at the plant perimeter fence or the plant property line.

Air-monitoring stations would be situated along the site boundary locations based on prevailing meteorological conditions (i.e., wind direction) and at nearby residential areas and businesses. In addition, an air-monitoring station would be located next to the Treated Effluent Evaporative Basin to measure for particulate radioactivity that would be resuspended into the air from sediment layers when the basin is dry (LES, 2005a). A control sample location would be established approximately 16 kilometers (10 miles) upwind from the proposed NEF. All environmental air samplers would 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 loads) (LES, 2005a).

Vegetation and soil samples from onsite and offsite locations would be collected on a quarterly basis beginning at least two years prior to startup to establish a baseline. During the operational years, vegetation and soil sampling would be performed semiannually in eight sectors surrounding the proposed NEF site, including three with the highest predicted atmospheric deposition in the prevailing wind direction. Vegetation samples could include vegetables and grass, depending on availability. Soil samples would be collected in the same vicinity as the vegetation samples (LES, 2005a).

Groundwater samples from onsite monitoring well(s) would be collected semiannually for radiological analysis. The background groundwater monitoring well (MW1), as shown in Figure 6-1, would be located on the northern boundary of the proposed NEF site, between the proposed NEF and Wallach Concrete, Inc. This location would be up-gradient of the proposed NEF and cross-gradient from the

Waste Control Specialists facility. The other four monitoring wells would be located within the proposed NEF site. All of the monitoring well locations would be based on the slope of the red bed surface at the base of the shallow sand and gravel layer, the groundwater gradient in the 67-meter (220-foot) groundwater zone under the proposed NEF site, and in proximity to key site structures.

The monitoring wells would monitor groundwater in the sand and gravel layer at the 67-m (220-ft) zone. This groundwater zone is not considered an aquifer (it does not transmit significant quantities of water under ordinary hydraulic gradients), but it is the closest occurrence of groundwater beneath the proposed NEF site. It is possible that the background monitoring well MW1 could become contaminated from operations associated with Wallach Concrete, Inc., and Sundance Services, Inc. These two facilities process “produced water” in lagoons that could infiltrate the ground to the groundwater. Contaminants of concern from these two facilities would primarily be hydrocarbons. The proposed NEF would not emit hydrocarbons in quantities that would be detectable so any contamination found in the NEF groundwater wells would be readily differentiated from any offsite sources (LES, 2005a).

Sediment samples would be collected semiannually from both of the stormwater runoff detention/retention basins onsite to look for any buildup of uranic material being deposited. With respect to the Treated Effluent Evaporative Basin, measurements of the expected accumulation of uranic material into the sediment layer would be evaluated along with nearby air-monitoring data to assess any observed resuspension of particles into the air.

Direct radiation in offsite areas from processes inside the proposed NEF building would be expected to be minimal because the low-energy radiation associated with the uranium would be shielded by the process piping, equipment, and cylinders to be used at the proposed NEF site. However, the UBCs stored on the UBC Storage Pad could more directly impact public exposures due to direct and scatter (skyshine) radiation. The conservative evaluation found in Chapter 4 of this EIS showed that an annual dose equivalent of < 0.2 millisievert (20 millirem) would be expected at the highest impacted area at the proposed NEF perimeter fence. Because the offsite dose equivalent rate from stored UBCs would be very low and difficult to distinguish from the variance in normal background radiation beyond the site boundary, compliance would be demonstrated by NEF by relying on a system that combines direct-dose-equivalent measurements and computer modeling to extrapolate the measurements (LES, 2005a).

Environmental thermoluminescent dosimeters placed at the plant perimeter fenceline or other location(s) close to the UBCs would provide quarterly direct-dose-equivalent information. The direct dose equivalent at offsite locations would be estimated through extrapolation of the quarterly thermoluminescent dosimeter data using the Monte Carlo N-Particle computer program or a similar computer program (ORNL, 2000).

10 CFR Part 70.59 requires that LES submit a semi-annual report to the NRC that specifies the quantity of each of the principal radionuclides released to unrestricted areas in liquid and gaseous effluents during the previous six months of operation. In addition, the semi-annual report will specify such other information as the Commission may require to estimate maximum potential annual radiation doses to the public resulting from effluent releases in compliance with 10 CFR § 20.1301. The proposed NEF would perform the estimate by calculating the TEDE of an individual who would be likely to receive the annual highest dose as specified by 10 CFR § 20.1302(b)(1). Computer codes would be used that have undergone validation and verification, and they would follow the methodology for pathway modeling described in the NRC Regulatory Guide 1.109, “Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I” (NRC, 1977). Dose-conversion factors to be used in the computer models would be those presented in Federal Guidance Reports numbers 11 and 12 (LES, 2005a). In addition to the regulatory requirements,



LES plans to monitor trends in radiological effluent releases through monthly dose projections to members of the public. These dose projections will assist in ensuring that the annual dose to members of the public would not exceed the as-low-as-reasonably-achievable constraint of 0.1 millisievert (10 millirem) per year in accordance with 10 CFR § 20.1101(d) (LES, 2005d).

### **6.1.2.2 Procedures**

Monitoring procedures would employ well-known, acceptable analytical methods and instrumentation. The instrument maintenance and calibration program would comply with manufacturers recommendations. The onsite laboratory and any contractor laboratory used to analyze the NEF samples would participate in third-party laboratory intercomparison programs appropriate to the media and analyses being measured. The following are examples of these third-party programs:

- The U.S. Department of Energy (DOE) Mixed Analyte Performance Evaluation Program and DOE Quality Assurance Program.
- Analytics, Inc., Environmental Radiochemistry Cross-Check Program.

The proposed NEF would require that all radiological and nonradiological laboratory vendors are certified by the National Environmental Laboratory Accreditation Program or an equivalent State laboratory accreditation agency for the analytes being tested (LES, 2005a).

The Radiological Environmental Monitoring Program would fall under the oversight of the proposed NEF's Quality Assurance Program. Quality assurance procedures would be implemented 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. In addition, written procedures would ensure that sampling and measuring equipment, including ancillary equipment such as airflow meters, would be properly maintained and calibrated at regular intervals according to manufacturer recommendations. The implementing procedures would include functional testing and routine checks to demonstrate that monitoring and measuring instruments are in working condition. Audits would be periodically conducted as part of the Quality Assurance Program (LES, 2005a).

The quality control procedures used by the analytical laboratories would conform with the guidance in Regulatory Guide 4.15 (NRC, 1979). These quality control procedures would include the use of established standards such as those provided by the National Institute of Standards and Technology as well as standard analytical procedures such as those established by the National Environmental Laboratory Accreditation Conference (LES, 2005a).

### **6.1.2.3 Reporting**

Reporting procedures would comply with the requirements of 10 CFR § 70.59 and the guidance specified in Regulatory Guide 4.16 (NRC, 1985). Each year, the proposed NEF would submit a summary report of the Environmental Sampling Program to the NRC. The NRC would place this report (and all other relevant information pertaining to environmental sampling) on the NRC's web site to make it available to the public. The report would include the types, numbers, and frequencies of environmental measurements and the identities and activity concentrations of proposed NEF-related nuclides found in environmental samples. The minimum detectable concentrations for the analyses and the error associated with each data point would also be included. Significant positive trends in activities would be noted in the report along with any adjustment to the program, unavailable samples, and deviation from the sampling program. Monitoring reports in which the quantities are estimated on the basis of methods other than direct

measurement would include an explanation and justification of how the results were obtained (LES, 2005a).

## **6.2 Physiochemical Monitoring**

The primary objective of physiochemical monitoring would be to provide verification that the operations at the proposed NEF do not result in detrimental chemical impacts on the environment. Effluent controls, which are discussed in Chapters 2 and 4 of this EIS, would be in place to ensure that chemical concentrations in gaseous and liquid effluents are maintained within applicable limits. In addition, physiochemical monitoring would provide data to confirm the effectiveness of effluent controls. The physiochemical monitoring program would comply with the pertinent regulations/permits issued by Federal and State agencies.

LES would establish administrative action levels, as described below, for effluent sampling and monitoring as an additional step in the effluent control process (LES, 2005a). Action levels would be divided into the following three priorities:

1. The sample parameter is three times the normal background level.
2. The sample parameter exceeds any existing administrative limits.
3. The sample parameter exceeds any regulatory limits.

For the first two priorities, LES would initiate steps for the exceedance of an administrative action level to increase monitoring, review operations that could lead to the increased release, restrict personnel access near the release locations, and implement corrective measures that would reduce the releases to below the administrative action levels. The third priority represents the worst case scenario that would be prepared for but would not be expected. Corrective actions for the third priority would be implemented to ensure that the cause for the action level exceedance would be identified and immediately corrected; applicable regulatory agencies would be notified, if required; communications to address lessons learned would be made to appropriate personnel; and applicable procedures would be revised accordingly, if needed. All action plans would be commensurate to the severity of the exceedance. Under routine operating conditions, the impact analyses in Chapter 4 of this EIS show that radioactive material in effluents discharged from the proposed NEF would comply with the regulatory release criteria (LES, 2005a).

Administrative action levels would be implemented prior to the proposed NEF operation to ensure that chemical discharges would remain below the limits specified in the proposed NEF discharge permits. The limits would be specified in the U.S. Environmental Protection Agency (EPA) Region 6 National Pollutant Discharge Elimination System (NPDES) General Discharge Permits as well as the New Mexico Environment Department Water Quality Bureau Groundwater Discharge Permit/Plan (LES, 2005a).

Chapters 2 and 4 of this EIS provide specific information regarding the source and characteristics of all nonradiological plant effluents and wastes that would be collected and disposed of offsite or discharged in various effluent streams.

In conducting physiochemical monitoring, sampling protocols and emission/effluent monitoring would be performed for routine operations with provisions for additional evaluation in response to a potential accidental release (LES, 2005a).

The proposed NEF would use the Environmental Monitoring Laboratory, located in the Technical Services Building, to analyze solid, liquid, and gaseous effluents. This laboratory would be equipped with analytical instruments needed to ensure that the operation of the plant activities complies with

Federal, State, and local environmental regulations and requirements. Compliance would be demonstrated by monitoring and sampling at various plant and process locations, analyzing the samples, and reporting the results of these analyses to the appropriate agencies. The sampling/monitoring locations would be selected by the Health, Safety and Environmental organization staff in accordance with proposed NEF permits and good sampling practices. Constituents to be monitored would be identified in environmental permits obtained for the proposed NEF operations (LES, 2005a).

The Environmental Monitoring Laboratory would be available to perform analyses on air, water, soil, flora, and fauna samples obtained from designated areas around the plant. In addition to its environmental and radiological capabilities, the Environmental Monitoring Laboratory would also be capable of performing bioassay analyses when necessary. Offsite commercial laboratories could also be contracted to perform bioassay analyses. Monitoring procedures would employ well-known acceptable analytical methods and instrumentation. The instrument maintenance and calibration program would comply with manufacturer recommendations. LES would ensure that the onsite laboratory and any contractor laboratory used to analyze proposed NEF samples participate in third-party laboratory intercomparison programs appropriate to the media and analytes being measured (LES, 2005a).

Results of process sample analyses would be used to verify that process parameters would be operating within expected performance ranges. Results of liquid effluent sample analyses would be characterized to determine if treatment would be required prior to discharge to the Treated Effluent Evaporative Basin and if corrective action would be required in proposed NEF process and/or effluent collection and treatment systems (LES, 2005a).

All waste liquids, solids, and gases from enrichment-related processes and decontamination operations would be analyzed and/or monitored for chemical contamination to determine safe disposal methods and/or further treatment requirements (LES, 2005a).

### **6.2.1 Effluent Monitoring**

Chemical constituents discharged to the environment in proposed NEF effluents would be below concentrations that have been established by State and Federal regulatory agencies as protective of the public health and the natural environment. Under routine operating conditions, no significant quantities of contaminants would be released from the proposed NEF. LES would confirm this through monitoring and collection and analysis of environmental data (LES, 2005a). The exhaust stacks for the gaseous effluent vent systems and the exhaust filtration system for the Centrifuge Test and Postmortem Facilities would be equipped with monitors for hydrogen fluoride. Hydrogen fluoride monitors would have a range of 0.04 to 50 milligrams per cubic meter ( $2 \times 10^{-9}$  to  $3 \times 10^{-6}$  pounds per cubic foot) and a lower detection limit of 0.04 milligrams per cubic meter ( $2 \times 10^{-9}$  pounds per cubic foot).

Chapter 2 of this EIS lists routine liquid effluents from the proposed NEF. The proposed NEF would not directly discharge any industrial effluents to surface waters or grounds offsite, and there would be no plant tie-in to a publicly owned treatment works. Except for discharges from the septic systems, all liquid effluents would be contained on the proposed NEF site via collection tanks and detention/retention basins. Annual chemical sampling of the septic systems would be based on the approval of the Groundwater Discharge Permit by New Mexico Environment Department Water Quality Bureau for total Kjeldahl nitrogen, nitrate, total dissolved solids, and chloride.

Parameters for continuing environmental performance would be developed from the baseline data collected during pre-operational sampling. In addition, operational monitoring surveys would be conducted using sampling sites at frequencies established from baseline sampling data and based on

requirements contained in EPA Region 6 NPDES General Discharge Permits as well as the Groundwater Discharge Permit/Plan (LES, 2005a).

The frequency of some types of samples could be modified depending on baseline data for the parameters of concern. The monitoring program would be designed to use the minimum percentage of allowable limits (lower limits of detection) broken down daily, quarterly, and semiannually. As construction and operation of the enrichment plant would proceed, changing conditions (e.g., regulations, site characteristics, and technology) and new knowledge could require that the monitoring program be reviewed and updated. The monitoring program would be enhanced as appropriate to maintain the collection and reliability of environmental data. The specific location of monitoring points would be determined in the detailed design.

During implementation of the monitoring program, some samples could be collected in a different manner than specified herein. Examples of reasons for these deviations could include severe weather events, changes in the length of the growing season, and changes in the amount of vegetation. Under these circumstances, documentation would be prepared to describe how the samples were collected and the rationale for any deviations from normal monitoring program methods. If a sampling location has frequent unavailable samples or deviations from the schedule, then another location could be selected or other appropriate actions taken (LES, 2005a). Each year, the proposed NEF would submit a summary of the Environmental Sampling Program and associated data to the proper regulatory authorities, as required by each regulatory agency. This summary would include the types, numbers, and frequencies of samples collected.

Physiochemical monitoring would be conducted via sampling of stormwater, soil, sediment, vegetation, and groundwater to confirm that trace, incidental chemical discharges would be below regulatory limits. Table 6-8 defines physiochemical sampling by type, location, frequency, and collections.

Because no naturally occurring surface waters would be on the site, a Surface Water Monitoring Program would not be implemented; however, soil sampling would include outfall areas such as the outfall at the Site Stormwater Detention Basin. In the event of any accidental release from the proposed NEF, these sampling protocols would be initiated immediately and on a continuing basis to document the extent and impact of the release until conditions have been abated and mitigated (LES, 2005a).

**Table 6-8 Physiochemical Sampling**

<b>Sample Type</b>	<b>Sample Location</b>	<b>Frequency</b>	<b>Sampling and Collections<sup>b</sup></b>
Stormwater	Site Stormwater Detention Basin  UBC Storage Pad Stormwater Retention Basin	Quarterly	Analytes as determined by baseline program
Vegetation	4 minimum <sup>a</sup>	Quarterly (growing seasons)	Fluoride uptake
Soil/Sediment	4 minimum <sup>a</sup>	Quarterly	Metals, organics, pesticides, and fluoride uptake
Groundwater	All selected groundwater wells	Semiannually	Metals, organics, and pesticides

<sup>a</sup> Location to be established by Health, Safety and Environmental organization staff.

<sup>b</sup> Analyses would meet EPA Lower Limits of Detection, as applicable, and would be based on the baseline surveys and the type of matrix (sample type).

Source: LES, 2005a.

**6.2.2 Stormwater Monitoring**

A Stormwater Monitoring Program would be initiated during construction of the proposed NEF. Data collected from the program would 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 would be used as a sediment control basin during construction as part of the overall sedimentation erosion control plan.

The water quality of the discharge would be typical runoff from building roofs and paved areas. Except for small amounts of oil and grease typically found in runoff from paved roadways and parking areas, the discharge would not be expected to contain contaminants.

Stormwater monitoring would continue with the same monitoring frequency upon initiation of the proposed NEF operation. During plant operation, samples would be collected from the UBC Storage Pad Stormwater Retention Basin and the Site Stormwater Detention Basin to demonstrate that runoff would not contain any contaminants.

Table 6-9 shows a list of parameters that would be monitored and monitoring frequencies. This monitoring program would be refined to reflect applicable requirements as determined during the NPDES process. Additionally, the Site Stormwater Detention Basin would adhere to the requirements of the Groundwater Discharge Permit/Plan under *New Mexico Administrative Code 20.6.2.3104* (LES, 2005a).

Normal discharge from the Site Stormwater Detention Basin would be through evaporation and infiltration into the ground. During high precipitation runoff events, some discharge could occur from the outfall next to New Mexico Highway 234. If any discharge from this outfall would occur, the volume of water would be expected to be equal to or less than the preconstruction runoff rates from the site area. Several culverts presently exist under New Mexico Highway 234 that transmit runoff to the south side of the highway. Since flow from this outfall would be intermittent, no monitoring would be conducted because the detention basin would be monitored (LES, 2005a).

**Table 6-9 Stormwater Monitoring Program**

<b>Monitored Parameter</b>	<b>Monitoring Frequency</b>	<b>Sample Type</b>	<b>Lower Limit of Detection</b>
Oil and Grease	Quarterly, if standing water exists.	Grab	0.5 ppm
Total Suspended Solids	Quarterly, if standing water exists.	Grab	0.5 ppm
Five-Day Biological Oxygen Demand	Quarterly, if standing water exists.	Grab	2 ppm
Chemical Oxygen Demand	Quarterly, if standing water exists.	Grab	1 ppm
Total Phosphorus	Quarterly, if standing water exists.	Grab	0.1 ppm
Total Kjeldahl Nitrogen	Quarterly, if standing water exists.	Grab	0.1 ppm
pH	Quarterly, if standing water exists.	Grab	0.01 unit
Nitrate Plus Nitrite Nitrogen	Quarterly, if standing water exists.	Grab	0.2 ppm
Metals	Quarterly, if standing water exists.	Grab	Varies by metal

ppm - parts per million; ppb - parts per billion.  
 Source: LES, 2005a.

The diversion ditch would intercept surface runoff from the area upstream of the proposed NEF site around the east and west sides of the proposed NEF structures during extreme precipitation events. There would be no retention or attenuation of flow within the diversion ditch. The east side would divert surface runoff into the Site Stormwater Detention Basin, which would be monitored. The west side would divert surface runoff around the site where it would continue on as overland flow. There would be no need to monitor this overland flow because this water would not flow through the proposed NEF site (LES, 2005a).

**6.2.3 Environmental Monitoring**

Chemistry data collected as part of the effluent and stormwater monitoring programs would be used for environmental monitoring. The chemistry data would be used to comply with NPDES and air permit obligations. Final constituent analysis requirements, which include the hazardous constituent to be monitored, minimum detectable concentrations, emission limits, and analytical requirements, would be in accordance with the permits that would be obtained prior to construction and operation (LES, 2005a).

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

Vegetation and soil sampling would be conducted. Vegetation samples would include grasses and, if available, vegetables. Soil would be collected in the same vicinity as the vegetation sample. The samples would be collected from both onsite and offsite locations in various sectors. Sectors would be chosen based on air modeling.

Sediment samples would be collected from discharge points into the different collection basins onsite. Groundwater samples would be obtained semiannually from wells located within the proposed NEF boundary and monitored for metals, organics, and pesticides to ensure groundwater would not become

contaminated from the proposed NEF operations and to identify any contaminants that could migrate from non-NEF facilities. Stormwater samples collected in the UBC Storage Pad Stormwater Retention Basin would be sampled to ensure no contaminants are present in the UBC Storage Pad runoff (LES, 2005a).

#### **6.2.4 Meteorological Monitoring**

A 40-meter (132-foot) meteorological tower would be installed and operated onsite to monitor and characterize meteorological phenomena (e.g., wind speed, direction, and temperature) during plant operation and to analyze the effect of the local terrain on meteorology conditions. The data obtained from the meteorological tower would assist in evaluating the potential impacts of the proposed NEF operations on workers onsite and the community offsite due to any emissions (LES, 2005a).

The meteorological tower would be located and operated in a manner consistent with the guidance in Regulatory Guide 3.63, “Onsite Meteorological Measurement Program for Uranium Recovery Facilities—Data Acquisition and Reporting” (NRC, 1988). The meteorological tower would be located at a site approximately the same elevation as the finished facility grade and in an area where proposed NEF structures would have little or no influence on the meteorological measurements. An area approximately 10 times the obstruction height around the tower towards the prevailing wind direction would be maintained. This practice would be used to avoid spurious measurements resulting from local building-caused turbulence. The program for instrument maintenance and servicing, combined with redundant data recorders, would ensure at least 90-percent data recovery (LES, 2005a). The data this equipment provides would be recorded in the proposed NEF control room and could be used for dispersion calculations. Equipment would also measure temperature and humidity that would be recorded in the control room.

#### **6.2.5 Local Flora and Fauna**

Section 6.3, “Ecological Monitoring,” details the monitoring of radiological and physiochemical impacts to local flora and fauna.

#### **6.2.6 Quality Assurance**

The proposed NEF would use a set of formalized and controlled procedures for sample collection, laboratory analysis, chain of custody, reporting of results, and corrective actions. Corrective actions would be instituted when an administrative action level is exceeded for any of the measured parameters, as described in section 6.1.1.

The proposed NEF would ensure that the onsite laboratory and any contractor laboratory used to analyze NEF samples participate in third-party laboratory intercomparison programs appropriate to the media and constituents being measured as described in section 6.1.1.

#### **6.2.7 Lower Limits of Detection**

Table 6-9 lists the lower limits of detection for the parameters sampled in the Stormwater Monitoring Program. Minimum detectable concentrations for the radiological parameters shown in Tables 6-3 and 6-5 would be based on the results of the baseline surveys and the sample type.

### **6.3 Ecological Monitoring**

Cattle grazing, oil/gas pipeline right-of-ways, and access roads have impacted the existing natural habitats on the proposed NEF site and the surrounding region. These current and historic land uses have resulted in a dominant habitat type, the Plains Sand Scrub. As discussed in Chapter 4 of this EIS, no significant impacts from construction and operations would be anticipated; however, the environment at the site could potentially support endangered, threatened, and candidate species and species of concern described in Chapter 3 of this EIS.

### **6.3.1 Monitoring Program Elements**

The ecological monitoring program would focus on four elements: vegetation, birds, mammals, and reptiles/amphibians. Currently, there is no action or reporting level for each specific element. Appropriate agencies (New Mexico Department of Game and Fish and the U.S. Fish and Wildlife Service) would be consulted as ecological monitoring data are collected. Agency recommendations would be considered when developing reporting levels for each element and mitigation plans, if needed (LES, 2005a).

LES would periodically monitor the proposed NEF site property and basin waters during construction and plant operations to ensure the risk to birds and wildlife is minimized. If needed, measures would be taken to release entrapped wildlife. The monitoring program would assess the effectiveness of the entry barriers and release features to ensure risk to wildlife would be minimized (LES, 2005a).

### **6.3.2 Observations and Sampling Design**

The proposed NEF site observations would include preconstruction, construction, and operational monitoring programs. The preconstruction monitoring program would establish the site baseline data. LES would use procedures to characterize the plant, bird, mammalian, and reptilian/amphibian communities at the proposed NEF during preconstruction monitoring. In addition, operational monitoring surveys would be conducted annually (except semiannually for birds and reptiles/amphibians) using the same sampling sites established during the preconstruction monitoring program.

These surveys would be intended to help identify gross changes in the composition of the vegetative, avian, mammalian, and reptilian/amphibian communities of the site associated with operation of the plant. Interpretation of operational monitoring results, however, would consider those changes that would be expected at the proposed NEF site as a result of natural succession processes. Plant communities at the site would continue to change as the proposed NEF site begins to regenerate and mature. Changes in the bird, small mammal, and reptile/amphibian communities would likely occur concomitantly in response to the changing habitat (LES, 2005a).

#### **6.3.2.1 Vegetation**

Collection of ground cover, frequency, woody plant density, and production data would be sampled from 16 permanent sampling locations within the proposed NEF site. Annual sampling would occur in September or October to coincide with the mature flowering stage of the dominant perennial species.

The sampling locations would be selected in areas outside of the proposed footprint of the proposed NEF site but within the site boundary. The selected sampling locations would be marked physically onsite, and the Global Positioning System coordinates would be recorded. Figure 6-1 shows the expected positions of the sampling locations. The establishment of permanent sampling locations would facilitate a long-term monitoring system to evaluate vegetation trends and characteristics.



Transects used for data collection would originate at the sampling location and radiate out 30 meters (100 feet) in a specified compass direction. Ground cover and frequency would be determined using the line-intercept method. Each 0.3-meter (1-foot) segment would be considered a discrete sampling unit. Cover measurements would be read to the nearest 0.03 meter (0.1 foot). Woody plant densities would be determined using the belt transect method. All shrub and tree species rooted within 2 meters (6 feet) of the 30-meter (100-foot) transect would be counted.

Productivity would be determined using a double-sampling technique that estimates the production within three 0.25-square-meter (2.7-square-foot) plots and harvesting one equal-sized plot for each transect. Harvesting would consist of clipping each species in a plot separately, oven drying, and weighing to the nearest 0.01 gram (0.00035 ounce). The weights would be converted to kilograms (pounds) of oven-dry forage per hectare (acre) (LES, 2005a).

### **6.3.2.2 Birds**

Site-specific avian surveys would be conducted in both the wintering and breeding seasons to verify the presence of particular bird species at the proposed NEF site. The winter and spring surveys would be designed to identify the members of the avian community.

The winter survey would identify the distinct habitats at the site and the composition of bird species within each of the habitats described. Transects 100 meters (328 feet) in length would be established within each distinct homogenous habitat, and data would be collected along the transect. Species composition and relative abundance would be determined based on visual observations and call counts.

In addition to verifying species presence, the spring survey would determine the nesting and migratory status of the species observed and (as a measure of the nesting potential of the site) the occurrence and number of territories of singing males and/or exposed, visible posturing males. The area would be surveyed using the standard point-count method (USDA, 1993; USDA, 1995). Standard point counts would require a qualified observer to stand in a fixed position and record all the birds seen and heard over a time period of 5 minutes. Distances and time would each be subdivided. Distances would be divided into less than 50 meters (164 feet) and greater than 50 meters (164 feet) categories (estimated by the observer), and the time would be divided into two categories: 0-3 minute and 3-5 minute segments. All birds seen and heard at each station/point visited would be recorded on standard point-count forms. All surveys would be conducted from 6:15 a.m. to 10:30 a.m. to coincide with the territorial males' peak singing times. The stations/points would be recorded using a Global Positioning System that would enable the observer to make return visits. Surveys would only be conducted when fog, wind, or rain do not interfere with the observer's ability to accurately record data.

Chapter 3 of this EIS describes the avian communities, and all data collected would be recorded and compared to this information. The field data collections would be performed semiannually. The initial monitoring would be effective for at least the first three years of commercial operation. Following this period, program changes could be initiated based on operational experience (LES, 2005a).

### **6.3.2.3 Mammals**

Annual onsite surveys would monitor the mammalian communities. Chapter 3 of this EIS describes the existing mammalian communities. General observations would be compiled concurrently with other wildlife monitoring data and compared to information listed in Table 3-16 of Chapter 3 of this EIS. The initial monitoring would be effective for at least the first three years of commercial operation. Following this period, program changes could be initiated based on operational experience (LES, 2005a).

#### **6.3.2.4 Reptiles and Amphibians**

Approximately 13 species of lizards, 13 species of snakes, and 11 species of amphibians could occur on the site and in the area. Chapter 3 of this EIS describes the reptile and amphibian communities.

A combination of pitfall drift-fence trapping and walking transects (at trap sites) could provide data in sufficient quantity to allow statistical measurements of population trends, community composition, body-size distributions, and sex ratios that would reflect environmental conditions and changes at the site over time.

The monitoring program would include at least two other replicated sample sites beyond the primary location on the proposed NEF site. Offsite locations on U.S. Bureau of Land Management or New Mexico State land to the south, west, or north of the proposed NEF site would be given preference for additional sampling sites. Each of these catch sites would have the same pitfall drift-fence arrays and standardized walking transects, and would be operated simultaneously.

Replicate sample sites were selected for reptiles and amphibians. The basis for choosing these two types of animals over other ecological media is that reptiles and amphibians are very sensitive to climatic conditions (e.g., the amount of moisture an area receives in a given year). The climate in New Mexico is very diverse and can exhibit dramatic changes within a few kilometers (miles). For this reason, nearby replicate sampling locations were chosen for a more representative population sample for reptiles and amphibians in the vicinity of the NEF. Onsite sampling for other ecological media (i.e., vegetation, birds, and mammals) is considered sufficient to characterize changes in the composition of these media associated with the operation of the plant.

Each sample site would be designed to maximize the total catch of reptiles and amphibians rather than data on each individual caught. Each animal caught would be identified, sexed, measured for snout-vent length, inspected for morphological anomalies, and released. There would be two sample periods at the same time each year, in May and late June/early July. These months coincide with the breeding activity for lizards, most snakes, and depending on rainfall, amphibians.

Because reptiles and amphibians are sensitive to climatic conditions, and to account for the spotty effects of rainfall, each sampling event would also record rainfall, relative humidity, and temperatures. The rainfall and temperature data would act as a covariant in the analysis. The meteorological data would be obtained from the site meteorological tower.

Additionally, the offsite sample locations would act to balance out climatic effects on populations of small animals. The comparison of proposed NEF site data and offsite location data would allow for monitoring to be a much more informative environmental indicator of conditions at the proposed NEF site.

In addition to the monitoring plan described above, general observations would be gathered and recorded concurrently with other wildlife monitoring. The data would be compared to information contained in Chapter 3 of this EIS. As with the programs for birds and mammals, the initial reptile and amphibian monitoring program would be effective for at least the first three years of commercial operation. Following this period, program changes could be initiated based on operational experience (LES, 2005a).

#### **6.3.3 Statistical Validity of Sampling Program**

The proposed sampling program would include descriptive statistics. These descriptive statistics would include the mean, standard deviation, standard error, and confidence interval for the mean. In each case,

the sampling size would be clearly indicated. These standard descriptive statistics would be used to show the validity of the sampling program. A significance level of 5 percent would be used for the studies, which results in a 95-percent confidence level (LES, 2005a).

#### **6.3.4 Sampling Equipment and Methods**

Due to the type of ecological monitoring planned for the proposed NEF, no specific sampling equipment or chemical analyses would be necessary.

#### **6.3.5 Data Analysis, Documentation, and Reporting Procedures**

LES or its contractor would analyze the ecological data collected on the proposed NEF site. The NEF Health, Safety and Environmental Manager or a staff member would be responsible for the data analysis. The manager would be responsible for documentation of the environmental monitoring programs. A summary report would be prepared that would include the types, numbers, and frequencies of samples collected. Data relevant to the ecological monitoring program would be recorded in paper and/or on electronic forms. These data would be kept on file for the life of the proposed NEF (LES, 2005a).

#### **6.3.6 Established Criteria**

The ecological monitoring program would be conducted in accordance with generally accepted practices and the requirements of the New Mexico Department of Game and Fish. Data would be collected, recorded, stored, and analyzed. Actions would be taken as necessary to reconcile anomalous results (LES, 2005a).

### **6.4 References**

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## 7 COST BENEFIT ANALYSIS

This chapter summarizes costs and benefits associated with the proposed action and the no-action alternative. Chapter 4 of this Environmental Impact Statement (EIS) discusses the potential socioeconomic impacts of the construction, operation, and decommissioning of the proposed National Enrichment Facility (NEF) by the Louisiana Energy Services (LES).

The implementation of the proposed action would generate national, regional, and local benefits and costs. The primary national benefit of building the proposed NEF would be a greater assurance of a stable domestic supply of low-enriched uranium. The regional benefits of building the proposed NEF would be increased employment, economic activity, and tax revenues in the region around the site. Some of these regional benefits, such as tax revenues, accrue specifically to Lea County and the City of Eunice. Other benefits may extend to neighboring counties in Texas. Costs associated with the proposed NEF are, for the most part, limited to the area surrounding the site. Examples of these environmental impacts would include increased road traffic and the presence of temporarily stored wastes. However, the impact of these environmental costs on the local community are considered to be SMALL to MODERATE.

### 7.1 No-Action Alternative

Under the no-action alternative, the proposed NEF would not be constructed or operated in Lea County, New Mexico. The proposed site would remain undisturbed, and ecological, natural, and socioeconomic resources would remain unaffected. All potential local environmental impacts related to water use, land use, groundwater contamination, ecology, air emissions, human health and occupational safety, waste storage and disposal, disposition of depleted uranium hexafluoride (DUF<sub>6</sub>), and decommissioning and decontamination would be avoided. Similarly, all socioeconomic impacts related to employment, economic activity, population, housing, community resources, and financing would be avoided.

### 7.2 Proposed Action

Under the proposed action, LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico. In support of this proposed action, the U.S. Nuclear Regulatory Commission (NRC) would grant a license to LES to possess and use source material, byproduct, and special nuclear material in accordance with the requirements of Title 10, "Energy," of the *U.S. Code of Federal Regulations* (10 CFR) Parts 30, 40, and 70. The proposed NEF would be constructed over an eight-year period with operations beginning during the third construction year. Production would increase as additional cascades are completed and reach full production approximately seven years after initial ground breaking. Peak enrichment operations would continue from about 2014 to 2027, and then production would gradually wind-down as decommissioning and decontamination begins. The principal socioeconomic impact or benefit from the proposed NEF would be an increase in the jobs in the region of influence. The region of influence is defined as a radius of 120 kilometers (75 miles) from the proposed NEF. Enrichment operations and decommissioning and decontamination would overlap for about five years. As production winds-down, some operations personnel would gradually migrate to decommissioning and decontamination activities.

Based on the current population of the region of influence (i.e., 82,982 people in 2000), the limited number of new people and jobs created by the construction and operation of the proposed NEF in the region of influence would not be expected to lead to a significant change in population or cause a significant change in the demand for housing and public services. The total population increase at peak construction would be estimated to be 280 residents and less during later construction stages and facility operations. With 15 percent of housing units currently unoccupied, no housing demand impact is

expected during facility construction and operation. Further, any additional demand for public services would not be significant given the small change in population.

The construction and operation of the proposed NEF would provide additional tax revenues to the State of New Mexico, Lea County, and the city of Eunice. Tax revenues would accrue primarily to the State of New Mexico through an increase in gross receipts taxes and corporate income taxes. Over the 30-year operating life of the proposed NEF, estimated property taxes could range between \$10.4 and \$14.5 million (LES, 2005a). Table 7-1 shows a summary of the estimated tax revenue to the State and local community during the life of the proposed NEF.

**Table 7-1 Summary of Estimated Tax Revenues to State and Local Communities Over 30 Year Facility Life (in 2004 dollars)**

Type of Tax <sup>a</sup>	New Mexico	Lea County	Total
Gross Receipts Tax			
High Estimate	\$ 33,400,000	\$ 1,800,000	\$ 35,200,000
Low Estimate	\$ 22,600,000	\$ 1,200,000	\$ 23,800,000
NM Corporate Income Tax <sup>b</sup>			
High Estimate	\$ 144,900,000	N/A <sup>c</sup>	\$ 144,900,000
Low Estimate	\$ 124,200,000	N/A <sup>c</sup>	\$ 124,200,000
NM Property Tax			
High Estimate	--	\$ 14,500,000	\$ 14,500,000
Low Estimate	--	\$ 10,400,000	\$ 10,400,000

<sup>a</sup> Tax values are based on tax rates as of April 2004.

<sup>b</sup> Based on average earnings over the life of the proposed NEF.

<sup>c</sup> Allocation would be made by the State of New Mexico.

Source: LES, 2005a.

The property taxes paid to Lea County, as identified in Table 7-1, is about 20 percent of what it would normally pay. The NRC expects the total property tax exemption to range between \$40 and \$56 million over the operational life of the facility. Instead of paying the full amount of property taxes, LES would make the payments towards the industrial revenue bond that Lea County would hold. The industrial revenue bond is a procedural mechanism under New Mexico law that is required for tax abatement purposes.

### 7.2.1 Costs Associated with Construction Activities

The proposed NEF is estimated to cost approximately \$1.24 billion (in 2004 dollars) to construct. This excludes escalation, contingencies, and interest. About one-third of the cost of constructing the proposed NEF would be spent locally on goods, services, and wages. Construction jobs are expected to pay above average wages for the Lea County region (LES, 2005a).

Construction of the proposed NEF would provide up to 800 construction jobs during the peak construction period and an average of 397 jobs per year for the eight years of construction. Construction of the proposed NEF would have indirect economic impacts by creating an average of 582 additional jobs in the community each year (Figure 4-4). The combined direct and indirect jobs expected to be created would provide a moderately beneficial socioeconomic impact for the communities within the region of

influence. Due to the transitory nature of the construction crews, the projected influx of workers and their families during construction would have only a SMALL impact on the housing vacancy rate and demand for public services (LES, 2005a).

### 7.2.2 Costs Associated with the Operation of the Proposed NEF

Operation of the proposed NEF would provide 210 full-time jobs at peak operations with an average of 150 jobs per year over the life of the facility (Figure 4-4). These 210 direct jobs would generate an additional 173 indirect jobs at peak operations in the region of influence. The combination of the direct and indirect jobs would have a MODERATE impact on the economics of the communities within the region of influence. Most of the impact would be a direct result of the \$10.9 million in payroll and another \$9.9 million in purchases of local goods and services LES expects to spend during peak operations (LES, 2005a). The influx of workers would have only a SMALL impact on the vacancy rates for housing in the region of influence, and purchase of local goods and services would have a similar SMALL impact on the supply and demand for the region of influence. The jobs are expected to pay above-average wages for Lea County, New Mexico.

### 7.2.3 Costs Associated with Disposition of the DUF<sub>6</sub>

The proposed NEF would generate two components: low-enriched uranium hexafluoride (or product) and DUF<sub>6</sub>. The low-enriched uranium would be sold to nuclear fuel fabricators. During operation, the proposed NEF would generate approximately 7,800 metric tons (8,600 tons) of DUF<sub>6</sub> annually during peak operations. This would be stored in an estimated 627 uranium byproduct cylinders (UBCs) each year. These UBCs would be temporarily stored onsite on an outside storage pad. The storage pad could ultimately have a capacity of 15,727 UBCs, which would be sufficient to store the total cumulative production of DUF<sub>6</sub> over the 30-year expected life of the facility (LES, 2005a).

***The size of the socioeconomic impacts are defined as follows in this EIS:***

- *Employment/economic activity* – Small is <0.1-percent increase in employment; moderate is between 0.1- and 1.0-percent increase in employment; and large is defined as >1-percent increase in employment.
- *Population/housing impacts* – Small is <0.1-percent increase in population growth and/or <20-percent of vacant housing units required; moderate is between 0.1- and 1.0-percent increase in population growth and/or between 20 and 50 percent of vacant housing units required; and large impacts are defined as >1-percent increase in population growth and/or >50 percent of vacant housing units required.
- *Public services/financing* – Small is <1-percent increase in local revenues; moderate is between 1- and 5-percent increase in local revenues large impacts are defined as >5-percent increase in local revenues.

Source: NRC,1996; DOE, 1999.

The NRC evaluated several alternatives to the LES proposed action. As part of its evaluation of the proposed action, the NRC evaluated two options for disposal of the DUF<sub>6</sub>: (1) conversion by a privately owned facility and (2) conversion by a U.S. Department of Energy (DOE) facility. LES's preferred



approach is transporting the material to a private conversion facility. Section 4.2.14.3 of this EIS discusses the DUF<sub>6</sub> disposal options.

There are numerous possible pathways for the transport, conversion, and disposal of DUF<sub>6</sub> (LLNL, 1997). In addition, there are some potentially beneficial uses for DUF<sub>6</sub> (Haire and Croff, 2004). For example, DUF<sub>6</sub> has been used in a variety of applications ranging from munitions to counterweights, and attempts are being made to develop new uses that potentially could mitigate some or all of the costs of DUF<sub>6</sub> disposition (Haire and Croff, 2004). However, the current inventory of depleted uranium in the United States far exceeds the current and near-term future demand for the material. For each of the two disposition options, it is assumed that the most tractable disposition pathway and the one supported by the NRC is to convert the DUF<sub>6</sub> to a more stable oxide form (U<sub>3</sub>O<sub>8</sub>) and dispose of the material in a licensed disposal facility.

LES is required to put in place a financial surety bonding mechanism to assure that adequate funds would be available to dispose of all DUF<sub>6</sub> generated by the proposed NEF (10 CFR § 70.25). In 2004 dollars, the amount of funding LES proposes to set aside for DUF<sub>6</sub> disposition is \$5.85 per kilogram of uranium (LES, 2005a; LES, 2005b). This amount is based on LES's estimate of the cost of converting and disposing of all DUF<sub>6</sub> generated during operation of the proposed NEF. The NRC evaluated the adequacy of the proposed funding in the Safety Evaluation Report.

Under the disposition options considered in this EIS, the DUF<sub>6</sub> would be converted to U<sub>3</sub>O<sub>8</sub> at a conversion facility located either at a private facility outside the region of influence (Option 1a); at a private conversion facility within the region of influence of the proposed NEF (Option 1b); or at the DOE conversion facilities to be located at Portsmouth, Ohio, and Paducah, Kentucky (Option 2). Conversion of the maximum DUF<sub>6</sub> inventory which could be produced at the proposed NEF could extend the time of operation by approximately 11 years for the Paducah conversion facility or 15 years for the Portsmouth conversion facility. The DOE has estimated that the cost of converting and disposing of LES's projected DUF<sub>6</sub> inventory would be approximately \$3.34 per kilogram of DUF<sub>6</sub> or \$4.91 per kilogram of uranium in 2004 dollars. This estimate includes construction of the conversion facility; transportation of the DUF<sub>6</sub> from the proposed NEF to the conversion site (approximately 3.600 kilometers [1,900 miles]), storage of the DUF<sub>6</sub> awaiting conversion, conversion of the DUF<sub>6</sub>, disposal of the depleted uranium oxide as low-level radioactive waste, and decontamination and decommissioning of the conversion facility (DOE, 2005). Thus, using

### ***DUF<sub>6</sub> Disposition Options Considered***

***Option 1a: Private Conversion Facility (LES Preferred Option).*** *Transporting the UBCs from the proposed NEF to an unidentified private conversion facility outside the region of influence. After conversion to U<sub>3</sub>O<sub>8</sub>, the wastes would then be transported to a licensed disposal facility for final disposition.*

***Option 1b: Adjacent Private Conversion Facility.*** *Transporting the UBCs from the proposed NEF to an adjacent private conversion facility. This facility is assumed to be adjacent to the site and would minimize the amount of DUF<sub>6</sub> onsite by allowing for ship-as-you-generate waste management of the converted U<sub>3</sub>O<sub>8</sub> and associated conversion byproducts (i.e., CaF<sub>2</sub>). The wastes would then be transported to a licensed disposal facility for final disposition.*

***Option 2: DOE Conversion Facility.*** *Transporting UBCs from the proposed NEF to a DOE conversion facility. For example, the UBCs could be transported to one of the DOE conversion facilities either at Paducah, Kentucky, or Portsmouth, Ohio (DOE, 2004b; DOE, 2004c). The wastes would then be transported to a licensed disposal facility for final disposition.*

the DOE's cost estimate of \$4.91 per kilogram of uranium, the cumulative cost of  $\text{DUF}_6$  disposition would be \$653 million at a DOE conversion facility. This estimate does not include a contingency factor.

The conversion facilities at Paducah and Portsmouth would have annual processing capacities of 18,000 and 13,500 metric tons  $\text{DUF}_6$ , respectively (DOE, 2004a). Assuming a completion date of 2006 for these conversion facilities, the stockpiles held at Paducah could be processed by the year 2031, and the stockpiles destined for the Portsmouth conversion facility could be converted by the year 2025. Production at the proposed NEF is scheduled to cease by the year 2034. Therefore, the Portsmouth facility could begin processing the accumulated  $\text{DUF}_6$  in 2026 and have nearly all of the accumulated UBCs processed by 2038, which is the time decommissioning and decontamination activities are scheduled to end.

Converting the accumulated proposed NEF  $\text{DUF}_6$  could therefore extend the socioeconomic impacts of one of these facilities. It is estimated that slightly more than 300 direct and indirect jobs would be created by each conversion facility at Portsmouth and Paducah, each with a total annual income of approximately \$13.5 million (2004 dollars) (DOE, 2004b; DOE, 2004c). While a conversion facility within the region of influence of the proposed NEF or at another private site would be designed with a slightly smaller processing capacity, it can be assumed that the socioeconomic operational impacts would be smaller than, and therefore bounded by, the DOE facilities.

For a new conversion facility with a lower processing capacity constructed near the proposed NEF or at another location, the construction impacts would be approximately 180 total jobs created for a total annual income of \$7.1 million. Construction would take place in a 2-year period (DOE, 2004b and 2004c). Operating the facility would create about 185 jobs (direct and indirect) with a total annual income of \$7.7 million.

The disposition costs for temporarily storing the UBCs until decontamination and decommissioning begins would be minimal for the first 21 years of operation of the proposed NEF but would increase as  $\text{DUF}_6$  is shipped offsite. These costs, which include construction of the UBC Storage Pads and ongoing monitoring of the UBCs, would be small relative to costs for construction and operations. A private facility would be able to begin the conversion and disposal process immediately upon being constructed, reducing the cost of constructing additional storage pads at the proposed NEF. The DOE conversion facilities could accept  $\text{DUF}_6$  as it is generated by the proposed NEF or DOE could wait until completion of conversion of their own materials before accepting  $\text{DUF}_6$  from the proposed NEF. In 2004 dollars, the cumulative cost of  $\text{DUF}_6$  disposition would be \$778 million using the \$5.85 per kilogram of uranium estimate (LES, 2005a; LES, 2005b).

Disposition Options 1a and 2 (using a private conversion facility outside the region of influence or using the DOE conversion facilities, respectively) are similar in terms of environmental impact. Specific offsite impacts would depend on the timing of the shipments, the location of the conversion facility, length of storage at the conversion facility prior to processing, and the location and type of final burial of the  $\text{U}_3\text{O}_8$ .

A private conversion facility located within the region of influence would result in the smallest onsite accumulation of  $\text{DUF}_6$ . All shipments offsite would occur shortly after generation, and the material would be quickly converted to oxide and shipped to a final disposal site. The effect of storage would be to delay conversion and shift cost curves to the future.

#### **7.2.4 Costs Associated with Decommissioning Activities**

Approximately 21 years after initial groundbreaking, the proposed NEF would begin the shutdown of operations and LES would initiate the decommissioning and decontamination process. As the enrichment cascades are stopped and the site decontamination starts, some of the operational jobs would be eliminated. LES estimates that 10 percent of the operations workforce would be transferred to decommissioning and decontamination activities while other operations personnel would be gradually laid off. It is also possible that private contractors could be used to decontaminate and decommission the proposed NEF.

Using current decommissioning and decontamination techniques, it is estimated that the total workforce during most of the decommissioning and decontamination effort would average 21 direct jobs per year with an additional 20 indirect jobs for part of the nine years required to complete the decommissioning and decontamination activities. The pay scale on the decommissioning and decontamination jobs would be slightly lower than that paid during operation, but it would still be higher than the general average for the region of influence.

Implementation of decommissioning and decontamination activities would have a SMALL socioeconomic impact on the region of influence. LES estimates the total cost of decommissioning to be about \$941.6 million in 2004 dollars. Completion of the decommissioning and decontamination activities would result in a shutdown facility with no employees. The site structures and some supporting equipment would remain and be available for alternative use.

### **7.3 Summary of Benefits of Proposed NEF**

Implementation of the proposed action would have a moderate overall economic impact on the region of influence. Table 7-2 summarizes the expenditures and jobs expected during each phase of the proposed project.

Decommissioning of the proposed NEF would be phased in over a nine-year period. During this time, the number of jobs would slowly decrease, and the types of positions would switch from operations to decontamination and waste shipment.

Under temporary storage of UBCs during the operational life of the proposed NEF, the DUF<sub>6</sub> would remain onsite until the start of decommissioning. It would then be shipped to a conversion facility for processing and disposal. This would require the maximum number of jobs for surveillance and maintenance of the DUF<sub>6</sub> during the operating phase of the proposed NEF.

Table 7-3 shows a summary of the socioeconomic impacts of the proposed action with the various DUF<sub>6</sub> disposal options.

**Table 7-2 Summary of Expenditures and Jobs Expected to be Created**

Project Phase	Expenditures (in 2004 dollars)	Number of Jobs	
		Direct	Indirect
Construction	Total - \$1.24 billion	397 (average)	582 (average)
	Local - \$404 million	800 (peak)	
Operations	\$20.8 million	150 (average)	173 (average)
	(annual at peak operations)	210 (peak )	
Decommissioning and Decontamination	\$941.6 million (\$163.9 million excluding DUF <sub>6</sub> disposition)	21	20

**Table 7-3 Socioeconomic Benefits of the Proposed Action with DUF<sub>6</sub> Disposition Options**

Benefit/Cost	No Action	Proposed Action with Proposed DUF <sub>6</sub> Disposition Option		
		Temporary Storage	Options 1a and 1b	Option 2
<i>Need for Facility</i>				
National Energy Security	No Local Impact	Increased Supply Security	Increased Supply Security	Increased Supply Security
<i>Construction</i>				
Employment/Economic Activity	No Local Impact	Moderate Local Impact	Moderate Local Impact	Moderate Local Impact
Population/Housing	No Local Impact	Small Impact	Small Impact	Small Impact
Public Services/Financing	No Local Impact	Small Impact	Small Impact	Small Impact
<i>Operations</i>				
Employment/Economic Activity	No Local Impact	Moderate Local Impact	Moderate Local Impact	Moderate Local Impact
Population/Housing	No Local Impact	Small Impact	Small Impact	Small Impact
Public Services/Financing	No Local Impact	Small Impact	Small Impact	Small Impact

Benefit/Cost	No Action	Proposed Action with Proposed DUF <sub>6</sub> Disposition Option		
		Temporary Storage	Options 1a and 1b	Option 2
<b><i>Decontamination &amp; Decommissioning</i></b>				
Employment/ Economic Activity	No Local Impact	Small Impact	Small Impact	Small Impact
Population/ Housing	No Local Impact	Small Impact	Small Impact	Small Impact
Public Services/ Financing	No Local Impact	Small Impact	Small Impact	Small Impact
<b><i>Tails Disposition</i></b>				
Disposition Costs	No Local Impact	Requires Maximum Surveillance and Maintenance of Inventory	Option 1a - Surveillance and Maintenance Depends on Timing of Shipments.  Option 1b - Surveillance and Maintenance Depends on Timing of Shipments. No Additional Expenditures Required to Monitor and Maintain Inventory.	Surveillance and Maintenance Depends on Timing of Shipments
Employment/ Economic Activity	No Local Impact	Small Impact	Option 1a – Small Impact  Option 1b– Moderate Impact to Employment with Presence of DUF <sub>6</sub> Conversion Facility	Small Impact
Population/ Housing	No Local Impact	Small Impact	Option 1a – Small Impact  Option 1b – Small Impact	Small Impact
Public Services/ Financing	No Local Impact	Small Impact	Option 1a –Small Impact  Option 1b – Small Impact	Small Impact

Disposition options:

Option 1a – Private DUF<sub>6</sub> conversion facility located outside the region of influence.

Option 1b – Private DUF<sub>6</sub> conversion facility located inside the region of influence.

Option 2 – Transport the UBCs from the proposed NEF site to a DOE conversion facility.

## 7.4 References

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**APPENDIX A**  
**SCOPING FOR THIS ENVIRONMENTAL IMPACT STATEMENT**

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**ENVIRONMENTAL IMPACT STATEMENT SCOPING  
PROCESS**

**SCOPING SUMMARY REPORT**

**Proposed Louisiana Energy Services  
National Enrichment Facility  
Lea County, New Mexico**

**April 2004**



U.S. Nuclear Regulatory Commission  
Rockville, Maryland

## 1. INTRODUCTION

By letter dated December 12, 2003, Louisiana Energy Services (LES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility to be located near Eunice, New Mexico.

The LES facility, if licensed, would enrich uranium for use in commercial nuclear fuel for power reactors. Feed material would be natural (not enriched) uranium in the form of uranium hexafluoride (UF<sub>6</sub>). LES proposes to use centrifuge technology to enrich the isotope uranium-235 in the UF<sub>6</sub>, up to 5 percent. The centrifuge would operate at below atmospheric pressure. The capacity of the plant would be up to 3 million separative work units (SWU).<sup>1</sup>

In accordance with NRC regulations at 10 CFR Part 51 and the National Environmental Policy Act (NEPA), the NRC staff is preparing an Environmental Impact Statement (EIS) on the proposed facility as part of its decision-making process. The EIS will examine the potential environmental impacts associated with the proposed LES facility in parallel with the review of the license application. In addition to the EIS, the NRC staff will prepare a Safety Evaluation Report (SER) on health and safety issues raised by the proposed action. The SER will document the NRC staff evaluation of the safety of the activities proposed by LES in its license application and the compliance with applicable NRC regulations.

As part of the NEPA process, the scoping process was initiated on February 4, 2004, with the publication in the *Federal Register* of a Notice of Intent to prepare an EIS and to conduct the scoping process (69 *Federal Register* 5374-5375). Scoping is an early and open process designed to help determine the range of actions, alternatives, and potential impacts to be considered in the EIS, and to identify significant issues related to the proposed action. Input from the public and other agencies is solicited so the analysis can be more clearly focused on issues of genuine concern.

On March 4, 2004, the NRC staff held a public scoping meeting in Eunice, New Mexico, to solicit both oral and written comments from interested parties. The public scoping meeting began with NRC staff providing a description of the NRC's role, responsibilities, and mission. A brief overview of the safety review process (i.e., preparation of the SER) was followed by a description of the environmental review process and a discussion on how the public can effectively participate in the process. The bulk of the meeting was allotted for attendees to make comments on the scope of the review.

This report has been prepared to summarize the determinations and conclusions reached in the scoping process. After publication of a draft EIS, the public will be invited to comment on that document. Availability of the draft EIS, the dates of the public comment period, and information about the public meeting will be announced in the *Federal Register*, on NRC's LES website (<http://www.nrc.gov/materials/fuel-cycle-fac/lesfacility.html>) and in the local news media when the draft EIS is distributed. After evaluating comments on the draft EIS, the NRC staff will issue a final EIS that will serve as the basis for the NRC's consideration of environmental impacts in its decision on the proposed facility.

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<sup>1</sup>SWU relates to a measure of the work used to enrich uranium.

Section 2 of this report summarizes the comments and concerns expressed by government officials, agencies, and the public. Section 3 identifies the issues the draft EIS will address and Section 4 identifies those issues that are not within the scope of the draft EIS. Where appropriate, Section 4 identifies other places in the decisionmaking process where issues that are outside the scope of the draft EIS may be considered.



## 2. ISSUES RAISED DURING THE SCOPING PROCESS

### 2.1 OVERVIEW

Approximately, 250 individuals attended the March 4, 2004, public scoping meeting concerning the LES National Enrichment Facility (NEF). During the meeting, 43 individuals offered comments. Of these 43 commenters, 33 individuals fully supported construction of the LES NEF. Two commenters provided petitions to the NRC staff at the meeting with over 2,080 signatures in support of the NEF licensing and construction. This petition stated that “the signers of this petition believe this facility will be safely operated, contribute to energy independence and security for the United States and provide substantial economic benefits to our communities.” In addition, 127 written comments were received from various individuals during the public scoping period, which ended on March 18, 2004. Of these 127 written comments, the NRC staff received approximately 60 letters expressing support for the proposed project.

This active participation by the public in the scoping process is an important component in determining the major issues that the NRC should assess in the draft EIS. Individuals providing oral and written comments addressed several subject areas related to the proposed LES facility and the draft EIS development. In addition to private citizens, the various commenters included:

- A Member of Congress.
- New Mexico State Representatives.
- Local officials from the cities of Eunice, Hobbs, Jal, Lovington and Andrews.
- Representatives of Federal agencies or organizations.
- Representatives of State of New Mexico agencies or departments.
- Representatives of other organizations including:
  - Citizens for Alternatives to Radioactive Dumping
  - Citizens Nuclear Information Center
  - Concerned Citizens for Nuclear Safety
  - Creative Commotion
  - *Eunice News*
  - Forest Guardians
  - Institute for Energy and Environmental Research
  - Hispanic Workers Council
  - National Association for the Advancement of Colored People
  - New Mexico Audubon Council
  - New Mexico Junior College
  - Nuclear Information and Resource Service
  - Nuclear Workers for Justice
  - Public Citizen
  - Southwest Research and Information Center
  - United Way of Lea County.

The following general topics categorize the comments received during the public scoping period:

- NEPA and public participation.

- Land use and site selection.
- Need.
- Alternatives.
- Ecology, geology, emissions, soil, and water resources.
- Socioeconomics.
- Environmental justice.
- Transportation.
- Waste management.
- Cumulative impacts.
- Decommissioning.
- Safety and risk.
- Nonproliferation and security.
- Terrorism.
- Credibility.

In addition to raising important issues about the potential environmental impacts of the proposed facility, some commenters offered opinions and concerns that typically would not be included in the subject matter of an EIS—these include general opinions about LES or issues that are more appropriately considered in the SER. Comments of this type are taken into consideration by the NRC staff, but they do not point to significant environmental issues to be analyzed. Other statements may be relevant to the proposed action, but they have no direct bearing on the evaluation of alternatives or on the decision-making process involving the proposed action. For instance, general statements of support for or opposition to the proposed project fall into this category. Again, comments of this type have been noted but are not used in defining the scope and content of the EIS.

Section 2.2 summarizes the comments received during the public scoping period. Most of the issues raised have a direct bearing on the NRC’s analysis of potential environmental impacts.

## **2.2 SUMMARY OF ISSUES RAISED**

As noted above, a large number of commenters expressed support for the facility. On the other hand, several individuals raised concerns regarding the construction and operation of the NEF. The following summary groups the comments received during the scoping period by technical area and issues.

### **2.2.1 NEPA and public participation**

A commenter stated that given the level of interest in this EIS in New Mexico, a single scoping meeting in a remote location seemed inadequate. Another commenter stated that the public scoping meeting in Eunice, New Mexico, presented “no substance from LES or their supporters” but was a “really great pep rally.” Another commenter stated that the local community is capable of making its own decisions and does not want non-local intervener groups interfering with decision-making. Another commenter noted that “98% of the residents of Lea County are in favor of the enrichment facility.” Another commenter noted that “there are very few Nay

Sayers of the project” and most of the individuals, that the commenter has personal contact with, have “positive views” of the NEF.

Another commenter requested that the NRC include land use, transportation, geology and soils, water resources, ecology, air quality, noise, historical and cultural resources, visual and scenic resources, socioeconomics, environmental justice, public and occupational health, and waste management as topics for the EIS, and that particular attention be paid to environmental justice and waste management in the EIS and licensing process.

### **2.2.2 Land use and site selection**

A commenter recommended that the NRC staff consult with the administrator of the Land and Water Conservation Fund (L&WCF) program in the State of New Mexico to determine any potential conflicts with existing L&WCF projects.

Several commenters suggested that the EIS should explain why LES is no longer pursuing alternative locations in Louisiana and Tennessee and the circumstances under which LES was required to withdraw their proposals in these States. Another commenter questioned why the NRC would allow LES to prey upon impoverished areas to site the NEF and noted that Eunice is the third such area that LES has approached. Another commenter noted that the United States Enrichment Corporation (USEC) was previously interested in Lea County for uranium enrichment using the Atomic Vapor Laser Isotope Separation (AVLIS) process in 1998 to 1999, but the project was canceled when AVLIS was proven to be unfeasible. The commenter felt that siting the project in Lea County would be more feasible and welcomed by the community.

### **2.2.3 Need**

Several commenters raised concerns over the need for the facility. One commenter asked the NRC to explain (with accompanying facts and figures) where the need is for enriched uranium. Another commenter stated that the EIS must fully analyze the need for the proposed facility “in the light of the existing uranium enrichment capacity, which is meeting the domestic U.S. nuclear power plant requirements.” A commenter stated that the United States needs the LES NEF to help ensure national energy security by having a strong nuclear energy program nationwide.

### **2.2.4 Alternatives**

Several commenters stated that the EIS should address all environmental impacts of a range of reasonable alternatives, including the no-action alternative. A commenter stated that Lea County should consider alternative (i.e., safer) economic development projects other than the proposed action. Commenters stated that the no-action alternative in the EIS should consider the nonproliferation merits of using downblended low enriched uranium fuel from U.S. and Russian surplus highly enriched uranium. In addition, the EIS should add an alternative that increases the quantity and pace of downblending the surplus highly enriched uranium into reactor fuel. For the proposed action, the NRC should compare the generation of additional

depleted uranium tails from the proposed action to the no-action alternative. A commenter stated that, in addition to the no-action and proposed action alternatives, another alternative of “storage of up to 15,727 uranium byproduct cylinders (UBCs) beyond the operational lifetime of the facility must be fully analyzed.” The commenter emphasized that this alternative is reasonable because “LES has made no other arrangements for the materials and wastes contained in those UBCs,” and no existing disposal option for the wastes exists. Another commenter suggested that windmills or other alternative power generators be considered as alternatives in the draft EIS.

## **2.2.5 Ecology, geology, emissions, soil and water resources**

**Ecology:** Several commenters expressed concerns that the construction and operation of the facility may have an undue impact on birds, other wildlife, and habitat in New Mexico. A commenter stated the EIS should consider the impacts to imperiled species such as the lesser prairie chicken, sand dune lizard, black-tailed prairie dogs, black-footed ferret, mountain plover, swift fox, ferruginous hawk, burrowing owl, and northern aplomado falcon. Another commenter expressed concern over the “unintentional habitat” that would be created by effluents and process cooling water that could attract and potentially harm local wildlife. Another commenter was concerned that local dove and quail could become contaminated due to the facility. Another commenter expressed concern about the adequacy of the LES Environmental Report as it pertains to local wildlife resources like sand dune lizards and the lesser prairie chicken. Another commenter was concerned with the potential for bioaccumulation in the foodchain resulting from the proposed facility.

**Geology, emissions, and soil:** Several commenters expressed concern over the long-term effects of any emissions (particularly gaseous) or contaminated soil (i.e., radioactive dust) being transported offsite. A number of commenters felt that the construction and operation of the proposed facility would be hazardous to the local community due to soil contamination similar to the contamination from the Paducah and Portsmouth facilities operations. A commenter stated that the EIS must fully examine the effects of the continuous releases of small amounts of uranium and other materials in the air, including the possible large releases of these materials in the case of a significant accident. Another commenter suggested those impacts from the treated effluent basin such as fugitive dust and monitoring must be included in the EIS. Another commenter suggested that the NRC must review the geology of the site. Another commenter questioned the location of the facility in one of the largest karstland.

Several commenters requested that the NRC consider the potential impact of air emissions on the health and safety of New Mexico and Texas residents. Several commenters requested that the NRC include a thorough examination of the potential impact to human health and the environment from radioactive dust storms. A commenter stated that the EIS should evaluate the effects from air releases traveling beyond 50 miles due to the persistent winds in the region. The commenter further suggested that any environmental studies should include the high prevailing southerly winds that could quickly spread emissions.

**Water resources:** Several commenters expressed concern over the long-term effects of any liquids being transported offsite. A commenter noted that the facility would not have a serious impact on existing water supplies or users and submitted a letter that summarized the county’s

water-use audit demonstrating this conclusion. On the other hand, several commenters expressed concerns about the water volumes that are expected to be used by the proposed facility (e.g., volumes, consumptive uses, and associated water rights) and future usage with anticipated growth in the population. A commenter stated that the EIS must analyze the total water use, not just the consumption, as the total amount of water used would not be available for other domestic uses of the Hobbs and Eunice communities. According to this commenter, this analysis must include impacts of peak water use, as well as the amounts of water use based on the LES NEF design. Another commenter stated that the EIS should address all impacts on water levels in the Ogallala Aquifer, as well as for the cities of Hobbs and Eunice arising from the facility's proposed use of cooling water from municipal water supplies that draw upon the Ogallala Aquifer.

A number of commenters felt that the construction and operation of the proposed facility would be hazardous to the local community due to groundwater contamination. Commenters expressed concern about the impact of the proposed facility on the groundwater, specifically the Ogallala Aquifer over which the facility would be built. A commenter suggested that the NRC must review the hydrology of the site, as well as the relation of area aquifers to larger, regional aquifers such as the Ogallala Aquifer.

Several commenters expressed doubt that the values given on water usage from the county/local governments, water-resource boards, and LES are correct, and that the declining water level in the Ogallala Aquifer was a concern. Another commenter stated that LES has admitted to lying about the proposed facility's air and water emissions, and LES' questionable credibility puts the Ogallala Aquifer water supply in jeopardy.

A commenter stated that the EIS must consider the possibility that the containers in which LES plans to store depleted UF<sub>6</sub> may leak and allow contaminants to seep into groundwater. The commenter further noted that the NRC must thoroughly evaluate the LES proposed wastewater containment system and its ability to prevent the permeation of contaminated groundwater in the future. Another commenter stated the EIS must analyze all possible water discharge points and their capacity. Another commenter expressed concerns of contamination by the onsite "open contamination water pit." The commenter questioned the construction of the pit and the type of liner. Ingestion from these holding ponds should be evaluated, should pond overflow occur. Uncertainty was expressed as to the resources available to clean up any contamination.

### **2.2.6 Socioeconomics**

**Economic benefit:** A number of commenters stated that the proposed facility would have a positive and beneficial economic impact on the community by bringing economic diversity and stability to the local area. A commenter stated that the project "will have a positive impact, not only on our economy in Lea County, but for the whole United States." Another commenter felt that it was necessary to bring in a variety of industries to keep jobs local for future generations and that the NEF would help stem the county's long-standing "brain-drain." Another commenter felt "this project and the many benefits that it will bring to the people of Lea County is very exciting." Commenters noted that "by supporting the construction of this facility, they were in reality, supporting the creation of 210 permanent jobs...[and] 400-800 short-term construction

jobs that will provide an estimated payroll of \$170 million.” Another commenter noted that the additions of these employees and families “would give needed stability and growth to the area.”

One U.S. Senator from New Mexico stated support for the proposed project because it would provide economic opportunity for southeastern New Mexico. Local officials from Hobbs submitted a resolution supporting efforts to locate the NEF in southeastern New Mexico, citing economic benefits that include stability, growth, job creation, and industry diversification. Other local politicians stated that they expected the LES to be a good corporate neighbor that would add to the quality of life in the area (e.g., LES donated money for the development of a safe playground).

Other commenters expressed reservations concerning the economic benefits of the proposed facility. A commenter stated concerns about the promise of jobs being used as motivation for public support of the NEF. Another commenter stated that many residents would move from Lea County before the NEF opens. Another commenter stated that the strengthened local economy as a result of the presence of the LES NEF is not enough reason to outweigh the possible cost in lives due to potential environmental contamination.

Another commenter requested the EIS to include an extensive and thorough examination of the number and quality of local jobs and to present a detailed job breakdown by number of local workers versus “imported” workers and by “worker upward mobility.” Other commenters requested that the EIS specify work titles and descriptions of duties, qualifications required, salary per job title, and quantity of workers. Another commenter also suggested the need for the economic multiplier that the LES NEF would add to the local economy. Also, the same commenter requested that the EIS investigate and document the number and nature of the potential jobs that LES can realistically offer the citizens of Lea County to establish any true economic benefits. Another commenter stated that businesses would have difficulty recruiting new employees. Another commenter questioned whether the revenue and product generated by the proposed facility would be staying within the United States or would it be sent overseas.

**Tax and bonds:** A commenter questioned why Lea County should provide tax breaks, municipal bonds, and other public funds for this project given both the questionable world market demand for enriched uranium and the financial health of at least one of its major partners, British Nuclear Fuels, Ltd. A commenter inquired as to what would be the impact of the \$1.8 billion bond agreement on Lea County if the project shuts down early or never opens. In addition, another commenter suggested that “the facility is not economical in that it can only operate if it has the \$1.8 billion Industrial Revenue Bonds,” and this fact must be included in the EIS. A commenter proposed a “socioeconomic alternative” (i.e., an across-the-board tax cut for the businesses and people of Lea County) that would give the people and businesses of Lea County a \$435 million tax break (instead of giving LES a \$180 million tax break) and would provide Lea County with “significantly more long-term jobs and free enterprise economic development.”

**Property value:** A commenter stated concern that, as a landowner of several properties, values for property could be adversely affected by a problem at the proposed LES NEF or by unintentional contamination of land or water resources. Another commenter suggested that the EIS should discuss the effects of effluents and potential accidents on the local property values.

**Foreign-Trade Zone:** A commenter questioned whether LES would be utilizing the Foreign-Trade Zone and possibly applying for a sub-zone. If so, the commenter asked if this information should be included in the EIS.

**Public Service:** A commenter expressed doubt that the local communities could handle the increased public service demands from an increased population.

### **2.2.7 Environmental justice**

Several commenters suggested a detailed environmental justice review including an analysis of the effects on minority and low-income populations. Any disproportionate effect of minority or low-income populations should be subject to further investigation. A commenter stated that the EIS should examine all environmental justice issues, including the racial and economic makeup, expected composition of the workforce, and whether any claim to the land is held by any Indian tribes in the area around the proposed facility.

Another commenter representing the National Association for the Advancement of Colored People stated that they “unequivocally and without reservation support the construction...[and] operation of the Louisiana Energy Services plant.” Another commenter stated that the local communities of Eunice, Hobbs, and Jal are ignorant concerning the proposed facility. The commenter further noted that because over one-third of the population is Mexican-American and do not understand English, information about the plant is not often comprehended and accepted. Another commenter noted that LES and NRC staff have shown concern regarding the impact of the proposed NEF on local minority populations. The commenter noted that they would be sharing this information with the minority population.

### **2.2.8 Transportation**

Several commenters expressed concerns regarding transportation to and from the proposed facility. A commenter stated that the EIS must consider the “wide variety of routes” and the impacts of the projected shipments of up to 16,000 UBCs. Another commenter voiced concern that all transportation routes should be evaluated to determine impacts (including environmental justice) on the public along the full length of those transport routes. A commenter expressed concern over the long-term road conditions of NM Highway 123 due to Waste Control Specialists (WCS), the landfill, and NEF traffic. The commenter noted surrounding roads are heavily used by pass-through recreational traffic (e.g., traffic to casinos and natural attractions).

Commenters stated that the EIS should include a precise, detailed analysis of the increased hazards of transporting  $UF_6$  over great distances, especially to a site accessible only by two-lane highways. A commenter expressed concern about the deteriorating conditions of some New Mexico roadways and the resulting high incidence of accidents that represent safety-related issues and aspects that need to be addressed.

A commenter stated that LES must demonstrate that it has the full understanding and support of the Western Interstate Energy Board, which is responsible for communication and cooperation among its membership with specific regard to the development and management of

nuclear energy projects. The commenter felt this was important because the LES project involves the interstate transport of nuclear waste materials.

### 2.2.9 Waste management

**General waste management:** A commenter expressed concern that it is misleading to describe the LES project only as a processing facility—in reality, it is a nuclear waste storage facility. Another commenter stated that the EIS must include a complete and thorough investigation into gaseous, liquid, and solid waste production, treatment, and disposal at the proposed facility. Another commenter asked what would happen to worn out parts, tools, solvents, chemicals, etc. that are radioactive and whether these contaminated items would be disposed onsite. The same commenter also asked how much the cleanup of the LES plant would cost and objected to any nuclear waste being disposed of in landfills. Another commenter suggested that low-level waste from the proposed LES NEF could be sent to WCS.

**Depleted uranium tails disposal:** While several commenters felt that the wastes are manageable, some commenters stated opposition to the approval of the LES' application because “no place has been approved to take the waste product.” A commenter asked why more waste should be added to waste already existing with no means of disposal. Another commenter expressed concern about the lack of a final disposal alternative for the depleted uranium tails that could lead to environmental exposure of radioactive materials in the long term. Another commenter proposed a condition for license approval to include final disposal of all waste must be out of State. Another commenter inquired as to where the waste would be stored and how soon it would be moved out of the State. Another commenter stated that the local community should mandate an agreement with LES prior to construction that any waste would be promptly removed. Another commenter stated that LES attempted to misrepresent to the public the amount of waste that would be stored in Lea County and, for this reason, LES' application for a license should be denied. Another commenter stated the NRC should evaluate waste characteristics of depleted uranium relative to transuranic waste in the scope of the EIS. Another commenter stated that “legitimate questions have been raised regarding the safe and secure storage and ultimate removal from New Mexico of the leftover uranium hexafluoride material, or tails, from the enrichment operation over the lifetime of the plant's operation.” Another commenter stated that the EIS should examine the veracity of LES' statement that waste would be shipped offsite to a licensed disposal facility. In addition, the EIS should examine all additional environmental, radiological, and chemical impacts from construction and operation of a possible additional UF<sub>6</sub> conversion facility for ultimate disposal nearby or even at the proposed LES site. Another commenter expressed concern about what would ultimately happen to the waste at the proposed LES NEF and what assurances exist that the waste would not be deconverted and stored at WCS. Another commenter stated the NRC must consider the effects of using the depleted uranium in warfare, a potential application. Another commenter suggested that the tails generated should be seen as a resource rather than as a waste product and should be used to entice another company to locate a deconversion facility adjacent to the LES NEF.

Commenters stated that the NRC must analyze the impacts of the two disposal options for UBCs. These options include 1) establishment of a private conversion facility for processing and disposal of the converted waste in “an exhausted uranium mine” and 2) having the UBCs taken by the U.S. Department of Energy. In addition, the commenters stated that the EIS must



analyze the plausibility of these options much more extensively than was done in the LES Environmental Report. The commenters also suggested that the EIS analyze the costs of indefinite waste storage at the LES facility. Another commenter suggested the EIS must analyze the financial assurance of disposition of the wastes.

**Life expectancy/safety of waste containers:** Commenters inquired as to the life expectancy of waste storage containers that may be used at the proposed LES NEF and expressed concern about their safety.

### **2.2.10 Cumulative Impacts**

Several commenters requested that the cumulative impacts of other activities such as oilfield operation be considered in the EIS and raised concern over the cumulative impacts of continued generation of depleted uranium. A commenter expressed concern that LES would not be able to contain radioactive contaminants in soil and plant life due to past and possibly ongoing contamination in southeast New Mexico. Another commenter stated that the environmental evaluation should include a consideration of long-term and cumulative environmental effects of the radioactive and hazardous waste created by the NEF, not excluding effects at any of the disposal or processing sites around the country. Commenters stated that in its EIS, the NRC should take into account past abuses and acts of malfeasance at domestic uranium enrichment facilities in determining the potential public health impact of the proposed plant. Commenters expressed concerns related to the Paducah and Portsmouth facilities' operations that involved cancer risks to workers and the public, impacts to wildlife, and adverse impacts on aquifer and groundwater, which they stated have damaged the environment and human health and safety. This damage would also occur at the proposed facility.

A commenter stated that LES must demonstrate that it has the full understanding and support of the Western Interstate Energy Board, which is responsible for communication and cooperation among its membership with specific regard to the development and management of nuclear energy projects. The commenter felt this was important because the proposed project involves potential impacts to the economies of both regional States and the Nation. Another commenter stated that the environmental analysis should include assessment of cumulative regional impacts on the sand dune lizards and the lesser prairie chicken. Commenters stated that the EIS must conduct a full investigation into the demographic makeup of the area near the proposed NEF, taking into account other nuclear facilities in the area near the proposed NEF such as the Waste Isolation Pilot Plant (WIPP) and the WCS toxic and radioactive waste repository and their cumulative effect on public health and ecological integrity. Another commenter noted two major accidents in Carlsbad and that they needed to be considered in the EIS analysis. The effects of such accidents at LES should be considered along with mitigation measures to prevent them.

### **2.2.11 Decommissioning**

A commenter suggested that the EIS should include a detailed disposition and closure plan for the site, supported by a cost analysis.

## 2.2.12 Safety and Risk

**Uranium hexafluoride (UF<sub>6</sub>):** A commenter asked who would regulate safety at the proposed facility. Another commenter inquired about the volatility of UF<sub>6</sub>, how much would be onsite at any given hour of the day, and the worst-case scenario if an accident with UF<sub>6</sub> should occur. Another commenter proposed a condition for license approval to include limiting the amount and time of UF<sub>6</sub> storage onsite.

**Risk and public health:** Several commenters felt that the risks are manageable. One commenter stated that the uranium enrichment industry used lessons learned from past and current U.S. enrichment facilities to improve the safety and operation of the LES NEF. Another commenter stated that the local community would be safe by ensuring that LES meets the regulatory requirements. Another commenter noted that the local community demonstrated due diligence during the licensing of WCS and that this was being repeated for the LES NEF. Having worked at large-scale nuclear and industrial facilities, a commenter felt the anti-NEF groups were exaggerating the dangers. Several commenters who toured the gas centrifuge facility in Europe (Almelo, Netherlands) stated that the technology is clean and safe for workers, the public, and the environment. Another commenter stated that the NEF “would not pose a threat to their [the public] health and safety, that it would not harm the environment, and that they [the public] would not be left with the plant’s wastes.” Another commenter noted that the proposed enrichment facility would be “tremendous addition to our technology.” Another commenter stated LES “take safety and security very seriously based on what they have heard about LES and the uranium enrichment plant.”

A number of commenters felt that the construction and operation of the proposed facility would be hazardous to the local community due to possible radiation exposure. A commenter stated that the EIS should address all impacts to public health arising from the increase in routine and accidental radioactive emissions to the air and water as a result of the operation of the proposed facility. This analysis should consider work by Dr. John Gofman and numerous other scientists showing that low-level radiation is a significant contributor to deaths from heart disease and cancer. Another commenter stated that the EIS should include a complete investigation into potential worker and public exposure to toxic and radioactive materials resulting from NEF operations. Another commenter suggested that the draft EIS should address the risks from effluent releases as latent cancer fatalities per 10,000 people. Another commenter suggested that the EIS should include a plan for maintaining and updating workers’ records in a secure and public location where NEF employees would be able to access their radiation records.

**Accident analysis:** A commenter stated that the EIS should address all impacts on public health and the environment arising from a severe accident and the impacts. Another commenter expressed concern that the accident analysis would not be properly completed and requested that the following be included: 1) risk of fire, 2) impacts beyond a 50-mile radius, 3) evaluation of impacts from all transportation paths (feed, tails, wastes) including collisions with local oil and gas transport trucks, and 4) identification of emergency response preparedness for Lea County and all transportation routes. Another commenter stated that the LES NEF would not be as safe as some individuals are saying and expressed the concern that industries want to take shortcuts in operations that may lead to accidents.

Another commenter inquired about what type of evacuation plan and procedure is in place in the case of an accident at the plant site, and how would information about these emergency evacuations be disseminated. Another commenter stated that the EIS should address the impacts of any emergency response measures such as relocation of the population. Another commenter stated that the NRC must promise to shut down the proposed facility if any effluent releases exceed regulatory limits. Another commenter suggested that an impartial (i.e., non-LES) expert be on the site at all times to provide emergency information. This commenter also stated that medical and emergency personnel should immediately start getting the necessary background training that would enable them to handle radiation situations now, not later.

### **2.2.13 Nonproliferation and security**

Several commenters expressed concern that advanced nuclear technology used at the LES NEF could be spread to other unfriendly governments as happened at Urenco. Another commenter expressed concern that there is “massive secrecy and cover up regarding the Urenco involvement in the spread of gas centrifuge uranium enrichment technology to Iraq, Pakistan, Iran, Libya, and North Korea which extends deep, far, and wide regarding nuclear proliferation and our national security problem.” For this reason, the commenter suggested that a thorough congressional investigation of Urenco and LES is desperately needed and that Congress should direct the NRC to withhold granting LES an operating license until that investigation is completed.

Several commenters stated that Urenco, Ltd. has been implicated in nonproliferation and security breaches and wondered what is going to be done to ensure this kind of security breach does not happen at the LES NEF. A commenter requested that “given the track records of both major backers of this project,” the EIS should provide “a detailed review of the national security and environmental policies of all the corporate participants in this project.” Another commenter expressed concern that Lea County leaders were unaware of these activities at Urenco, Ltd. Another commenter stated that the EIS should consider whether Urenco would likely adhere to U.S. national security policy that actively discourages the proliferation of nuclear technology worldwide.

Another commenter noted that local law enforcement was involved in the planning of security at the WIPP and it also intends to be involved in the planning of security at the proposed facility. Another commenter stated that the EIS should examine all impacts arising from increased security risks and tasks associated with the construction and operation of the proposed LES NEF.

### **2.2.14 Terrorism**

A commenter stated that accident consequences and risks should include terrorist attacks like September 11, 2001, regardless of the probability of such an event. Another commenter suggested the EIS include an analysis of the amount of gas and radiation that would be released into the atmosphere in the event of a 9/11-type terrorist catastrophe. Another commenter expressed concern that the LES NEF may “open up our country for controversy and risk for terror attacks” due to the nuclear materials and activities.

### **2.2.15 Credibility**

Several commenters stated that LES's officials have been straightforward, honest and complete in their responses with groups, the public and individuals. On the other hand, a commenter stated that LES seems to be less than truthful in their part of the licensing process. The commenter stated because LES has a record of polluting, future accountability should be an important factor in deciding whether the NEF should be constructed in a southeast New Mexico location. Another commenter suggested that LES needs to address why the operating license at the Almelo, Netherlands, facility was revoked twice and to discuss other multiple violations at the plant. Another commenter suggested that Urenco, Ltd. should open their books for audit.

Another commenter stated that LES was deceptive and misrepresented facts to local residents about air emissions, water contamination, waste disposal of tails, and planning for potential accidents. The same commenter questioned why the NRC would grant a license to a company that is both deceptive and incompetent to operate the proposed NEF.

Another commenter stated that NRC officials currently in charge of the licensing process are "ethically challenged and should be replaced" because they are not responding to LES' less than truthful statements.

### 3. SUMMARY AND CONCLUSIONS

#### 3.1 SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT AND SUMMARY OF ISSUES TO BE ADDRESSED

NEPA (Public Law 91-90, as amended), and the NRC's implementing regulations for NEPA (10 CFR Part 51), specify in general terms what should be included in an EIS prepared by the NRC staff. Regulations established by the Council on Environmental Quality (40 CFR Parts 1500-1508), while not binding on the NRC staff, provide useful guidance. The NRC staff has also prepared environmental review guidance to its staff for meeting NEPA requirements associated with licensing actions ("Environmental Review Guidance for Licensing Actions Associated with Office of Nuclear Material Safety and Safeguards (NMSS) Programs", NUREG -1748).

Pursuant to 10 CFR 51.71(a), in addition to public comments received during the scoping process, the contents of the draft EIS will depend in part on the environmental report. In accordance with 10 CFR 51.71(b), the draft EIS will consider major points of view and objections concerning the environmental impacts of the proposed action raised by other Federal, State, and local agencies, by any affected Indian tribes, and by other interested persons. Pursuant to 10 CFR 51.71(c), the draft EIS will list all Federal permits, licenses, approvals, and other entitlements which must be obtained in implementing the proposed action, and will describe the status of compliance with these requirements. Any uncertainty as to the applicability of these requirements will be addressed in the draft EIS.

Pursuant to 10 CFR 51.71(d), the draft EIS will include a consideration of the economic, technical, and other benefits and costs of the proposed action and alternatives to the proposed action. In the draft analysis, due consideration will be given to compliance with environmental quality standards and regulations that have been imposed by Federal, State, regional, and local agencies having responsibilities for environmental protection. The environmental impact of the proposed action will be evaluated in the draft EIS with respect to matters covered by such standards and requirements, regardless of whether a certification or license from the appropriate authority has been obtained. Compliance with applicable environmental quality standards and requirements does not negate the requirement for NRC to weigh all environmental effects of the proposed action, including the degradation, if any, of water quality, and to consider alternatives to the proposed action that are available for reducing adverse effects. While satisfaction of NRC standards and criteria pertaining to radiological effects will be necessary to meet the licensing requirements of the Atomic Energy Act, the draft EIS will also, for the purposes of NEPA, consider the radiological and non-radiological effects of the proposed action and alternatives.

Pursuant to 10 CFR 51.71(e), the draft EIS will normally include a preliminary recommendation by the NRC staff with respect to the proposed action. Any such recommendation would be reached after considering the environmental effects of the proposed action and reasonable alternatives, and after weighing the costs and benefits of the proposed action.

The scoping process summarized in this report will help determine the scope of the draft EIS for the proposed facility. The draft EIS will contain a discussion of the cumulative impacts of the proposed action. The development of the draft EIS will be closely coordinated with the SER prepared by the NRC staff to evaluate the health and safety impacts of the proposed action.

The goal in writing the EIS is to present the impact analyses in a manner that makes it easy for the public to understand. This EIS will provide the basis for the NRC decision with regard to potential environmental impacts. Significant impacts will be discussed in greater detail in the EIS, and explanations will be provided for determining the level of detail for different impacts. This should allow readers of the EIS to focus on issues that were determined to be important in reaching the conclusions supported by the EIS. The following topical areas and issues will be analyzed in the EIS.

- *Public and worker safety and health.* The draft EIS will include a determination of potentially adverse effects on human health that result from chronic and acute exposures to ionizing radiation and hazardous chemicals as well as from physical safety hazards. These potentially adverse effects on human health might occur during facility construction and operation. Impacts associated with the implementation of the proposed action will be assessed under normal operation and credible accident scenarios.
- *Alternatives.* The draft EIS will describe and assess the no-action alternative and other reasonable alternatives to the proposed action. Other reasonable alternatives to the proposed action will be considered such as alternative sites, enrichment sources, or technological alternatives to the proposed centrifuge technology.
- *Waste management.* The draft EIS will discuss the management of wastes, including byproduct materials, generated from the construction and operation of the NEF to assess the impacts of generation, storage, and disposition. Onsite storage of wastes will also be included in this assessment.
- *Depleted uranium disposition.* The draft EIS will address concerns about the depleted uranium hexafluoride material, or tails, resulting from the enrichment operation over the lifetime of the proposed plant's operation. These concerns include the safe and secure storage and ultimate removal of this material from New Mexico, and potential conversion of  $UF_6$  to  $U_3O_8$  and ultimate disposition.
- *Water resources.* The draft EIS will assess the potential impacts on groundwater quality and water use due to the implementation of the proposed action.
- *Geology and seismicity.* The draft EIS will describe the geologic and seismic characteristics of the proposed NEF site. Evaluation of the potential for earthquakes, ground motion, soil stability concerns, surface rupturing, and any other major geologic or seismic considerations that would affect the suitability of the proposed site will be addressed in the SER rather than in the draft EIS.
- *Compliance with applicable regulations.* The draft EIS will present a listing of the relevant permits and regulations that are believed to apply to the proposed NEF. These would include air, water, and solid waste regulations and disposal permits.
- *Air quality.* The draft EIS will make determinations concerning the meteorological conditions of the site location, the ambient air quality, and the contribution of other sources. In addition, the draft EIS will assess the impacts of the NEF's construction and operation on the local air quality.

- *Transportation.* The draft EIS will discuss impacts associated with the transportation of construction material, centrifuges, and feed and tails during both normal transportation and transportation under credible accident scenarios. The impacts on local transportation routes due to workers, large vehicles delivering needed equipment and materials, and vehicles removing waste from the proposed facility will be evaluated in the draft EIS.
- *Accidents.* The draft EIS will analyze the potential environmental impacts resulting from credible accidents at the NEF. The SER will assess the impacts associated with credible accidents at the proposed NEF, both from natural events and human activities. Based on the analyses, the EIS will summarize the potential environmental impacts resulting from credible bounding accidents at the proposed facility.
- *Land use.* The draft EIS will discuss the potential impacts associated with the changes in land use from predominately rangeland to industrial.
- *Socioeconomic impacts.* The draft EIS will address the demography, the economic base, labor pool, housing, utilities, public services, education, recreation, and cultural resources as impacted by NEF. The hiring of new workers from outside the area could lead to impacts on regional housing, public infrastructure, and economic resources. Population changes leading to changes to the housing market and demands on the public infrastructure will be assessed in the draft EIS.
- *Cost/benefits.* The draft EIS will address the potential cost/benefits of constructing and operating the NEF, and will discuss the cost/benefits of tails disposition options.
- *Cultural resources.* The draft EIS will assess the potential impacts of the proposed NEF on the historic and archaeological resources of the area and on the cultural traditions and lifestyle of Indian tribes.
- *Resource commitments.* The draft EIS will address the unavoidable adverse impacts, irreversible and irretrievable commitments of resources, and the relationship between local, short-term uses of the environment and the maintenance and enhancement of long-term productivity. In addition, associated mitigative measures and environmental monitoring will be presented.
- *Ecological resources.* The draft EIS will assess the potential environmental impacts of the proposed NEF on ecological resources including plant and animal species and threatened or endangered species or critical habitat that may occur in the area. As appropriate, the assessment will include an analysis of mitigation measures to address adverse impacts.
- *Need for the facility.* The draft EIS will provide a discussion of the need for the proposed NEF and the expected benefits.
- *Decommissioning.* The draft EIS will include a discussion of facility decommissioning and associated impacts.
- *Cumulative impacts.* The draft EIS will address the potential cumulative impacts from past, present, and reasonably foreseeable activities at and near the site.

#### 4.0 ISSUES CONSIDERED OUTSIDE THE SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

The purpose of an EIS is to assess the potential environmental impacts of a proposed action as part of the decision-making process of an agency-in this case, a licensing decision. As noted in Section 2.2, some issues and concerns raised during the scoping process are not relevant to the EIS because they are not directly related to the assessment of potential impacts or to the decision-making process. The lack of in depth discussion in the EIS, however, does not mean that an issue or concern lacks value. Issues beyond the scope of the EIS either may not yet be ripe for resolution or are more appropriately discussed and decided in other venues.

Some of these issues raised during the public scoping will not be addressed in the EIS. Major categories of these issues not analyzed in detail in the EIS include nonproliferation concerns, terrorism, security and safety issues, and credibility. The Commission has held that NRC staff is not required to consider terrorism in its EISs. In *The Matter of Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), 56 NRC 340 (2002), the Commission held that NRC is not required to consider terrorism in EISs. The Commission indicated, “the possibility of a terrorist attack ... is speculative and simply too far removed from the natural or expected consequences of agency action to require a study under NEPA.”

Some of these issues raised during the public scoping process for the proposed facility are outside the scope of the draft EIS, but they will be analyzed in the SER. For example, health and safety issues will be considered in detail in the SER prepared by NRC staff for the proposed action and will be summarized in the EIS. The draft EIS and the SER are related in that they may cover the same topics and may contain similar information, but the analysis in the draft EIS is limited to an assessment of potential environmental impacts. In contrast, the SER primarily deals with safety evaluations and procedural requirements or license conditions to ensure the health and safety of workers and the general public. The SER also covers other aspects of the proposed action such as demonstrating that the applicant will provide adequate funding for the proposed facility in compliance with NRC’s financial assurance regulations.



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# Federal Register

## NUCLEAR REGULATORY COMMISSION

### Notice of Intent To Prepare an Environmental Impact Statement for the Proposed LES Gas Centrifuge Uranium Enrichment Facility

**ACTION:** Notice of Intent (NOI).

**SUMMARY:** Louisiana Energy Services (LES) submitted a license application on December 12, 2003, that proposes the construction, operation and decommissioning of a gas centrifuge uranium enrichment facility to be located near Eunice, New Mexico. The U.S. Nuclear Regulatory Commission (NRC), in accordance with the National Environmental Policy Act (NEPA) and its regulations at 10 CFR part 51, announces its intent to prepare an Environmental Impact Statement (EIS). The EIS will examine the potential environmental impacts of the proposed LES facility.

**DATES:** The public scoping process required by NEPA begins with publication of this NOI and continues until March 18, 2004. Written comments submitted by mail should be postmarked by that date to ensure consideration. Comments mailed after that date will be considered to the extent practical.

The NRC will conduct a public scoping meeting to assist in defining the appropriate scope of the EIS, including the significant environmental issues to be addressed. The meeting date, times and location are listed below:

- *Meeting date:* March 4, 2004.

- *Meeting location:* Eunice Community Center, 1115 Avenue I, Eunice, NM.
- *Scoping meeting time:* 7 p.m. to 10 p.m.

**ADDRESSES:** Members of the public are invited and encouraged to submit comments to the Chief, Rules and Directives Branch, Mail Stop T6-D59, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Please note Docket No. 70-3103 when submitting comments. Due to the current mail situation in the Washington, DC area, commentors are encouraged to send comments electronically to [LES\\_EIS@nrc.gov](mailto:LES_EIS@nrc.gov) or by facsimile to (301) 415-5398, ATTN.: Melanie Wong.

**FOR FURTHER INFORMATION CONTACT:** For general or technical information associated with the license review of the LES application, please contact: Tim Johnson at (301) 415-7299. For general information on the NRC NEPA process, or the environmental review process related to the LES application, please contact: Melanie Wong at (301) 415-6262.

Information and documents associated with the LES project, including the LES license application (submitted on December 12, 2003), are available for public review through our electronic reading room: <http://www.nrc.gov/reading-rm/adams.html>. Documents may also be obtained from NRC's Public Document Room at U.S. Nuclear Regulatory Commission Headquarters, 11555 Rockville Pike (first floor), Rockville, Maryland.

#### SUPPLEMENTARY INFORMATION:

##### 1.0 Background

LES submitted a license application and an environmental report for a gas centrifuge uranium enrichment facility to the NRC on December 12, 2003. The NRC will evaluate the potential environmental impacts associated with LES enrichment facility in parallel with the review of the license application. This environmental evaluation will be documented in draft and final Environmental Impact Statements in accordance with NEPA and NRC's implementing regulations at 10 CFR part 51.

##### 2.0 LES Enrichment Facility

The LES facility, if licensed, would enrich uranium for use in manufacturing commercial nuclear fuel for use in power reactors. Feed material would be natural (not enriched) uranium in the form of uranium hexafluoride (UF<sub>6</sub>). LES proposes to use centrifuge technology to enrich isotope

uranium-235 in the uranium hexafluoride to up to 5 percent. The centrifuge would operate at below atmospheric pressure. The capacity of the plant would be up to 3 million separative work units (SWU) (SWU relates to a measure of the work used to enrich uranium). The enriched UF<sub>6</sub> would be transported to a fuel fabrication facility. The depleted UF<sub>6</sub> would be stored on site until it can be sold or disposed of commercially, or by the Department of Energy.

### 3.0 Alternatives To Be Evaluated

**No-Action**—The no-action alternative would be to not build the proposed LES gas centrifuge uranium enrichment facility. Under this alternative, the NRC would not approve the license application. This serves as a baseline for comparison.

**Proposed action**—The proposed action involves the construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility located near Eunice, NM. The applicant would be issued an NRC license under the provisions of 10 CFR parts 30, 40, and 70.

Other alternatives not listed here may be identified through the scoping process.

### 4.0 Environmental Impact Areas To Be Analyzed

The following areas have been tentatively identified for analysis in the EIS:

- **Land Use:** Plans, policies and controls;
- **Transportation:** Transportation modes, routes, quantities, and risk estimates;
- **Geology and Soils:** Physical geography, topography, geology and soil characteristics;
- **Water Resources:** Surface and groundwater hydrology, water use and quality, and the potential for degradation;
- **Ecology:** Wetlands, aquatic, terrestrial, economically and recreationally important species, and threatened and endangered species;
- **Air Quality:** Meteorological conditions, ambient background, pollutant sources, and the potential for degradation;
- **Noise:** Ambient, sources, and sensitive receptors;
- **Historical and Cultural Resources:** Historical, archaeological, and traditional cultural resources
- **Visual and Scenic Resources:** Landscape characteristics, manmade features and viewshed;
- **Socioeconomics:** Demography, economic base, labor pool, housing,

transportation, utilities, public services/facilities, education, recreation, and cultural resources;

- **Environmental Justice:** Potential disproportionately high and adverse impacts to minority and low-income populations;

- **Public and Occupational Health:** Potential public and occupational consequences from construction, routine operation, transportation, and credible accident scenarios (including natural events);

- **Waste Management:** Types of wastes expected to be generated, handled, and stored; and

- **Cumulative Effects:** Impacts from past, present and reasonably foreseeable actions at, and near the site(s).

This list is not intended to be all inclusive, nor is it a predetermination of potential environmental impacts. The list is presented to facilitate comments on the scope of the EIS. Additions to, or deletions from this list may occur as a result of the public scoping process.

### 5.0 Scoping Meeting

One purpose of this NOI is to encourage public involvement in the EIS process, and to solicit public comments on the proposed scope and content of the EIS. The NRC will hold a public scoping meeting in Eunice, New Mexico, to solicit both oral and written comments from interested parties.

Scoping is an early and open process designed to determine the range of actions, alternatives, and potential impacts to be considered in the EIS, and to identify the significant issues related to the proposed action. It is intended to solicit input from the public and other agencies so that the analysis can be more clearly focused on issues of genuine concern. The principal goals of the scoping process are to:

- Ensure that concerns are identified early and are properly studied;
- Identify alternatives that will be examined;
- Identify significant issues that need to be analyzed;
- Eliminate unimportant issues; and
- Identify public concerns.

The scoping meeting will begin with NRC staff providing a description of the NRC's role and mission. A brief overview of the licensing process will be followed by a brief description of the environmental review process. The bulk of the meeting will be allotted for attendees to make oral comments.

### 6.0 Scoping Comments

Written comments should be mailed to the address listed above in the ADDRESSES section.

The NRC staff will make the scoping summaries and project-related materials available for public review through our electronic reading room: <http://www.nrc.gov/reading-rm/adams.html>. The scoping meeting summaries and project-related materials will also be available on the NRC's LES Web page: <http://www.nrc.gov/materials/fuel-cycle-fac/lesfacility.html> (case sensitive).

### 7.0 The NEPA Process

The EIS for the LES facility will be prepared according to the National Environmental Policy Act of 1969 and the NRC's NEPA Regulations at 10 CFR part 51.

After the scoping process is complete, the NRC and its contractor will prepare a draft EIS. A 45-day comment period on the draft EIS is planned, and public meetings to receive comments will be held approximately three weeks after distribution of the draft EIS. Availability of the draft EIS, the dates of the public comment period, and information about the public meetings will be announced in the **Federal Register**, on NRC's LES Web page, and in the *local news media* when the draft EIS is distributed. The final EIS will incorporate public comments received on the draft EIS.

Signed in Rockville, MD this 16th day of January, 2004.

For The Nuclear Regulatory Commission,  
Lawrence E. Kokajko,  
Chief, Environmental and Performance  
Assessment Branch, Division of Waste  
Management, Office of Nuclear Material  
Safety and Safeguards.

[FR Doc. E4-179 Filed 2-3-04; 8:45 am]

BILLING CODE 7590-01-P

**APPENDIX B**  
**CONSULTATION LETTERS**

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**B.1**    *Endangered Species Act Consultation Letters*

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GOVERNOR  
Bill Richardson



STATE OF NEW MEXICO  
DEPARTMENT OF GAME & FISH

One Wildlife Way  
PO Box 25112  
Santa Fe, NM 87504

STATE GAME COMMISSION  
Guy Riordan, Chairman  
Albuquerque, NM

Alfredo Montoya, Vice-Chairman  
Alcalde, NM

David Henderson  
Santa Fe, NM

Jennifer Atchley Montoya  
Las Cruces, NM

Peter Pinc  
Zia Pueblo, NM

Dr. Tom Arvas  
Albuquerque, NM

Leo Sims  
Hobbs, NM

DIRECTOR AND SECRETARY  
TO THE COMMISSION  
Bruce C. Thompson

Visit our website at [www.wildlife.state.nm.us](http://www.wildlife.state.nm.us)  
For basic information or to order free publications: 1-800-862-9310.

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February 23, 2004

Chief, Rules and Directives Branch  
Mail Stop T6-D59  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Re: Docket No. 70-3103  
NMGF Project No. 9200

Dear Nuclear Regulatory Commission:

The New Mexico Department of Game and Fish (Department) has received the Notice of Intent to prepare an Environmental Impact Statement (EIS) for the proposed Louisiana Energy Services (LES) gas centrifuge uranium enrichment facility, known as the National Enrichment Facility (NEF). We have reviewed the Environmental Report (ER) submitted by LES with their license application, as it pertains to wildlife resources, and offer our comments below. We also enclose for your information a copy of our September 30, 2003, scoping letter to LES contractor Framatome ANP.

The Department is concerned about the adequacy of the assessment in the ER of potential impacts to the NM State Threatened sand dune lizard (*Sclerophorus arenicolus*). Section 3.5.3 states that although "(t)he NEF site contains areas of sand dunes", "(a) survey of the NEF site did not identify any sand dune lizard habitats". Section 3.5.5 characterizes the site vegetation as dense shrubs, mostly shinnery oak (*Quercus havardi*), yet Section 3.5.6 concludes the habitat is unsuitable due to "low frequency of shinnery oak dunes and large blowouts". Section 3.5.8 asserts that "the site does contain sand dune - oak shinnery communities, that could be potential sand dune lizard habitat". Finally Section 4.5.7 refers to the site having "the potential to provide habitat for the sand dune lizard" but "various factors make it unsuitable". This accumulation of seemingly contradictory statements leaves it unclear whether there is in fact suitable habitat for the species or not.

The ER also refers to a survey for sand dune lizards that took place in October 2003 and did not find any. No information is given as to the participants or methods of the survey. If there is in fact suitable habitat, the Department requests information as to the qualifications of the individual(s) conducting the survey. Sand dune lizards are extremely difficult to identify and there are only a very few people qualified to conduct a presence/absence survey. October is rather late in the year for a survey; the lizards are likely to be dormant at that time.



The Department is likewise concerned about the adequacy of assessment in the ER of potential impacts on the lesser prairie chicken (*Tympanuchus pallidicinctus*), a federal Species of Concern. The document identifies the site as suitable habitat, states that the nearest known lek (breeding area) is 4 miles distant, and refers to a survey conducted in September 2003, that did not find any lesser prairie chickens. According to our prairie chicken biologist, the area around the project has not been adequately surveyed for lek sites. Surveys should be conducted in the spring (typically early to mid April, before sunrise). Lesser prairie chickens will use an area within two miles of the lek for nesting and rearing. Birds have been reported from the Eunice area. Since there is a large acreage of contiguous habitat, and a lek within four miles, it is reasonable to assume these birds may be impacted by the development.

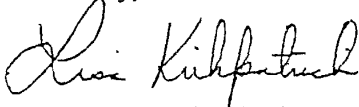
The National Environmental Policy Act (NEPA) analysis should include assessment of cumulative regional impacts on both of these sensitive species. Other impacts include grazing and oil and gas development.

Although not directly a wildlife habitat issue, the Department would like to express our concern regarding the lack of a final disposal alternative for the depleted uranium tails. The ER presents several plausible options, however each of them faces significant problems and would require many years of feasibility analysis and development. The safeguards and procedures for short- to medium-term storage of the materials seem adequate to prevent health or environmental hazards, however the lack of a viable solution for disposal may lead to environmental exposure of radioactive materials in the long term.

LES proposes a number of favorable mitigations, including the use of native plant species for revegetation, downshielding site illumination to reduce impact on bird behavior, various habitat improvements and following the Department's recommendations regarding pipeline trenching and exclusion of migratory birds from the evaporative ponds. These mitigations should be incorporated into the license approval, if granted. The Department remains available for further consultation on development of possible mitigations.

Thank you for the opportunity to participate in the preparation of NEPA analysis and documentation for this project. If you have any questions, please contact Rachel Jankowitz at 505-476-8159 or [rjankowitz@state.nm.us](mailto:rjankowitz@state.nm.us).

Sincerely,



Lisa Kirkpatrick, Chief  
Conservation Services Division

LK/rjj

cc: Joy Nicholopoulos, Ecological Services Field Supervisor, USFWS  
Roy Hayes, SE Area Operations Chief, NMGF  
Alexa Sandoval, SE Area Habitat Specialist, NMGF  
Rachel Jankowitz, Habitat Specialist, NMGF



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

March 2, 2004

Ms. Joy Nicholopoulos  
U.S. Fish and Wildlife Service  
New Mexico Field Office  
2105 Osuna Road NE  
Albuquerque, NM 87113-1001

SUBJECT: REQUEST FOR INFORMATION REGARDING ENDANGERED SPECIES AND  
CRITICAL HABITATS FOR LOUISIANA ENERGY SERVICES PROPOSED GAS  
CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA COUNTY, NM

Dear Ms. Nicholopoulos:

Louisiana Energy Services (LES) has submitted a license application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission a proposed gas centrifuge uranium enrichment facility. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) for the proposed facility to be located near Eunice, New Mexico, in Lea County. The proposed facility, as well as all associated construction, operation, and decommissioning activities and impacts, will be within the 220-ha (543 acre) LES National Enrichment Facility (NEF) site.

We are requesting a list of threatened or endangered species or critical habitats within the action area. The action area is defined as the NEF site which is located in Section 32 of Township 21 South, Range 38 East (New Mexico Meridian). The approximate center is at Latitude 32 degrees, 26 minutes, 1.74 seconds North and Longitude 103 degrees, 4 minutes, 43.47 seconds West. The action area is approximately 5 miles East of Eunice, New Mexico and is bordered on the South by New Mexico Highway 234.

After assessing the information provided by you, the NRC will determine what additional actions are necessary to comply with Section 7 of the Endangered Species Act. If you have any questions or comments, or need any additional information, please contact Matthew Blevins of my staff at 301-415-7684.

Sincerely,

A handwritten signature in cursive script, appearing to read "L. Kokajko".

Lawrence E. Kokajko, Chief  
Environmental and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
New Mexico Ecological Services Field Office  
2105 Osuna NE  
Albuquerque, New Mexico 87113  
Phone: (505) 346-2525 Fax: (505) 346-2542

March 26, 2004

Cons. # 2-22-04-I-349

Lawrence E. Kokajko, Chief  
Environmental and Performance Assessment Branch  
Division of Waste Management  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Dear Mr. Kokajko:

Thank you for your March 2, 2004, letter requesting information on threatened or endangered species or important wildlife habitats that could be affected by a proposed project to construct, operate, and decommission a gas centrifuge uranium enrichment facility near Eunice, Lea County, New Mexico. The proposed facility and construction would disturb 543 acres of land located within the Louisiana Energy Services National Enrichment Facility site.

We have enclosed a current list of federally endangered, threatened, proposed, and candidate species, and species of concern that may be found in Lea County, New Mexico.<sup>1</sup> Under the Endangered Species Act, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects.

Candidates and species of concern have no legal protection under the Act and are included in this document for planning purposes only. We monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

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<sup>1</sup> Additional information about these species is available on the Internet at <http://nmrareplants.unm.edu>, <http://nrmnhp.unm.edu/bisonm/bisonquery.php>, and <http://ifw2es.fws.gov/endangeredspecies>.

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands. These habitats should be conserved through avoidance, or mitigated to ensure no net loss of wetlands function and value.

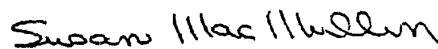
The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service (Service). To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

The primary concern of the Service is the protection of the Nation's fish and wildlife resources including threatened and endangered species, migratory birds, and their habitats. Under its responsibilities in the Migratory Bird Treaty Act, the Service would be concerned if an open, hazardous waste impoundment attracted migratory birds or other wildlife to their detriment. During flight, migratory birds (as well as bats) would not necessarily distinguish between an impoundment and a natural waterbody and could be attracted to drink, rest, and perhaps feed on the insects that are invariably associated with impounded wastewater. The facility lighting could attract them as well. Therefore, the Service supports that any open hazardous waste lagoon, pond, or container be constructed with appropriate exclusion technology (*e.g.*, netting, fences, enclosed tanks, *etc.*) to prevent migratory bird access, and that any exclusion technologies are regularly maintained. To minimize the likelihood of adverse impacts to nesting migratory birds during facility construction, we recommend that construction activities occur outside the general migratory bird-nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. In future correspondence regarding this project, please refer to consultation # 2-22-04-I-349. If you have any questions about the information in this letter, please contact Dennis Coleman at the letterhead address or at (505) 346-2525, ext. 4716.

Sincerely,



Susan MacMullin  
Field Supervisor

Lawrence E. Kokajko, Chief

3

Enclosure

cc: (w/o enc)

Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico

Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry  
Division, Santa Fe, New Mexico

FEDERAL ENDANGERED, THREATENED,  
PROPOSED, AND CANDIDATE SPECIES  
AND SPECIES OF CONCERN IN NEW MEXICO  
Consultation Number 2-22-04-I-349  
March 25, 2004

Lea County

ENDANGERED

- Black-footed ferret (*Mustela nigripes*)\*\*
- Northern aplomado falcon (*Falco femoralis septentrionalis*)

THREATENED

- Bald eagle (*Haliaeetus leucocephalus*)

CANDIDATE

- Black-tailed prairie dog (*Cynomys ludovicianus*)
- Lesser prairie chicken (*Tympanuchus pallidicinctus*)
- Sand dune lizard (*Sceloporus arenicolus*)

SPECIES OF CONCERN

- Swift fox (*Vulpes velox*)
- American peregrine falcon (*Falco peregrinus anatum*)
- Arctic peregrine falcon (*Falco peregrinus tundrius*)
- Baird's sparrow (*Ammodramus bairdii*)
- Bell's vireo (*Vireo bellii*)
- Western burrowing owl (*Athene cunicularia hypugea*)
- Yellow-billed cuckoo (*Coccyzus americanus*)

## Index

- Endangered = Any species which is in danger of extinction throughout all or a significant portion of its range.
- Threatened = Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- Candidate = Candidate Species (taxa for which the Service has sufficient information to propose that they be added to list of endangered and threatened species, but the listing action has been precluded by other higher priority listing activities).
- Proposed = Any species of fish, wildlife or plant that is proposed in the Federal Register to be listed under section 4 of the Act.
- Species of Concern = Taxa for which further biological research and field study are needed to resolve their conservation status OR are considered sensitive, rare, or declining on lists maintained by Natural Heritage Programs, State wildlife agencies, other Federal agencies, or professional/academic scientific societies. Species of Concern are included for planning purposes only.
- \*\* = Survey should be conducted if project involves impacts to prairie dog towns or complexes of 200-acres or more for the Gunnison's prairie dog (*Cynomys gunnisoni*) and/or 80-acres or more for any subspecies of Black-tailed prairie dog (*Cynomys ludovicianus*). A complex consists of two or more neighboring prairie dog towns within 4.3 miles (7 kilometers) of each other.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

August 9, 2004

Ms. Joy Nicholopoulos  
U.S. Fish and Wildlife Service  
New Mexico Field Office  
2105 Osuna Road NE  
Albuquerque, NM 87113-1001

SUBJECT: REQUEST FOR CONCURRENCE ON THE DETERMINATION OF EFFECT ON  
FEDERALLY LISTED SPECIES AND THEIR CRITICAL HABITATS FOR THE  
PROPOSED NATIONAL ENRICHMENT FACILITY

Dear Ms. Nicholopoulos:

By letter dated March 2, 2004, the U.S. Nuclear Regulatory Commission (NRC) informed you of the preparation of an Environmental Impact Statement (EIS) on Louisiana Energy Services's (LES) proposal to construct, operate and decommission a gas centrifuge uranium enrichment facility to be located in Lea County, New Mexico. This letter described the action area and requested a list of threatened or endangered species or critical habitats within the action area. By letter dated March 26, 2004, you provided a current list of threatened, endangered, proposed, and candidates species, and species of concern that may be found in Lea County, New Mexico (Cons. #: 2-22-04-I-349).

After a review of the potential impacts of the proposed action, the NRC staff has determined that the proposed action would not affect any listed species or critical habitat. The supporting basis for this conclusion is included in the enclosed draft EIS.

In the March 26, 2004 letter, you also included candidates and species of concern for planning purposes only and recommended that candidates and species of concern be included in the surveys. The enclosed draft EIS evaluates the impact of the proposed action on these species. The NRC staff has concluded that the effects on candidates and species of concern would be small.



J. Nicholopoulos

-2-

We request your concurrence with the NRC staff's determination of "no effect" to any listed species or their critical habitat. If you have any questions or comments, please contact Anna Bradford, Project Manager for the environmental review of the proposed project, at (301) 415-5228. Thank you for your assistance.

Sincerely,



Scott C. Flanders  
Deputy Director for the Environmental and  
Performance Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: Draft EIS

Docket No.: 70-3013

cc: Service List

## **B.2 Section 106 Consultation Letters**

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UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 17, 2004

Ms. Jan Biella  
Deputy SHPO  
Historic Preservation Division  
Office of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87503

**SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT  
SECTION 106 PROCESS FOR LOUISIANA ENERGY SERVICES  
PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY**

Dear Ms. Biella:

Louisiana Energy Services (LES) has submitted a license application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission a proposed gas centrifuge uranium enrichment facility. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) for the proposed facility to be located near Eunice, New Mexico, in Lea County. The proposed facility will use gas centrifuge technology to enrich the isotope Uranium-235 in uranium hexafluoride (UF<sub>6</sub>), up to 5 percent (assay level for practical use in nuclear reactors). This proposed facility, as well as all associated construction, operation, and decommissioning activities and impacts, will be within the 220-ha (543 acre) LES National Enrichment Facility (NEF) site. The forthcoming EIS will document the impacts associated with the construction, operation, and decommissioning of the facility.

In September 2003, LES performed a survey of the proposed NEF site. Seven prehistoric archeological sites were identified, with three of the sites found in the area of potential effects (APE) and one of these sites is potentially eligible for listing on the National Register of Historical Places. The APE is considered the NEF site area, including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. LES has indicated that the one site potentially eligible may be affected by an access road. LES has indicated that it intends to submit the complete Cultural Resources Survey Report of all survey findings. The NRC, in consultation with your office and any identified consulting parties, will provide a determination of eligibility after the Cultural Resources Report is received.

As part of the NRC licensing process, LES submitted an Environmental Report (ER) in support of the proposed NEF. In the ER, LES indicated it had contacted six Indian tribes at your request. As required by 36 CFR 800.4(a), the NRC is requesting the views of the State Historical Preservation Officer on further actions to identify historic properties that may be affected by the NRC's undertaking. As part of the EIS preparation the NRC will be hosting a public scoping meeting Thursday, March 4, 2004, at the Eunice Community Center, 1115 Avenue I, in Eunice, New Mexico from 7:00 p.m. until 10:00 p.m. The meeting will include NRC staff presentations on the safety and environmental review process, after which members of the public will be given the opportunity to present their comments on what environmental issues NRC should consider during its environmental review.

J. Biella

2

This scoping information, along with the forthcoming LES Cultural Resource Report, and any information you provide, will be used to document affects in accordance with 36 CFR Part 800.4 and 800.5. Additionally, we intend to use the EIS process for Section 106 purposes as described in 36 CFR Part 800.8.

We have attached additional background information relating to cultural resources as it appears in the LES ER. If you have any questions or comments, or need any additional information, please contact Matthew Blevins of my staff at 301-415-7684.

Sincerely,

*/RA/*

Lawrence E. Kokajko, Chief  
Environmental and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Enclosure: Cultural Resources Information for LES National Enrichment Facility,  
Environmental Report, December 12, 2003

Service List



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

February 17, 2004

Arturo Sinclair, Governor  
Ysleta del Sur Pueblo  
P.O. Box 17579 - Ysleta Station  
El Paso, TX 79917

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT  
SECTION 106 CONSULTATION FOR LOUISIANA ENERGY SERVICES  
PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA  
COUNTY, NEW MEXICO

Dear Governor Sinclair:

The U.S. Nuclear Regulatory Commission (NRC) has recently received an application from Louisiana Energy Services (LES) to construct, operate, and decommission the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility. The proposed NEF would be located near Eunice, New Mexico, in Lea County and would be within a 543 acre parcel of land that LES is in the process of acquiring from the State of New Mexico. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) which will document the impacts associated with the NEF.

In September 2003, LES performed a survey of the proposed NEF site. Seven prehistoric archeological sites were identified with several of these sites occurring in the area of potential effects (APE). One site that may be affected is potentially eligible for listing on the National Register of Historical Places. The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. LES has indicated that it intends to submit the complete Cultural Resources Survey Report of all survey findings.

The NRC staff is soliciting information from potential consulting parties as the NRC begins its Section 106 consultation with the New Mexico State Historical Preservation Office. As the NRC staff intends to use the EIS process for Section 106 purposes, we would also like to invite you to attend a public meeting that we will be hosting on Thursday, March 4, 2004, at the Eunice Community Center, 1115 Avenue I, in Eunice, New Mexico, from 7:00 p.m. until 10:00 p.m. The purpose of this meeting is to solicit comments from members of the public on the scope of the EIS review.

Governor Sinclair

2

If you are unable to attend this meeting, we would still like to hear from you. You are invited to contact Matthew Blevins of my staff at (301) 415-7684 so we may hear your comments or concerns.

Sincerely,



Lawrence E. Kokajko, Chief  
Environmental and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Attachment: Cultural Resources Information for LES National Enrichment Facility,  
Environmental Report, December 12, 2003

cc: Ms. Jan Biella  
Deputy SHPO  
Historic Preservation Division  
Office of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87503

Identical Letter sent to:

Alonso Chalepah, Chairman  
Apache Tribe of Oklahoma  
PO Box 1220  
Anadarko, OK 73005

Jimmy Arterberry, Director of Environment  
Comanche of Oklahoma  
PO Box 908  
Lawton, OK 73502

Clifford A. McKenzie, Chairman  
Kiowa Tribe of Oklahoma  
PO Box 369  
Carnegie, OK 73015

Ms. Holly B. E. Houghten  
Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, New Mexico 88340



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

February 17, 2004

Ms. Holly B. E. Houghten  
Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, New Mexico 88340

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT  
SECTION 106 CONSULTATION FOR LOUISIANA ENERGY SERVICES  
PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA  
COUNTY, NEW MEXICO

Dear Ms. Houghten:

The U.S. Nuclear Regulatory Commission (NRC) has recently received an application from Louisiana Energy Services (LES) to construct, operate, and decommission the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility. The proposed NEF would be located near Eunice, New Mexico, in Lea County and would be within a 543 acre parcel of land that LES is in the process of acquiring from the State of New Mexico. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) which will *document the impacts associated with the NEF*.

In September 2003, LES performed a survey of the proposed NEF site. Seven prehistoric archeological sites were identified with several of these sites occurring in the area of potential effects (APE). One site that may be affected is potentially eligible for listing on the National Register of Historical Places. The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. LES has indicated that it intends to submit the complete Cultural Resources Survey Report of all survey findings.

The NRC staff is soliciting information from potential consulting parties as the NRC begins its Section 106 consultation with the *New Mexico State Historical Preservation Office*. As the NRC staff intends to use the EIS process for Section 106 purposes, we would also like to invite you to attend a public meeting that we will be hosting on Thursday, March 4, 2004, at the Eunice Community Center, 1115 Avenue I, in Eunice, New Mexico, from 7:00 p.m. until 10:00 p.m. The purpose of this meeting is to solicit comments from members of the public on the scope of the EIS review.



Ms. H. Houghten

2

If you are unable to attend this meeting, we would still like to hear from you. You are invited to contact Matthew Blevins of my staff at (301) 415-7684 so we may hear your comments or concerns.

Sincerely,



Lawrence E. Kokajko, Chief  
Environmental and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Attachment: Cultural Resources Information for LES National Enrichment Facility,  
Environmental Report, December 12, 2003

cc: Ms. Jan Biella  
Deputy SHPO  
Historic Preservation Division  
Office of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87503

Identical Letter sent to:

Alonso Chalepah, Chairman  
Apache Tribe of Oklahoma  
PO Box 1220  
Anadarko, OK 73005

Jimmy Arterberry, Director of Environment  
Comanche of Oklahoma  
PO Box 908  
Lawton, OK 73502

Clifford A. McKenzie, Chairman  
Kiowa Tribe of Oklahoma  
PO Box 369  
Carnegie, OK 73015

Arturo Sinclair, Governor  
Ysleta del Sur Pueblo  
P.O. Box 17579 - Ysleta Station  
El Paso, TX 79917



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

February 17, 2004

Clifford A. McKenzie, Chairman  
Kiowa Tribe of Oklahoma  
PO Box 369  
Carnegie, OK 73015

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT  
SECTION 106 CONSULTATION FOR LOUISIANA ENERGY SERVICES  
PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA  
COUNTY, NEW MEXICO

Dear Chairman McKenzie:

The U.S. Nuclear Regulatory Commission (NRC) has recently received an application from Louisiana Energy Services (LES) to construct, operate, and decommission the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility. The proposed NEF would be located near Eunice, New Mexico, in Lea County and would be within a 543 acre parcel of land that LES is in the process of acquiring from the State of New Mexico. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) which will document the impacts associated with the NEF.

In September 2003, LES performed a survey of the proposed NEF site. Seven prehistoric archeological sites were identified with several of these sites occurring in the area of potential effects (APE). One site that may be affected is potentially eligible for listing on the National Register of Historical Places. The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. LES has indicated that it intends to submit the complete Cultural Resources Survey Report of all survey findings.

The NRC staff is soliciting information from potential consulting parties as the NRC begins its Section 106 consultation with the New Mexico State Historical Preservation Office. As the NRC staff intends to use the EIS process for Section 106 purposes, we would also like to invite you to attend a public meeting that we will be hosting on Thursday, March 4, 2004, at the Eunice Community Center, 1115 Avenue I, in Eunice, New Mexico, from 7:00 p.m. until 10:00 p.m. The purpose of this meeting is to solicit comments from members of the public on the scope of the EIS review.

Chairman McKenzie

2

If you are unable to attend this meeting, we would still like to hear from you. You are invited to contact Matthew Blevins of my staff at (301) 415-7684 so we may hear your comments or concerns.

Sincerely,



Lawrence E. Kokajko, Chief  
Environmental and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Attachment: Cultural Resources Information for LES National Enrichment Facility,  
Environmental Report, December 12, 2003

cc: Ms. Jan Biella  
Deputy SHPO  
Historic Preservation Division  
Office of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87503

Identical Letter sent to:

Alonso Chalepah, Chairman  
Apache Tribe of Oklahoma  
PO Box 1220  
Anadarko, OK 73005

Jimmy Arterberry, Director of Environment  
Comanche of Oklahoma  
PO Box 908  
Lawton, OK 73502

Ms. Holly B. E. Houghten  
Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, New Mexico 88340

Arturo Sinclair, Governor  
Ysleta del Sur Pueblo  
P.O. Box 17579 - Ysleta Station  
El Paso, TX 79917



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

February 17, 2004

Jimmy Arterberry, Director of Environment  
Comanche of Oklahoma  
PO Box 908  
Lawton, OK 73502

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT  
SECTION 106 CONSULTATION FOR LOUISIANA ENERGY SERVICES  
PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA  
COUNTY, NEW MEXICO

Dear Mr. Arterberry:

The U.S. Nuclear Regulatory Commission (NRC) has recently received an application from Louisiana Energy Services (LES) to construct, operate, and decommission the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility. The proposed NEF would be located near Eunice, New Mexico, in Lea County and would be within a 543 acre parcel of land that LES is in the process of acquiring from the State of New Mexico. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) which will document the impacts associated with the NEF.

In September 2003, LES performed a survey of the proposed NEF site. Seven prehistoric archeological sites were identified with several of these sites occurring in the area of potential effects (APE). One site that may be affected is potentially eligible for listing on the National Register of Historical Places. The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. LES has indicated that it intends to submit the complete Cultural Resources Survey Report of all survey findings.

The NRC staff is soliciting information from potential consulting parties as the NRC begins its Section 106 consultation with the New Mexico State Historical Preservation Office. As the NRC staff intends to use the EIS process for Section 106 purposes, we would also like to invite you to attend a public meeting that we will be hosting on Thursday, March 4, 2004, at the Eunice Community Center, 1115 Avenue I, in Eunice, New Mexico, from 7:00 p.m. until 10:00 p.m. The purpose of this meeting is to solicit comments from members of the public on the scope of the EIS review.

J. Arterberry

2

If you are unable to attend this meeting, we would still like to hear from you. You are invited to contact Matthew Blevins of my staff at (301) 415-7684 so we may hear your comments or concerns.

Sincerely,



Lawrence E. Kokajko, Chief  
Environmental and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Attachment: Cultural Resources Information for LES National Enrichment Facility,  
Environmental Report, December 12, 2003

cc: Ms. Jan Biella  
Deputy SHPO  
Historic Preservation Division  
Office of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87503

Identical Letter sent to:

Alonso Chalepah, Chairman  
Apache Tribe of Oklahoma  
PO Box 1220  
Anadarko, OK 73005

Clifford A. McKenzie, Chairman  
Kiowa Tribe of Oklahoma  
PO Box 369  
Carnegie, OK 73015

Ms. Holly B. E. Houghten  
Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, New Mexico 88340

Arturo Sinclair, Governor  
Ysleta del Sur Pueblo  
P.O. Box 17579 - Ysleta Station  
El Paso, TX 79917



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

February 17, 2004

Aionso Chalepah, Chairman  
Apache Tribe of Oklahoma  
PO Box 1220  
Anadarko, OK 73005

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT  
SECTION 106 CONSULTATION FOR LOUISIANA ENERGY SERVICES  
PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA  
COUNTY, NEW MEXICO

Dear Chairman Chalepah:

The U.S. Nuclear Regulatory Commission (NRC) has recently received an application from Louisiana Energy Services (LES) to construct, operate, and decommission the National Enrichment Facility (NEF); a gas centrifuge uranium enrichment facility. The proposed NEF would be located near Eunice, New Mexico, in Lea County and would be within a 543 acre parcel of land that LES is in the process of acquiring from the State of New Mexico. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) which will document the impacts associated with the NEF.

In September 2003, LES performed a survey of the proposed NEF site. Seven prehistoric archeological sites were identified with several of these sites occurring in the area of potential effects (APE). One site that may be affected is potentially eligible for listing on the National Register of Historical Places. The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. LES has indicated that it intends to submit the complete Cultural Resources Survey Report of all survey findings.

The NRC staff is soliciting information from potential consulting parties as the NRC begins its Section 106 consultation with the New Mexico State Historical Preservation Office. As the NRC staff intends to use the EIS process for Section 106 purposes, we would also like to invite you to attend a public meeting that we will be hosting on Thursday, March 4, 2004, at the Eunice Community Center, 1115 Avenue I, in Eunice, New Mexico, from 7:00 p.m. until 10:00 p.m. The purpose of this meeting is to solicit comments from members of the public on the scope of the EIS review.

Chairman Chalepah

2

If you are unable to attend this meeting, we would still like to hear from you. You are invited to contact Matthew Blevins of my staff at (301) 415-7684 so we may hear your comments or concerns.

Sincerely,



Lawrence E. Kokajko, Chief  
Environmental and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Attachment: Cultural Resources Information for LES National Enrichment Facility,  
Environmental Report, December 12, 2003

cc: Ms. Jan Biella  
Deputy SHPO  
Historic Preservation Division  
Office of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87503

Identical Letter sent to:

Jimmy Arterberry, Director of Environment  
Comanche of Oklahoma  
PO Box 908  
Lawton, OK 73502

Clifford A. McKenzie, Chairman  
Kiowa Tribe of Oklahoma  
PO Box 369  
Carnegie, OK 73015

Ms. Holly B. E. Houghten  
Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, New Mexico 88340

Arturo Sinclair, Governor  
Ysleta del Sur Pueblo  
P.O. Box 17579 - Ysleta Station  
El Paso, TX 79917



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 18, 2004

Mr. Lewis Robertson  
Lea County Archaeological Society  
1980 NE 1001  
Andrews, TX 79714-9154

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT  
SECTION 106 CONSULTATION FOR LOUISIANA ENERGY SERVICES  
PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA  
COUNTY, NEW MEXICO

Dear Mr. Robertson:

The U.S. Nuclear Regulatory Commission (NRC) has recently received an application from Louisiana Energy Services (LES) to construct, operate, and decommission the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility. The proposed NEF would be located near Eunice, New Mexico, in Lea County and would be within a 543 acre parcel of land that LES is in the process of acquiring from the State of New Mexico. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) which will document the impacts associated with the NEF. We would like your assistance in our review of the cultural resources impacts.

In September 2003, LES performed a survey of the proposed NEF site. Seven prehistoric archeological sites were identified with several of these sites occurring in the area of potential effects (APE). One site that may be affected is potentially eligible for listing on the National Register of Historical Places. The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. Attached is information LES provided in its Environmental Report relative to cultural resources. We are currently reviewing this information. LES has indicated that it intends to submit the complete Cultural Resources Survey Report of all survey findings.



L. Robertson

-2-

The NRC staff is soliciting information from a number of stakeholders as the NRC begins its Section 106 consultation with the New Mexico State Historical Preservation Office, as required by the National Historic Preservation Act. We request that you provide any information that you may have relative to this proposed action or the Section 106 consultation. Please contact Matthew Blevins of my staff at (301) 415-7684 if you have any questions.

Sincerely,



Lawrence E. Kokajko, Chief  
Environmental and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Attachment: Cultural Resources Information for LES National Enrichment Facility,  
Environmental Report, December 12, 2003 (ML040500429)

cc: Ms. Jan Biella (without Enclosure)  
Deputy SHPO  
Historic Preservation Division  
Office of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87503

Service List (without Enclosure)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

March 29, 2004

Ms. Jan Biella  
Deputy SHPO  
Historic Preservation Division  
Office of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87503

SUBJECT: CULTURAL RESOURCE INVENTORY FOR LOUISIANA ENERGY SERVICES  
PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN  
LEA COUNTY, NEW MEXICO

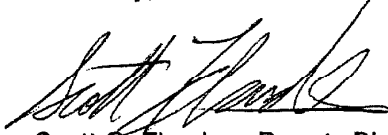
Dear Ms. Biella:

As discussed in our February 17, 2004, letter, Louisiana Energy Services has submitted a license application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission a proposed gas centrifuge uranium enrichment facility at a site in Lea County, New Mexico. The NRC staff is in the initial stages of developing an Environmental Impact Statement for the proposed facility and is in the early stages of soliciting information from potential consulting parties.

Enclosed for your review is a cultural resource survey performed in September 2003 for the proposed site. Seven prehistoric archeological sites were identified, with four of the sites potentially eligible for listing on the National Register of Historical Places. One of these potentially eligible sites is considered within the area of potential effects (APE). The APE is considered the National Enrichment Facility site area, including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. The NRC staff, in consultation with your office and any identified consulting parties, will provide a determination of eligibility after the Cultural Resources Report is reviewed.

If you have any questions or comments, or need any additional information, please contact Matthew Blevins of my staff at 301-415-7684.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: Cultural Resources Inventory for the National Enrichment Facility

Docket No.: 70-3103

cc: Alonso Chalepah, Chairman (w/o enclosure)  
Clifford McKenzie, Chairman (w/o enclosure)  
Arturo Sinclair, Governor (w/o enclosure)  
Jimmy Arterberry, Director of Environment (w/o enclosure)  
Holly B. E. Houghten, Tribal Historic Preservation Officer (w/o enclosure)  
Service List w/o enclosure (w/o enclosure)



STATE OF NEW MEXICO  
DEPARTMENT OF CULTURAL AFFAIRS  
HISTORIC PRESERVATION DIVISION

228 EAST PALACE AVENUE  
SANTA FE, NEW MEXICO 87501  
(505) 827-6320

BILL RICHARDSON  
Governor

April 26, 2004

Matthew Blevins  
Project Manager  
Environmental and Low-Level Waste Section  
U.S. Nuclear Regulatory Commission  
Mail Stop T7J8  
Washington D.C. 20555

Re: National Enrichment Facility Near Eunice, Lea County, New Mexico

Dear Mr. Blevins:

I am writing to follow-up the meeting held between our office, you, Melanie Wong and Paul Nickens, and David Eck from the NM State Land Office in Albuquerque on April 7, 2004. At our meeting we discussed the process for consultation under Section 106 of the National Historic Preservation Act and the archaeological survey report submitted by WCRM for archaeological survey of the National Enrichment Facility near Eunice, New Mexico.

WCRM discovered and recorded seven prehistoric archaeological sites within the project area and recommended that four of the sites (LA 140704, LA 140705, LA 140706, and LA 140707) are eligible for listing to the National Register of Historic Places. WCRM recommended that three sites (LA 140701, LA 140702, and LA 140703) are not eligible for listing to the Register. We do not concur with these recommendations of eligibility. In our opinion, all seven sites are similar site types and may contain buried cultural resources; therefore, archaeological sites LA 140701, LA 140702, and LA 140703 are of undetermined eligibility to be listed to the Register.

It appears from the site location map (Figure 4) of the survey report that three of the archeological sites (LA 140702, LA 140701, and LA 140705) are within the proposed construction footprint for the enrichment facility. Since these sites will be impacted by construction we have determined that the National Enrichment Facility will have an adverse effect on cultural resources.

In order to resolve adverse effects to cultural resources we suggest that our office and the NRC enter into a Memorandum of Agreement (MOA) that outlines agreed-upon measures that NRC will take to mitigate the adverse effects. An example of an MOA is enclosed for your reference.

NRC will need to notify the Advisory Council on Historic Preservation (ACHP) that there will be adverse effects to cultural resources and invite them to be a signatory to the MOA. The ACHP may decline to participate. The NRC must also re-contact Native American tribes, forward copies of the archaeological survey report for their review, and ask if they wish to be concurring parties to the MOA.

It is our understanding that the current land status is the NM State Land Office and that they have entered into a long-term lease agreement with Louisiana Energy Services for the project area, but that the land may be traded after the license from NRC is obtained. This trade will need to be discussed in the MOA and the Commissioner of Public Lands will also be a signatory to the MOA. An exchange from state land to private is considered an adverse effect, thus all seven sites, not just the three within the project area will have to be considered for mitigation.

As we discussed during our meeting, there are several options for mitigating the adverse effects to the archaeological sites. One option is to treat all seven sites as eligible for listing to the Register and considering them as a population of sites. A data recovery plan will be designed to treat all seven sites as a population, meaning that each site will not need full data recovery. This alternative may be the least costly since it eliminates the need for testing to determine eligibility.

A second option would be for Louisiana Energy Services to avoid and protect the sites outside of the project (LA 140703, LA 140704, LA 140706, and LA 140707) by nominating them for listing to the State Register of Cultural Properties. Enclosed are copies of the New Mexico Cultural Properties Act and Cultural Properties Protection Act. In these statutes you will find information concerning the responsibilities of state agencies (in this case the State Land Office) and the State Register of Cultural Properties.

Sincerely,



Michelle M. Ensey  
Staff Archaeologist

Log: 70747

Enc. Sample MOA, Cultural Properties Act, Cultural Properties Protection Act

Cc: R.M. Krich, Vice President, licensing, Safety, and Nuclear Engineering, Louisiana Energy Services, One Sun Plaza, 100 Sun Lane NE, Suite 204, Albuquerque, NM 87109

Tim Leftwich, Principal, GL Environmental, Inc., 4200 Meadowlark Lane, Suite 1A. Rio Rancho, NM 87124

David C. Eck, Cultural Resource Specialist, NM State Land Office

Thomas J. Lennon, Principal Investigator, WCRM, 2603 West Main St., Suite B, Farmington, NM 87401

# MEMORANDUM OF AGREEMENT

AMONG

THE FEDERAL HIGHWAY ADMINISTRATION,  
THE NEW MEXICO STATE HIGHWAY AND TRANSPORTATION DEPARTMENT,  
AND  
THE NEW MEXICO STATE HISTORIC PRESERVATION OFFICE,

REGARDING

DATA RECOVERY AT LA 740 AND LA 750  
ALONG US 84/285,  
SANTA FE COUNTY, NEW MEXICO

WHEREAS, the Federal Highway Administration (FHWA), in cooperation with the New Mexico State Highway and Transportation Department (NMSHTD) proposes to construct an interchange and associated local access road near Cuyamungue on US 84/285 between Santa Fe and Pojoaque, on highway right of way acquired from private sources, (NMSHTD project AC-HPP-MIP-084-6(59)177, CN 2155); and

WHEREAS, the FHWA, acting as lead agency, has determined that the Project adversely affects LA 740 and LA 750, archaeological sites eligible for inclusion in the National Register of Historic Places under criterion "d", and has consulted with the Advisory Council on Historic Preservation (Council) and the New Mexico State Preservation Officer (SHPO), pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act; and has determined that data recovery is the most appropriate form of treatment to mitigate adverse effects of the Project on this site; and

WHEREAS, the Advisory Council has declined to be a signatory to this Agreement; and

WHEREAS, the *Data Recovery Plan*, provided in Appendix A, has been developed and prepared in a manner consistent with the *Secretary of the Interior's Standards and Guidelines for Archaeological Documentation* (48 FR 44734-37) and the Council's handbook, *Treatment of Archaeological Properties*;

NOW THEREFORE, the FHWA, NMSHTD, and the SHPO agree that the project shall be administered in accordance with the following stipulations in order to take into account the effect of the Project on historic properties and to satisfy responsibilities under Section 106 for the Project.

## STIPULATIONS

I. To the extent of its legal authority and in coordination with the SHPO, the FHWA and the NMSHTD will ensure that the measures and procedures specified in the data recovery plan by the consultant are implemented; this Agreement addresses all aspects of the data recovery plan developed by the consultant.

II. The consultant will prepare a final report discussing the findings resulting from the data recovery efforts. The report will be reviewed by the NMSHTD and the SHPO and any necessary revisions will be completed by the consultant. The NMSHTD will have 30 days for review; following this time period the SHPO will have 30 days to review the report.

III. Data recovery on state lands (highway right of way acquired from private sources) will be done by a cultural resource consultant via a permit issued by the Cultural Properties Review Committee (CPRC).

#### IV. DISCOVERY SITUATIONS

A. In the event that unrecorded or unanticipated properties that may be eligible for inclusion on the National Register are located during data recovery, or it is recognized that such actions may effect a known historic property in an unanticipated manner, the FHWA/NMSHTD will terminate data recovery in the vicinity of the property and will take all reasonable measures to avoid or minimize harm to the property until consultation with the SHPO regarding significance and effect can be concluded. The FHWA/NMSHTD will notify the SHPO at the earliest possible time and consult to develop actions that will take the effects of the undertaking into account. The FHWA/NMSHTD will notify the SHPO of any time constraints, and the FHWA/NMSHTD and the SHPO will mutually agree upon time frames for the consultation. These procedures will be addressed in the Monitoring and Discovery Plan included as part of the data recovery plan.

#### V. TREATMENT OF HUMAN REMAINS

B. Since the site is on state lands, the treatment and disposition for any burial or "human remains and associated funerary object, material objects or artifacts" will be in accordance with Section 18-6-11.2 of the State's Cultural Properties Act and 4 NMAC 10.11 regulations, including consultation through HPD and the Office of Indian Affairs with the appropriate Indian tribes. All of these sensitive objects will be treated with dignity and respect and consideration for the specific cultural and religious traditions applicable until their analysis is complete and their disposition has occurred. The limited analysis of human remains and associated funeral objects will be non-destructive unless otherwise agreed to by the culturally affiliated tribe(s).

#### VI. CURATION

A. The FHWA/NMSHTD shall ensure that the consultant provides for all records and materials resulting from data recovery efforts to be curated in accordance with standards and guidelines generated by 36 CFR Part 79.  
a. Artifacts will be curated at the Museum of New Mexico/MIAC.

#### VII. DISPUTE RESOLUTION

A. Should any Signatory to this Agreement object within 30 calendar days to any action(s) provided for review pursuant to this Agreement, the FHWA/NMSHTD shall consult with the objecting party to resolve the objection. The objection must be specifically identified, and the reasons for objection documented. If the FHWA/NMSHTD determines that the objection cannot be resolved, the FHWA/NMSHTD shall forward all documentation relevant to the dispute to the Council, pursuant to 36 CFR 800.7(b), and notify SHPO as to the nature of the dispute. Within 45 calendar days of receipt of all pertinent documentation, the Council shall provide the FHWA/NMSHTD with recommendations in accordance with 36 CFR 800.7(C)(2)

B. Any Council comment provided in response to such a request will be taken into account by the FHWA/NMSHTD in accordance with 36 CFR 800.7(b)(4) with reference to the subject of the dispute. Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute; the FHWA/NMSHTD and the consultant responsibilities to carry out all actions under this Agreement that are not the subject of the dispute will remain unchanged.

#### VIII. OBJECTIONS

A. At any time during the implementation of the measures stipulated in this Agreement, should an objection be raised by a consulting party or a member of the public, the FHWA/NMSHTD shall take the objection into account, notify the SHPO of the objection, and consult as needed with the objecting party to resolve the objection. If the FHWA determines that the objection cannot be resolved, the FHWA shall forward all documentation relevant to the dispute to the Council and request that the Council comment.

B. After receipt of the pertinent documentation, the Council shall either:

1. Provide the FHWA with recommendations to take into account in reaching a final decision regarding the dispute; or
2. Notify the FHWA that the Council will comment in accordance with 36 CFR Section 800.6(b)(2) and proceed to comment.

C. Any Council comment provided in response to such a request shall be taken into account by the FHWA in accordance with 36 CFR Section 800.6(c)(2) with reference only to the subject of the dispute. The FHWA responsibility to carry out all other actions and activities under this MOA that are not the subject of the dispute remain unchanged.

#### **IX. DURATION OF AGREEMENT/TERMINATION**

A. Should the proposed project be approved by the FHWA/NMSHTD and the SHPO, this MOA shall remain in effect until all construction associated with the interchange has been completed, and when all requirements of the treatment and data recovery plans and stipulations of the MOA have been met. If implementation is delayed for more than two years after the date of execution of this MOA, the FHWA/NMSHTD shall review this MOA to determine whether revisions are needed. If revisions are needed, the FHWA/NMSHTD will consult in accordance with 36 CFR Part 800 to make such revisions.

B. Any signatory to this agreement may terminate it by providing 30 days notice to the other parties, providing that the parties will consult during the period prior to the termination to seek agreements or amendments or other actions that would avoid termination. In the event of termination, the FHWA/NMSHTD will comply with 36 CFR 800.3 through 800.6.

#### **X. AMENDMENT**

A) Any Signatory to this Agreement pursuant to 36 CFR 800.6(c)(1) may request that it be amended, whereupon the Signatories will consult in accordance with 36 CFR Part 800.6(c)(7) to consider such amendment.

#### **XI. FAILURE TO CARRY OUT THE TERMS OF THE AGREEMENT**

In the event that the terms of this Agreement are not completed, the FHWA/NMSHTD shall comply with 36 CFR 800.3 through 800.6 with regard to individual actions covered by this Agreement.

#### **XII. SCOPE OF AGREEMENT**

A. This Agreement is limited in scope to the construction of the Cuyamungue interchange and the associated local access road adjacent to US 84/285, CN 2155, and is entered into solely for that purpose, should the proposed project be approved by the FHWA/NMSHTD.

B. Execution of this MOA, its subsequent filing with the Council, and implementation of its terms, evidences that the FHWA/NMSHTD has afforded the Council an opportunity to comment on the US 84/285 Cuyamungue interchange project (CN 2155) and its effects on historic properties, and has, therefore, taken into account the effects of the project, if it is approved, on historic properties and has satisfied its Section 106 responsibilities for all individual actions of this undertaking.



Memorandum of Agreement: Signatories

DATA RECOVERY PLAN FOR PORTIONS OF LA 391 ALONG U.S. 84/285, SANTA FE COUNTY, NEW MEXICO

**Federal Highway Administration**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
J. Don Martinez  
Division Administrator

**New Mexico State Historic Preservation Officer**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Katherine Slick  
State Historic Preservation Officer

**New Mexico State Highway and Transportation Department**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
R. Blake Roxlau  
Cultural Resources Coordinator



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

April 27, 2004

Alonso Chalepah, Chairman  
Apache Tribe of Oklahoma  
PO Box 1220  
Anadarko, OK 73005

SUBJECT: CULTURAL RESOURCES INVENTORY REPORT FOR LOUISIANA ENERGY SERVICES PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA COUNTY, NEW MEXICO

Dear Chairman Chalepah:

As you are aware, by letter dated December 12, 2003, Louisiana Energy Services (LES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility to be located near Eunice, New Mexico.

As described in our letter dated February 17, 2004, which requested information for the Section 106 process of the National Historic Preservation Act, LES performed a cultural resource survey of the proposed National Enrichment Facility (NEF) site in September 2003. Seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. A copy of the cultural resources report documenting the cultural resource inventory is enclosed. Site location information contained in the report may not be released to the general public under federal law, and it is essential that this information be protected.

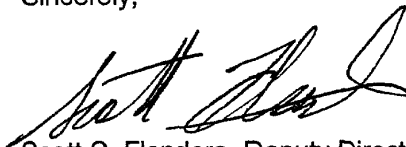
As you will see in the report, no properties of traditional religious and cultural significance to an Indian tribe have been identified. The NRC staff is interested in knowing if you have specific knowledge of any properties within the APE that you believe have traditional religious and cultural significance. In addition, we are interested in knowing if you are aware of or are concerned for any site, or object eligible for inclusion on the National Register of Historic Places that is not included in the report. This will assure appropriate consideration in the Section 106 process.

Chairman Chalepah

2

If you have any questions or comments regarding this request, please contact Matthew Blevins of my staff at (301) 415-7684.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott C. Flanders". The signature is fluid and cursive, with a large initial "S" and "C".

Scott C. Flanders, Deputy Director  
Environmental and Performance Assessment  
Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Enclosure: Cultural Resources Inventory  
for the National Enrichment Facility

cc w/o enclosure: Ms. Jan Biella  
Service List



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

April 27, 2004

Jimmy Arteberry, Director of Environment  
Comanche of Oklahoma  
PO Box 908  
Lawton, OK 73502

SUBJECT: CULTURAL RESOURCES INVENTORY REPORT FOR LOUISIANA ENERGY SERVICES PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA COUNTY, NEW MEXICO

Dear Mr. Arteberry:

As you are aware, by letter dated December 12, 2003, Louisiana Energy Services (LES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility to be located near Eunice, New Mexico.

As described in our letter dated February 17, 2004, which requested information for the Section 106 process of the National Historic Preservation Act, LES performed a cultural resource survey of the proposed National Enrichment Facility (NEF) site in September 2003. Seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. A copy of the cultural resources report documenting the cultural resource inventory is enclosed. Site location information contained in the report may not be released to the general public under federal law, and it is essential that this information be protected.

As you will see in the report, no properties of traditional religious and cultural significance to an Indian tribe have been identified. The NRC staff is interested in knowing if you have specific knowledge of any properties within the APE that you believe have traditional religious and cultural significance. In addition, we are interested in knowing if you are aware of or are concerned for any site, or object eligible for inclusion on the National Register of Historic Places that is not included in the report. This will assure appropriate consideration in the Section 106 process.

J. Arteberry

2

If you have any questions or comments regarding this request, please contact Matthew Blevins of my staff at (301) 415-7684.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott Flanders". The signature is fluid and cursive, with a prominent loop at the end.

Scott C. Flanders, Deputy Director  
Environmental and Performance Assessment  
Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Enclosure: Cultural Resources Inventory  
for the National Enrichment Facility

cc w/o enclosure: Ms. Jan Biella  
Service List



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

April 27, 2004

Arturo Sinclair, Governor  
Ysleta del Sur Pueblo  
P.O. Box 17579 - Ysleta Station  
El Paso, TX 79917

SUBJECT: CULTURAL RESOURCES INVENTORY REPORT FOR LOUISIANA ENERGY SERVICES PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA COUNTY, NEW MEXICO

Dear Governor Sinclair:

As you are aware, by letter dated December 12, 2003, Louisiana Energy Services (LES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility to be located near Eunice, New Mexico.

As described in our letter dated February 17, 2004, which requested information for the Section 106 process of the National Historic Preservation Act, LES performed a cultural resource survey of the proposed National Enrichment Facility (NEF) site in September 2003. Seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. A copy of the cultural resources report documenting the cultural resource inventory is enclosed. Site location information contained in the report may not be released to the general public under federal law, and it is essential that this information be protected.

As you will see in the report, no properties of traditional religious and cultural significance to an Indian tribe have been identified. The NRC staff is interested in knowing if you have specific knowledge of any properties within the APE that you believe have traditional religious and cultural significance. In addition, we are interested in knowing if you are aware of or are concerned for any site, or object eligible for inclusion on the National Register of Historic Places that is not included in the report. This will assure appropriate consideration in the Section 106 process.

A. Sinclair

2

If you have any questions or comments regarding this request, please contact Matthew Blevins of my staff at (301) 415-7684.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott C. Flanders". The signature is fluid and cursive, with a large loop at the end.

Scott C. Flanders, Deputy Director  
Environmental and Performance Assessment  
Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Enclosure: Cultural Resources Inventory  
for the National Enrichment Facility

cc w/o enclosure: Ms. Jan Biella  
Service List



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

April 27, 2004

Clifford A. McKenzie, Chairman  
Kiowa Tribe of Oklahoma  
PO Box 369  
Carnegie, OK 73015

SUBJECT: CULTURAL RESOURCES INVENTORY REPORT FOR LOUISIANA ENERGY SERVICES PROPOSED GAS CENTRIFUGE URANIUM ENRICHMENT FACILITY IN LEA COUNTY, NEW MEXICO

Dear Chairman McKenzie:

As you are aware, by letter dated December 12, 2003, Louisiana Energy Services (LES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility to be located near Eunice, New Mexico.

As described in our letter dated February 17, 2004, which requested information for the Section 106 process of the National Historic Preservation Act, LES performed a cultural resource survey of the proposed National Enrichment Facility (NEF) site in September 2003. Seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE is considered the NEF site area including permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. A copy of the cultural resources report documenting the cultural resource inventory is enclosed. Site location information contained in the report may not be released to the general public under federal law, and it is essential that this information be protected.

As you will see in the report, no properties of traditional religious and cultural significance to an Indian tribe have been identified. The NRC staff is interested in knowing if you have specific knowledge of any properties within the APE that you believe have traditional religious and cultural significance. In addition, we are interested in knowing if you are aware of or are concerned for any site, or object eligible for inclusion on the National Register of Historic Places that is not included in the report. This will assure appropriate consideration in the Section 106 process.



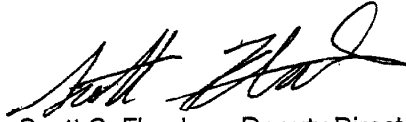
April 27, 2004

Chairman McKenzie

2

If you have any questions or comments regarding this request, please contact Matthew Blevins of my staff at (301) 415-7684.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance Assessment  
Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 70-3103

Enclosure: Cultural Resources Inventory  
for the National Enrichment Facility

cc w/o enclosure: Ms. Jan Biella  
Service List



**MESCALERO APACHE TRIBAL HISTORIC PRESERVATION OFFICE**

**P.O. Box 227**

**Mescalero, New Mexico 88340**

**Phone: 505/464-4711**

**Fax: 505/464-4637**

June 10, 2004

Mr. Scott C. Flanders  
United States  
Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

**RE: Cultural Resources Inventory Report for Louisiana Energy Services proposed Gas Centrifuge Uranium Enrichment Facility in Lea County, New Mexico**

Dear Mr. Flanders:

(X) The *Mescalero Apache Tribe* has determined that the proposed Gas Centrifuge Uranium Enrichment Facility in Lea County, New Mexico **WILL NOT AFFECT** any objects sites, or locations important to our traditional culture or religion.

( ) The *Mescalero Apache Tribe* has determined that the proposed \_\_\_\_\_ project by \_\_\_\_\_ **WILL AFFECT** objects, sites, or locations important to our traditional culture or religion. We request that the \_\_\_\_\_ undertake further consultations to evaluate the effects of the project on the sites.

Thank you for providing the Mescalero Apache Tribe the opportunity to comment on this project. We look forward to reviewing and commenting on U.S. Nuclear Regulatory Commission projects.

CONCUR:

A handwritten signature in cursive script, appearing to read "Holly Houghten".

for Holly Houghten  
Tribal Historic Preservation Officer

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

June 24, 2004

Mr. Alan Stanfill  
Senior Program Analyst  
Advisory Council on Historic Preservation  
12136 West Bayaud Avenue, Suite 330  
Lakewood, CO 80228

**SUBJECT: NOTIFICATION OF INTENT TO PREPARE A MEMORANDUM OF AGREEMENT FOR THE LOUISIANA ENERGY SERVICES PROPOSED NATIONAL ENRICHMENT FACILITY**

Dear Mr. Stanfill:

As you are aware, by letter dated December 12, 2003, Louisiana Energy Services (LES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility to be located near Eunice, New Mexico. The proposed enrichment facility covers an area of approximately 543 acres. Construction activities, including permanent plant structures, temporary construction facilities, contractor parking and lay-down areas, would disturb 200 acres.

In September 2003, LES performed a cultural resource inventory of the proposed site. Seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE is considered the proposed site area including the permanent and temporary building(s) footprints, parking and lay-down areas, and all site access roads. In addition, the undertaking is located on the land currently owned by the State of New Mexico. However, in a land exchange process, this land would be deeded to LES. This land exchange process would be considered an adverse effect to these seven sites. A copy of the cultural resources report documenting the cultural resource inventory is enclosed.

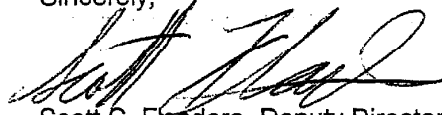
In accordance with NRC regulations at 10 CFR Part 51 and the National Environmental Policy Act, the NRC staff is preparing an Environmental Impact Statement (EIS) on the proposed facility which will assess the potential impacts of the proposed facility on the historic and archaeological resources of the area and on the cultural traditions and lifestyle of Indian tribes. The NRC staff will develop a Memorandum of Agreement (Agreement) with the New Mexico State Historic Preservation Officer, the New Mexico State Land Office and LES to ensure that the proposed action is undertaken in accordance with the requirements of Section 106 of the National Historic Preservation Act.

Pursuant to the requirements of 36 CFR 800, the NRC staff is notifying the Advisory Council on Historic Preservation (Council) of its intent to prepare the Agreement. The NRC staff recognizes that criteria exist for the Council's involvement in reviewing individual Section 106 cases. As described in Appendix A to 36 CFR 800, one of these criteria is whether the undertaking has the potential for presenting procedural problems. As discussed in the telephone conference calls on June 9, 2004 and June 22, 2004, the Agreement will address the land exchange process and its impacts on cultural resources.

Also, the NRC staff has offered Indian tribes that may be concerned with the possible effects of the proposed action on historic properties, an opportunity to participate in the Section 106 consultation process. As specified in 36 CFR 800.6, a copy of the executed Agreement will be submitted to the Council.

If you have any questions or comments, please contact Melanie Wong at (301) 415-6262.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott Flanders", written over a light blue horizontal line.

Scott C. Flanders, Deputy Director  
Environmental and Performance Assessment  
Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket: 70-3103

Enclosure: Cultural Resources Inventory  
for the National Enrichment Facility (ML040930424)

cc: Service List (w/o enclosure)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 6, 2004

The Honorable Wallace Coffey, Chairman  
Comanche Tribe of Oklahoma  
P.O. Box 908  
Lawton, OK 73502

SUBJECT: SECTION 106 CONSULTATION PROCESS OF THE NATIONAL HISTORIC PRESERVATION ACT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY

Dear Chairman Coffey:

On April 27, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff provided you with a copy of the Cultural Resource Inventory, which documents the cultural resources at the proposed site of the Louisiana Energy Services (LES) National Enrichment Facility (NEF). During the inventory, seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE consists of: the proposed NEF site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads.

In the letter transmitting the Cultural Resource Inventory, the NRC staff requested information *regarding properties within the APE that could have traditional religious or cultural significance*. The letter also requested that you notify the NRC staff if you were concerned about any site or object eligible for inclusion on the National Register of Historic Places that is not included in the Cultural Resources Inventory.

On June 2, 2004, Mr. Samuel Hernandez of the NRC staff contacted Mr. Jimmy Arterberry (Director of Environment), to discuss the requested information. This is a follow-up letter confirming the information provided in the telephone conversation. Mr. Arterberry informed Mr. Hernandez that there are no properties of cultural and traditional significance to the Comanche Tribe of Oklahoma within the APE. If your understanding of the telephone conference between Mr. Hernandez and Mr. Arterberry differs from the above, please notify us *as soon as possible*.

The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified. As a result of the findings of adverse effects, a draft Memorandum of Agreement (Agreement) and Treatment Plan will be developed, that outlines agreed-upon measures that LES will undertake to avoid, minimize, or mitigate any adverse effects. In the telephone conversation, Mr. Arterberry informed Mr. Hernandez that the Comanche Tribe of Oklahoma would like to be a concurring party to the Agreement.

Chairman Coffey

2

Once the Agreement and the Treatment Plan have been finalized, they will be forwarded for your review and comment. If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed NEF, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders  
Deputy Director for the Environmental and  
Performance Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket: 70-3103

cc: Jimmy Arterberry, Director of Environment  
Section 106 Service List



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 6, 2004

The Honorable Alonso Chalepah, Chairman  
Apache Tribe of Oklahoma  
P.O. Box 1220  
Anadarko, OK 73005

SUBJECT: SECTION 106 CONSULTATION PROCESS OF THE NATIONAL HISTORIC PRESERVATION ACT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY

Dear Chairman Chalepah:

On April 27, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff provided you with a copy of the Cultural Resource Inventory, which documents the cultural resources at the proposed site of the Louisiana Energy Services (LES) National Enrichment Facility (NEF). During the inventory, seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE consists of: the proposed NEF site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified. As a result of the findings of adverse effects, a draft Memorandum of Agreement (hereafter Agreement) and Treatment Plan will be developed, that outlines agreed-upon measures that LES will undertake to avoid, minimize, or mitigate any adverse effects.

In the letter transmitting the Cultural Resource Inventory, the NRC staff requested information regarding properties within the APE that could have traditional religious or cultural significance. The letter also requested that you notify the NRC staff if you were concerned about any site or object eligible for inclusion on the National Register of Historic Places that is not included in the Cultural Resources Inventory. During the month of June 2004, Mr. Samuel Hernandez of the NRC staff attempted on several occasions to contact a representative of your organization to *discuss the requested information but was unsuccessful.*

The NRC staff extends an invitation to the Apache Tribe of Oklahoma to be a concurring party to the Agreement and Treatment Plan. If the Apache Tribe of Oklahoma has information regarding properties within the APE and would like to be a concurring party to the Agreement, please notify us as soon as possible. If a response is not received within 30 days of receipt of this letter, the NRC staff will assume that the Apache Tribe of Oklahoma does not wish to be a concurring party to the Agreement.

Chairman Chalepah

-2-

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed NEF, at (301) 415-6262. Thank you for your assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott C. Flanders for".

Scott C. Flanders  
Deputy Director for the Environmental and  
Performance Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket: 70-3103

cc: Bobby Jay, Cultural Resources Officer  
Section 106 Service List





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 6, 2004

Holly Houghten, Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, NM 88340

SUBJECT: SECTION 106 CONSULTATION PROCESS OF THE NATIONAL HISTORIC  
PRESERVATION ACT FOR THE PROPOSED LOUISIANA ENERGY  
SERVICES NATIONAL ENRICHMENT FACILITY

Dear Ms. Houghten:

On April 27, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff provided you with a copy of the Cultural Resource Inventory, which documents the cultural resources at the proposed site of the Louisiana Energy Services (LES) National Enrichment Facility (NEF). During the inventory, seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE consists of: the proposed NEF site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified. As a result of the findings of adverse effects, a draft Memorandum of Agreement (hereafter Agreement) and Treatment Plan will be developed, that outlines agreed-upon measures that LES will undertake to avoid, minimize, or mitigate any adverse effects.

In the letter transmitting the Cultural Resource Inventory, the NRC staff requested information regarding properties within the APE that could have traditional religious or cultural significance. The letter also requested that you notify the NRC staff if you were concerned about any site or object eligible for inclusion on the National Register of Historic Places that is not included in the Cultural Resources Inventory. By letter dated June 10, 2004, you stated that the NEF will not affect any sites or locations important to the Mescalero Apache Tribe culture or religion.

During the month of June 2004, Mr. Samuel Hernandez of the NRC staff attempted on several occasions to contact Ms. Naida Natchez (Historic Preservation Officer), to discuss whether the Mescalero Apache Tribe would like to be a concurring party to the Agreement but was unsuccessful. If the Mescalero Apache would like to be a concurring party to the Agreement, please notify us as soon as possible. If a response is not received within 30 days of receipt of this letter, the NRC staff will assume that the Mescalero Apache Tribe does not wish to be a concurring party to the Agreement.

Ms. Houghten

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If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed NEF, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders  
Deputy Director for the Environmental and  
Performance Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket: 70-3103

cc: Section 106 Service List



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 6, 2004

The Honorable Arturo Sinclair, Governor  
Ysleta del Sur Pueblo  
P.O. Box 17579  
El Paso, TX 79917

**SUBJECT: SECTION 106 CONSULTATION PROCESS OF THE NATIONAL HISTORIC PRESERVATION ACT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY**

Dear Governor Sinclair:

On April 27, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff provided you with a copy of the Cultural Resource Inventory, which documents the cultural resources at the proposed site of the Louisiana Energy Services (LES) National Enrichment Facility (NEF). During the inventory, seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE consists of: the proposed NEF site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads.

In the letter transmitting the Cultural Resource Inventory, the NRC staff requested information regarding properties within the APE that could have traditional religious or cultural significance. The letter also requested that you notify the NRC staff if you were concerned about any site or object eligible for inclusion on the National Register of Historic Places that is not included in the Cultural Resources Inventory.

On June 2, 2004, Mr. Samuel Hernandez of the NRC staff contacted Ms. Silvia Garcia (Secretary), to discuss the requested information. This is a follow-up letter confirming the information provided in the telephone conversation. Ms. Garcia informed Mr. Hernandez that there are no properties of cultural and traditional significance to the Ysleta del Sur Pueblo within the APE. If your understanding of the telephone conference between Mr. Hernandez and Ms. Garcia differs from the above, please notify us as soon as possible.

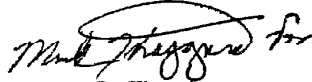
The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified. As a result of the findings of adverse effects, a draft Memorandum of Agreement (hereafter Agreement) and Treatment Plan will be developed, that outlines agreed-upon measures that LES will undertake to avoid, minimize, or mitigate any adverse effects. In the telephone conversation, Ms. Garcia informed Mr. Hernandez that the Ysleta del Sur Pueblo would like to be a concurring party to the Agreement.

Governor Sinclair

2

Once the Agreement and the Treatment Plan have been finalized, they will be forwarded for your review and comment. If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed NEF, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders  
Deputy Director for the Environmental and  
Performance Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket: 70-3103

cc: Section 106 Service List



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 26, 2004

The Honorable Clifford McKenzie, Chairman  
Kiowa Tribe of Oklahoma  
P.O. Box 369  
Carnegie, OK 73015

SUBJECT: SECTION 106 CONSULTATION PROCESS OF THE NATIONAL HISTORIC PRESERVATION ACT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY

Dear Chairman McKenzie:

On April 27, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff provided you with a copy of the Cultural Resource Inventory, which documents the cultural resources at the proposed site of the Louisiana Energy Services (LES) National Enrichment Facility (NEF). During the inventory, seven prehistoric archeological sites were identified with several of these sites occurring in the Area of Potential Effects (APE). The APE consists of: the proposed NEF site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads.

In the letter transmitting the Cultural Resource Inventory, the NRC staff requested information regarding properties within the APE that could have traditional religious or cultural significance. *The letter also requested that you notify the NRC staff if you were concerned about any site or object eligible for inclusion on the National Register of Historic Places that is not included in the Cultural Resources Inventory.*

On June 2, 2004, Mr. Samuel Hernandez of the NRC staff contacted Ms. Martha Perez (Secretary), to discuss the requested information. This is a follow-up letter confirming the information provided in the telephone conversation. Ms. Perez informed Mr. Hernandez that there are no properties of cultural and traditional significance to the Kiowa Tribe of Oklahoma within the APE. If your understanding of the telephone conference between Mr. Hernandez and Ms. Perez differs from the above, please notify us as soon as possible.


*The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified. As a result of the findings of adverse effects, a draft Memorandum of Agreement (hereafter Agreement) and Treatment Plan will be developed, that outlines agreed-upon measures that LES will undertake to avoid, minimize, or mitigate any adverse effects. In the telephone conversation, Ms. Perez informed Mr. Hernandez that the Kiowa Tribe of Oklahoma would like to be a concurring party to the Agreement.*

Chairman McKenzie

2

Once the Agreement and the Treatment Plan have been finalized, they will be forwarded for your review and comment. If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed NEF, at (301) 415-6262. Thank you for your assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott C. Flanders", with a stylized flourish at the end.

Scott C. Flanders  
Deputy Director for the Environmental and  
Performance Directorate  
Division of Waste Management and Environmental  
Protection  
Office of Nuclear Material Safety  
and Safeguards

Docket: 70-3103

cc: The Honorable George Tahboun, Vice-Chairman  
Section 106 Service List



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 26, 2004

Mr. Samuel Cata  
Tribal Liaison  
Historic Preservation Division  
228 East Palace Ave.  
Santa Fe, NM 87501

SUBJECT: STATUS OF SECTION 106 CONSULTATION PROCESS OF THE NATIONAL HISTORIC PRESERVATION ACT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY

Dear Mr. Cata:

As you are aware, by letter dated December 12, 2003, Louisiana Energy Services (LES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility to be located near Eunice, New Mexico. The proposed enrichment facility covers an area of approximately 543 acres.

In accordance with NRC regulations at 10 CFR Part 51 and the National Environmental Policy Act, the NRC staff is preparing an Environmental Impact Statement on the proposed facility which will assess the potential impacts of the proposed facility on the historic and archaeological resources of the area and on the cultural traditions and lifestyle of Indian tribes. In addition, the NRC staff will develop a Memorandum of Agreement (Agreement) with the New Mexico State Historic Preservation Officer (SHPO), the New Mexico State Land Office, Indian tribes and LES to ensure that the proposed action is undertaken in accordance with the requirements of the Section 106 consultation process of the National Historic Preservation Act.

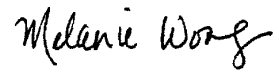
On May 18, 2004, Ms. Jan Biella (Deputy SHPO) recommended contacting you as the Governor appointed Tribal Liaison to discuss the proposed project and determine which Indian tribes should be contacted. On June 4, 2004, the NRC staff provided you information related to the Section 106 consultation process including NRC letters initiating the Section 106 consultation process with the affected Indian tribes. We are currently in the process of developing the abovementioned Agreement and a Treatment Plan, that outlines agreed-upon measures that LES will undertake to avoid, minimize, or mitigate any adverse effects.

S. Cata

2

We would very much appreciate your providing any comments you may have on the proposed project in a timely manner. If you have any questions or concerns, please do not hesitate to contact me at (301) 415-6262.

Sincerely,

A handwritten signature in black ink that reads "Melanie Wong". The signature is written in a cursive, flowing style.

Melanie Wong, Project Manager  
Environmental and Low-Level Waste Section  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguard

Docket 70-3103

cc: Service List





UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

Mr. Rod Krich, Vice President  
Licensing, Safety, and Nuclear Engineering  
Louisiana Energy Services  
2600 Virginia Avenue NW, Suite 610  
Washington, DC 20037

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF AGREEMENT AND TREATMENT PLAN FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY**

Dear Mr. Krich:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate a gas centrifuge uranium enrichment facility near Eunice, NM. By letter dated, February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. The NRC staff provided consulting parties with a copy of the report documenting the cultural resources located within the APE. The report includes a recommendation for each site within the APE, with regards to each site's eligibility for inclusion into the National Register of Historic Places.

During the inventory, seven prehistoric archeological sites were identified with several of these sites occurring in the APE. The APE consists of: the proposed National Enrichment Facility (NEF) site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified (Enclosure 1).

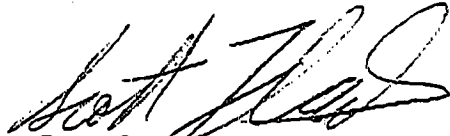
As a consequence of the findings of adverse effects, a draft Memorandum of Agreement (Enclosure 2) and Treatment Plan (Enclosure 3) have been developed that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. The NRC staff is requesting your comments on the draft Agreement and Treatment Plan within 30 days.

R. Krich

2

If you have any questions or comments, please contact Anna Bradford, Project Manager for the environmental review of the proposed project, at (301) 415-5228. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Anthropology Records (ML041900491)  
2. Draft Agreement (ML042240026)  
3. Draft Treatment Plan (ML042640105)

Docket: 70-3103

cc: Section 106 Service List (copy of Draft Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

Mr. Harry Teague, Commission Chairman  
Lea County  
100 North Main Street,  
Suite 4  
Lovington, NM 88260

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY**

Dear Commission Chairman Teague:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate a gas centrifuge uranium enrichment facility near Eunice, NM. By letter dated, February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. The NRC staff provided consulting parties with a copy of the report documenting the cultural resources located within the APE. The report includes a recommendation for each site within the APE, with regards to each site's eligibility for inclusion into the National Register of Historic Places.

During the inventory, seven prehistoric archeological sites were identified with several of these sites occurring in the APE. The APE consists of: the proposed National Enrichment Facility (NEF) site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified (Enclosure 1).

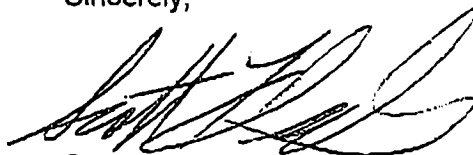
As a consequence of the findings of adverse effects, a draft Memorandum of Agreement (Enclosure 2) and Treatment Plan (Enclosure 3) have been developed that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. The NRC staff is requesting your comments on the draft Agreement and Treatment Plan within 30 days.

H. Teague

2

If you have any questions or comments, please contact Anna Bradford, Project Manager for the environmental review of the proposed project, at (301) 415-5228. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Anthropology Records (ML041900491)  
2. Draft Agreement (ML042240026)  
3. Draft Treatment Plan (ML042640105)

Docket: 70-3103

cc: Section 106 Service List (copy of Draft Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

Mr. David C. Eck, Cultural Resource Specialist  
New Mexico State Land Office  
P.O. Box 1148  
Santa Fe, NM 87504-1148

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF  
AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES  
NATIONAL ENRICHMENT FACILITY**

Dear Mr. Eck:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate a gas centrifuge uranium enrichment facility near Eunice, NM. By letter dated, February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. The NRC staff provided consulting parties with a copy of the report documenting the cultural resources located within the APE. The report includes a recommendation for each site within the APE, with regards to each site's eligibility for inclusion into the National Register of Historic Places.

During the inventory, seven prehistoric archeological sites were identified with several of these sites occurring in the APE. The APE consists of: the proposed National Enrichment Facility (NEF) site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified (Enclosure 1).

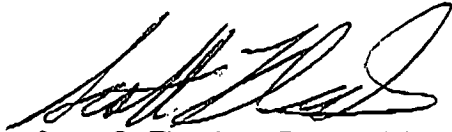
As a consequence of the findings of adverse effects, a draft Memorandum of Agreement (Enclosure 2) and Treatment Plan (Enclosure 3) have been developed that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. The NRC staff is requesting your comments on the draft Agreement and Treatment Plan within 30 days.

D. Eck

2

If you have any questions or comments, please contact Anna Bradford, Project Manager for the environmental review of the proposed project, at (301) 415-5228. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Anthropology Records (ML041900491)  
2. Draft Agreement (ML042240026)  
3. Draft Treatment Plan (ML042640105)

Docket: 70-3103

cc: Section 106 Service List (copy of Draft Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

Mr. Alan Stanfill, Senior Program Analyst  
Advisory Council on Historic Preservation  
12136 West Bayaud Avenue, Suite 330  
Lakewood, CO 80228

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF  
AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES  
NATIONAL ENRICHMENT FACILITY**

Dear Mr. Stanfill:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate a gas centrifuge uranium enrichment facility near Eunice, NM. By letter dated, February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. The NRC staff provided consulting parties with a copy of the report documenting the cultural resources located within the APE. The report includes a recommendation for each site within the APE, with regards to each site's eligibility for inclusion into the National Register of Historic Places.

During the inventory, seven prehistoric archeological sites were identified with several of these sites occurring in the APE. The APE consists of: the proposed National Enrichment Facility (NEF) site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified (Enclosure 1).

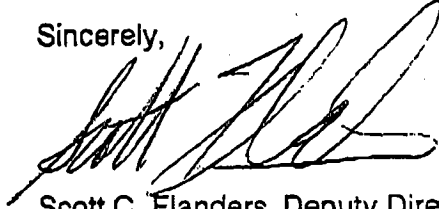
As a consequence of the findings of adverse effects, a draft Memorandum of Agreement (Enclosure 2) and Treatment Plan (Enclosure 3) have been developed that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. The NRC staff is requesting your comments on the draft Agreement and Treatment Plan within 30 days.

A. Stanfill

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If you have any questions or comments, please contact Anna Bradford, Project Manager for the environmental review of the proposed project, at (301) 415-5228. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Anthropology Records (ML041900491)  
2. Draft Agreement (ML042240026)  
3. Draft Treatment Plan (ML042640105)

Docket: 70-3103

cc: Section 106 Service List (copy of Draft Agreement only)





UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

Mr. Phillip A. Young, Planning Section Chief  
State of New Mexico  
Dept. of Cultural Affairs  
Historic Preservation Division  
228 East Palace Ave, Rm. 320  
Santa Fe, NM 87501

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF  
AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES  
NATIONAL ENRICHMENT FACILITY**

Dear Mr. Young:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate a gas centrifuge uranium enrichment facility near Eunice, NM. By letter dated, February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

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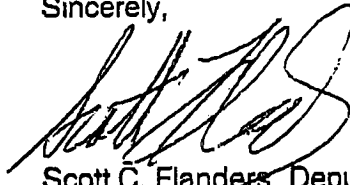
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P. Young

2

If you have any questions or comments, please contact Anna Bradford, Project Manager for the environmental review of the proposed project, at (301) 415-5228. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Anthropology Records (ML041900491)  
2. Draft Agreement (ML042240026)  
3. Draft Treatment Plan (ML042640105)

Docket: 70-3103

cc: Section 106 Service List (copy of Draft Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

The Honorable Clifford McKenzie, Chairman  
Kiowa Tribe of Oklahoma  
P.O. Box 369  
Carnegie, OK 73015

**SUBJECT: REQUEST FOR COMMENT ON THE DRAFT MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY**

Dear Chairman McKenzie:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate a gas centrifuge uranium enrichment facility near Eunice, NM. By letter dated, February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

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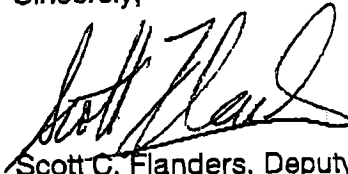
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C. McKenzie

2

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Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Anthropology Records (ML041900491)  
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Docket: 70-3103

cc: The Honorable George Tahboun, Vice-Chairman  
Section 106 Service List (copy of Draft Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

The Honorable Wallace Coffey  
Comanche Tribe of Oklahoma  
PO Box 908  
Lawton, OK 73502

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY**

Dear Chairman Coffey:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate a gas centrifuge uranium enrichment facility near Eunice, NM. By letter dated, February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

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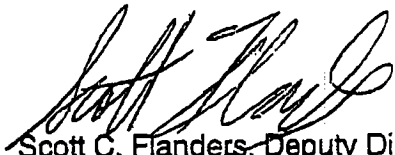
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W. Coffey

2

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Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Anthropology Records (ML041900491)  
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Docket: 70-3103

cc: Jimmy Arterberry, Director of Environment  
Section 106 Service List (copy of Draft Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

The Honorable Arturo Sinclair  
Ysleta del Sur Pueblo  
PO Box 17579-Ysleta Station  
El Paso, TX 79917

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY**

Dear Governor Sinclair:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate a gas centrifuge uranium enrichment facility near Eunice, NM. By letter dated, February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

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A. Sinclair

2

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Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
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Docket: 70-3103

cc: Section 106 Service List (copy of Draft Agreement only)





UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

The Honorable Alonso Chalepah, Chairman  
Apache Tribe of Oklahoma  
P.O. Box 1220  
Anadarko, OK 73005

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY**

Dear Chairman Chalepah:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate a gas centrifuge uranium enrichment facility near Eunice, NM. By letter dated, February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

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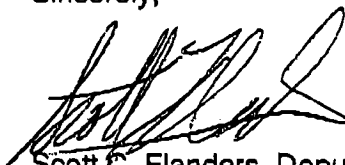
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A. Chalepah

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Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
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Docket: 70-3103

cc: Bobby Jay, Cultural Resources Officer  
Section 106 Service List (copy of Draft Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

Ms. Holly Houghten, Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, NM 88340

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF  
AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES  
NATIONAL ENRICHMENT FACILITY**

Dear Ms Houghten:

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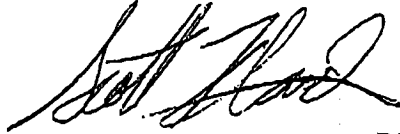
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Assessment Directorate  
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Docket: 70-3103

cc: Section 106 Service List (copy of Draft Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 2, 2004

Ms. Jan Biella  
Deputy State Historic Preservation Officer  
Historic Preservation Division  
New Mexico Department of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87501

**SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY**

Dear Ms. Biella:

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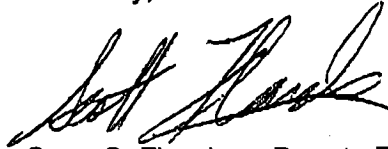
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J. Biella

2

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Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
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3. Draft Treatment Plan (ML042640105)

Docket: 70-3103

cc: Section 106 Service List (copy of Draft Agreement only)

**FINAL**

**MEMORANDUM OF AGREEMENT  
among the  
U.S. NUCLEAR REGULATORY COMMISSION  
NEW MEXICO STATE HISTORIC PRESERVATION OFFICER  
NEW MEXICO STATE LAND OFFICE  
LEA COUNTY  
and  
LOUISIANA ENERGY SERVICES  
regarding the  
MEASURES TO MITIGATE EFFECTS ON LA 140701, LA 140702, LA 140703, LA 140704,  
LA 140705, LA 140706, AND LA 140707  
in  
LEA COUNTY, New Mexico**

WHEREAS, the U.S. Nuclear Regulatory Commission (NRC), the lead Federal agency, has received an application from Louisiana Energy Services (LES), for the construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility (hereafter the undertaking), located in Lea County, New Mexico, as described in LES's application dated December 12, 2003, and revised February 27, 2004, July 30, 2004, and September 30, 2004; and,

WHEREAS, the approval or disapproval of the undertaking would be documented in a licensing action, according to NRC rules, regulations, and requirements; and,

WHEREAS, the New Mexico State Land Office (NMSLO), prior to the proposed undertaking, would convey trust lands to Lea County in exchange for a conveyance of non-trusts land by LES; and

WHEREAS, the undertaking's Area of Potential Effect (APE), as defined at 36 CFR 800.16(d) is shown in Figure 4 of An Intensive Cultural Resource Inventory of 543 Acres for the National Enrichment Facility Near Eunice, Lea County, New Mexico; and,

WHEREAS, pursuant to 36 CFR Part 800, the NRC has determined that the proposed project adversely affects LA 140701, LA 140702, LA 140703, LA 140704, LA 140705, LA 140706, and LA 140707, archaeological sites eligible for inclusion on the National Register of Historic Places (National Register) under criterion "d", and has consulted with the Advisory Council on Historic Preservation (Council), the State Historic Preservation Officer of New Mexico (SHPO), NMSLO, and LES on this Memorandum of Agreement (Agreement); and,

WHEREAS, pursuant to 36 CFR 800.3(f), the NRC has consulted with the Apache Tribe of Oklahoma, Kiowa Tribe of Oklahoma, Comanche Tribe of Oklahoma, Mescalero Apache, and Ysleta del Sur Pueblo regarding this Agreement; and,

WHEREAS, the NRC, as part of the National Environmental Policy Act review process, has sought public comments and notified the public of the potential effects of the undertaking on historic properties as required in 36 CFR Part 800 and has considered the applicable

requirements of Section 106 of the National Historic Preservation Act in the course of the consultation; and,

WHEREAS, LES has submitted to the SHPO a Treatment Plan for the archeological sites, which has been developed and prepared in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48 Fed. Reg. 44734-37) and the Council's Handbook, Treatment of Archaeological Properties; and,

NOW, THEREFORE, the signatories parties agree that the undertaking shall be administered in accordance with the following stipulations in order to consider the effect of the undertaking on historic properties and to satisfy Section 106 of the National Historic Preservation Act.

### **STIPULATIONS**

I. To the extent of its legal authority and in coordination with the SHPO and NMSLO, the NRC will ensure that the measures and procedures specified in the Treatment Plan, as approved by the SHPO, are implemented; this Agreement addresses all aspects of the Treatment Plan developed by LES.

II. LES will prepare a final report discussing the findings resulting from the Treatment Plan efforts. This report will be reviewed by the signatory and concurring parties within a 30-day comment period and any necessary revisions will be completed by LES.

#### III. Discovery

In the event that unrecorded or unanticipated properties that may be eligible for inclusion on the National Register are located during the Treatment Plan efforts, or it is recognized that such actions may affect known historic properties in an unanticipated manner, LES will terminate treatment in the vicinity of the property and will take all reasonable measures to avoid or minimize harm to the property until consultation with the signatory and concurring parties regarding significance and effect can be concluded. LES will notify the NRC, SHPO and the NMSLO at the earliest possible time and consult to develop actions that will take the effects of the undertaking into account. LES will further notify the NRC, SHPO, and NMSLO of any time constraints and they will mutually agree upon time frames for the consultation. These procedures will be addressed in the Treatment Plan.

#### IV. Contingency

LES shall prepare a draft nomination of the identified historic properties to the State Register of Cultural Properties prior to the land exchange. The draft nomination of these seven eligible archaeological sites shall be submitted to the SHPO, NMSLO, and Lea County for their review and files.

In the event that LES does not receive their NRC license for the National Enrichment Facility, Lea County shall formally submit the nomination to the Cultural Properties Review Committee for their consideration.



## V. Human Remains

If human remains are inadvertently discovered during construction activities, LES will notify the signatory parties and cease all construction within 300 feet in all directions of the human remains. Treatment and disposition of remains and associated grave goods will be consistent with applicable Federal and State laws including consultation with the appropriate Indian tribes. All of these sensitive objects will be treated with dignity and respect and consideration of the specific cultural and religious traditions applicable until their analysis is complete and their disposition has occurred. The limited analysis of human remains and associated funeral objects will be non-destructive unless otherwise agreed to by the culturally affiliated tribe(s).

## VI. Curation

LES shall provide for all records and materials resulting from data recovery efforts to be curated in accordance with standards and guidelines generated by 36 CFR Part 79. Artifacts will be curated at the Museum of New Mexico.

## VII. Confidentiality

All signatory and concurring parties shall ensure that shared data, including data concerning the precise location and nature of historic properties and properties of religious and cultural significance are protected from public disclosure to the greatest extent permitted by law, including conformance to Section 304 of the National Historic Preservation Act, as amended and Section 9 of the Archaeological Resources Protection Act and Executive Order No. 13007 on Indian Sacred Sites (Federal Register, Vol. 61 No. 104, May 24, 1996).

## VIII. Dispute Resolution

A. Should any signatory party to this Agreement object within 30 calendar days to any action proposed or any document provided for review pursuant to this Agreement, the NRC shall consult with the objecting party to resolve the objection unless otherwise specified in this document. If NRC determines that the objection cannot be resolved, the NRC shall forward all documentation relevant to the dispute to the Council.

B. The Council will, within 45 days after receipt of all pertinent documentation, either:

1. Provide the NRC with recommendations, (any comments provided by the Council and all comments from the parties to this Agreement will be taken into account by the NRC in reaching a final decision regarding the dispute.); or
2. Notify the NRC that it will comment in accordance with 36 CFR Part 800.7 and proceed to comment. (Any Council comment provided in response to such a request will be taken into account by the NRC in accordance with 36 CFR Part 800.7(c)(4) with reference to the subject of the dispute.)

C. Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute; the NRC's responsibility to carry out all actions under this Agreement that is not subject to dispute will remain unchanged.

D. Should any concurring party to this Agreement object to any actions pursuant to this Agreement within 30 calendar days of initiation of that action, the NRC shall consult with the

objecting parties to resolve the objection. The objection must be identified specifically and the reasons for the objection documented. Any timely objections by a concurring party shall be resolved by the NRC in such a manner as it deems appropriate, upon consultation with the signatory and concurring parties.

#### IX. Termination

Any signatory party to this Agreement may terminate it by providing 30 calendar days notice, in writing, to the other parties, provided that the parties consult during the period prior to termination to seek agreement or amendments or other action that would avoid termination. If any Signatory individually terminates its participation in the Agreement, then the Agreement is terminated in its entirety. In the event of termination, the Signatories will comply with 36 CFR Part 800 Subpart B.

#### X. Amendment

Any signatory to this Agreement pursuant to 36 CFR 800.6(c)(1) may request that it be amended, whereupon the Signatories will consult in accordance with 36 CFR Part 800.6(c)(7) to consider such amendment.

#### XI. Failure to carry out the terms of the Agreement

In the event that the terms of this Agreement are not carried out, the NRC shall comply with 36 CFR 800.3 through 800.6 with regard to individual actions covered by this Agreement.

#### XII. Term of this Agreement

In the event that the terms of this Agreement are not carried out within two (2) years from the date of its execution, this agreement shall be null and void, unless the signatories agree in writing to an extension for carrying out its terms.

#### XIII. Execution of this Agreement

Execution and implementation of this Agreement evidences that the NRC has afforded the Council a reasonable opportunity to comment on the undertaking and its effects on historic properties and that the NRC has taken into account the effects of the undertaking on historic properties.

**SIGNATORY PARTIES:**

U.S. NUCLEAR REGULATORY COMMISSION

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE HISTORIC PRESERVATION OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE LAND OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

LEA COUNTY

By: \_\_\_\_\_

Date: \_\_\_\_\_

LOUISIANA ENERGY SERVICES

By: \_\_\_\_\_

Date: \_\_\_\_\_

**CONCURRING PARTIES:**

APACHE TRIBE OF OKLAHOMA

By: \_\_\_\_\_

Date: \_\_\_\_\_

KIOWA TRIBE OF OKLAHOMA

By: \_\_\_\_\_

Date: \_\_\_\_\_

COMANCHE TRIBE OF OKLAHOMA

By: \_\_\_\_\_

Date: \_\_\_\_\_

MESCALERO APACHE TRIBE

By: \_\_\_\_\_

Date: \_\_\_\_\_

YSLETA DEL SUR PUEBLO

By: \_\_\_\_\_

Date: \_\_\_\_\_



*Preserving America's Heritage*

November 8, 2004

Mr. Scott C. Flanders  
Deputy Director  
Environmental and Performance Assessment Directorate  
Office of Nuclear Material Safety and Safeguards  
Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

REF: *Proposed Louisiana Energy Services National Enrichment Facility.*

Dear Mr. Flanders:

We received your notification and supporting documentation regarding the adverse effects of the referenced project on a property or properties eligible for inclusion in the National Register of Historic Places. Based upon the information you provided, we do not believe that our participation in consultation to resolve adverse effects is needed. However, should circumstances change, please notify us so we can re-evaluate if our participation is required. Pursuant to 36 CFR 800.6(b)(iv), you will need to file the Memorandum of Agreement, and related documentation at the conclusion of the consultation process. The filing of this Agreement with the ACHP is necessary to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with your notification of adverse effect. If you have any questions, please contact me at (303) 969-5110 or via eMail to [astanfill@achp.gov](mailto:astanfill@achp.gov).

Sincerely,

Alan Stanfill  
Senior Program Analyst  
Western Office of Federal  
Agency Programs

ADVISORY COUNCIL ON HISTORIC PRESERVATION

B-90

12136 West Bayaud Avenue, Suite 330 • Lakewood, Colorado 80228  
Phone: 303-969-5110 • Fax: 303-969-5115 • [achp@achp.gov](mailto:achp@achp.gov) • [www.achp.gov](http://www.achp.gov)



STATE OF NEW MEXICO  
**DEPARTMENT OF CULTURAL AFFAIRS**  
**HISTORIC PRESERVATION DIVISION**

228 EAST PALACE AVENUE  
SANTA FE, NEW MEXICO 87501  
(505) 827-6320

**BILL RICHARDSON**  
Governor

29 November 2004

Scott C. Flanders  
Deputy Director,  
Env. & Performance Assessment Directorate  
Div. of Waste Mgmt. & Env. Protection  
Office of Nuclear Material Safety & safeguards  
Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

ATTN: Anna Bradford

Subject: Comments on the Draft Memorandum of Agreement (MOA) for the  
Proposed Louisiana Energy Services National Enrichment Facility

Dear Mr. Flanders:

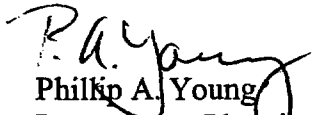
On 09 November 2004, the Historic Preservation Division (HPD) was pleased to receive your request for comments on the Draft MOA and Draft Treatment Plan for the proposed undertaking near Eunice, NM.

We believe the documents are much improved from earlier versions. We did note a mistake on Page 16, 4th paragraph of the Treatment Plan, where citing Meyer 1993 . . . The sentence reads "sedentary agriculturalists", and this should be "mobile hunters and gatherers." Starting with the previous sentence, it should state: "Some researchers believe that expedient lithic technology is associated with sedentary societies (cite references). Others, however, believe that it is more commonly associated with hunters and gathers (Meyer 1993, etc....)." We believe this was what Dr. Wheeler intended to write, but it got mixed up. An HPD archaeologist spoke to him about this, and he understood the Meyer 1993 argument.

We also recommend that the Treatment Plan should provide specific data needs (mutually exclusive data sets) for each question we're trying to answer. With mutually exclusive data sets, you can't say the presence of "lithics" is a key to defining a camp. Lithics are found on many different types of sites. However, you could say a specific type of tool, is expected at one site type, but not any other (depending on the site type and the assumptions presented by the researcher). Another would be that Pithouses are expected at villages, but not temporary camps, etc.

Anyway, thank you again for the opportunity to review this Draft. We look forward to seeing the finals. Feel free to call me at 505.827.6314 or Lisa Meyer at 505.827.7824 if you have any questions.

Sincerely

  
Philip A. Young  
Preservation Planning

HPD Log # 72698



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 25, 2005

Mr. Rod Krich, Vice President  
Licensing, Safety, and Nuclear Engineering  
Louisiana Energy Services  
2600 Virginia Avenue NW, Suite 610  
Washington, DC 20037

SUBJECT: FINAL MEMORANDUM OF AGREEMENT AND TREATMENT PLAN FOR THE  
PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT  
FACILITY

Dear Mr. Krich:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, NM. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. During the inventory, seven prehistoric archeological sites were identified, with several of these sites occurring in the APE. The APE consists of: the proposed site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified.

As a consequence of the findings of adverse effects, on November 2, 2004, the NRC staff requested comments on a draft Memorandum of Agreement and Treatment Plan that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. Based on comments received, the Agreement (Enclosure 1) and Treatment Plan (Enclosure 2) have been revised accordingly and are hereby provided to you in their final form.

As LES is identified as a signatory party on the Agreement, the NRC staff requests that the appropriate LES official sign and date the Agreement in the designated location. By signing, LES is agreeing to fulfill the requisite stipulations in the Agreement. The NRC staff requests that the signed original of the Agreement (as provided) be returned to the NRC within 14 days of LES's receipt of this transmittal letter.

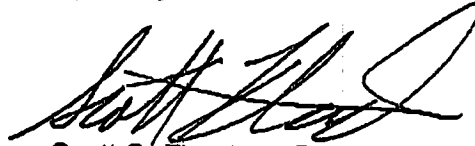


R. Krich

2

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Memorandum of Agreement (ML050530238)  
2. Treatment Plan (ML050480339)

Docket: 70-3103

cc: Section 106 Service List (copy of Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 25, 2005

Mr. Harry Teague, Commission Chairman  
Lea County  
100 North Main Street,  
Suite 4  
Lovington, NM 88260

SUBJECT: FINAL MEMORANDUM OF AGREEMENT AND TREATMENT PLAN FOR THE  
PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT  
FACILITY

Dear Mr. Teague:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, NM. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office, and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. During the inventory, seven prehistoric archeological sites were identified, with several of these sites occurring in the APE. The APE consists of: the proposed site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified.

As a consequence of the findings of adverse effects, on November 2, 2004, the NRC staff requested comments on a draft Memorandum of Agreement and Treatment Plan that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. Based on comments received, the Agreement (Enclosure 1) and Treatment Plan (Enclosure 2) have been revised accordingly and are hereby provided to you in their final form.

As Lea County is identified as a signatory party on the Agreement, the NRC staff requests that the appropriate Lea County official sign and date the Agreement in the designated location. The NRC staff requests that the signed original of the Agreement (as provided) be returned to the NRC within 14 days of your receipt of this transmittal letter.

H.Teague

2

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Memorandum of Agreement (ML050530238)  
2. Treatment Plan (ML050480339)

Docket: 70-3103

cc: Section 106 Service List (copy of Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 25, 2005

Mr. David C. Eck, Cultural Resource Specialist  
New Mexico State Land Office  
P.O. Box 1148  
Santa Fe, NM 87504-1148

SUBJECT: FINAL MEMORANDUM OF AGREEMENT AND TREATMENT PLAN FOR THE  
PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT  
FACILITY

Dear Mr. Eck:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, NM. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. During the inventory, seven prehistoric archeological sites were identified, with several of these sites occurring in the APE. The APE consists of: the proposed site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified.

As a consequence of the findings of adverse effects, on November 2, 2004, the NRC staff requested comments on a draft Memorandum of Agreement and Treatment Plan that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. Based on comments received, the Agreement (Enclosure 1) and Treatment Plan (Enclosure 2) have been revised accordingly and are hereby provided to you in their final form.


As the New Mexico State Land Office (NMSLO) is identified as a signatory party on the Agreement, the NRC staff requests that the appropriate NMSLO official sign and date the Agreement in the designated location. The NRC staff requests that the signed original of the Agreement (as provided) be returned to the NRC within 14 days of your receipt of this transmittal letter.

D.Eck

2

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Memorandum of Agreement (ML050530238)  
2. Treatment Plan (ML050480339)

Docket: 70-3103

cc: Section 106 Service List (copy of Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 25, 2005

Ms. Katherine Slick, State Historic Preservation Officer  
State of New Mexico  
Dept. of Cultural Affairs  
Historic Preservation Division  
228 East Palace Ave, Rm. 320  
Santa Fe, NM 87501

SUBJECT: FINAL MEMORANDUM OF AGREEMENT AND TREATMENT PLAN FOR THE  
PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT  
FACILITY

Dear Ms. Slick:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, NM. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. During the inventory, seven prehistoric archeological sites were identified, with several of these sites occurring in the APE. The APE consists of: the proposed site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified.

As a consequence of the findings of adverse effects, on November 2, 2004, the NRC staff requested comments on a draft Memorandum of Agreement and Treatment Plan that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. Based on comments received, the Agreement (Enclosure 1) and Treatment Plan (Enclosure 2) have been revised accordingly and are hereby provided to you in their final form.

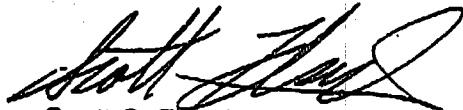
As the SHPO is identified as a signatory party on the Agreement, the NRC staff requests that the appropriate SHPO official sign and date the Agreement in the designated location. The NRC staff requests that the signed original of the Agreement (as provided) be returned to the NRC within 14 days of your receipt of this transmittal letter.

K.Slick

2

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Memorandum of Agreement (ML050530238)  
2. Treatment Plan (ML050480339)

Docket: 70-3103

cc: Jan Biella, Deputy State Historic Preservation Officer  
Phillip Young, Preservation Planning Manager  
Section 106 Service List (copy of Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 25, 2005

The Honorable Billy Evans Horse, Chairman  
Kiowa Tribe of Oklahoma  
P.O. Box 369  
Carnegie, OK 73015

SUBJECT: FINAL MEMORANDUM OF AGREEMENT AND TREATMENT PLAN FOR THE  
PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT  
FACILITY

Dear Chairman Evans Horse:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, NM. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. During the inventory, seven prehistoric archeological sites were identified, with several of these sites occurring in the APE. The APE consists of: the proposed site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified.

As a consequence of the findings of adverse effects, on November 2, 2004, the NRC staff requested comments on a draft Memorandum of Agreement and Treatment Plan that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. Based on comments received, the Agreement (Enclosure 1) and Treatment Plan (Enclosure 2) have been revised accordingly and are hereby provided to you in their final form.

As the Kiowa Tribe of Oklahoma is identified as a concurring party on the Agreement, the NRC staff requests that the appropriate Tribal official sign and date the Agreement in the designated location. By signing, the Kiowa Tribe of Oklahoma is concurring on the stipulations in the Agreement. The NRC staff requests that the signed original of the Agreement (as provided) be returned to the NRC within 14 days of your receipt of this transmittal letter.



B. Evans Horse

2

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Memorandum of Agreement (ML050530238)  
2. Treatment Plan (ML050480339)

Docket: 70-3103

cc: The Honorable George Tahboune, Vice-Chairman  
Section 106 Service List (copy of Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 25, 2005

The Honorable Wallace Coffey, Chairman  
Comanche Tribe of Oklahoma  
PO Box 908  
Lawton, OK 73502

SUBJECT: FINAL MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA  
ENERGY SERVICES NATIONAL ENRICHMENT FACILITY

Dear Chairman Coffey:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, NM. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. During the inventory, seven prehistoric archeological sites were identified, with several of these sites occurring in the APE. The APE consists of: the proposed site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified.

As a consequence of the findings of adverse effects, on November 2, 2004, the NRC staff requested comments on a draft Memorandum of Agreement and Treatment Plan that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. Based on comments received, the Agreement (Enclosure 1) and Treatment Plan (Enclosure 2) have been revised accordingly and are hereby provided to you in their final form.


As the Comanche Tribe of Oklahoma is identified as a concurring party on the Agreement, the NRC staff requests that the appropriate Tribal official sign and date the Agreement in the designated location. By signing, the Comanche Tribe of Oklahoma is concurring on the stipulations in the Agreement. The NRC staff requests that the signed original of the Agreement (as provided) be returned to the NRC within 14 days of your receipt of this transmittal letter.

W.Coffey

2

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Memorandum of Agreement (ML050530238)  
2. Treatment Plan (ML050480339)

Docket: 70-3103

cc: Section 106 Service List (copy of Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 25, 2005

The Honorable Arturo Sinclair, Governor  
Ysleta del Sur Pueblo  
PO Box 17579-Ysleta Station  
El Paso, TX 79917

SUBJECT: FINAL MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA  
ENERGY SERVICES NATIONAL ENRICHMENT FACILITY

Dear Governor Sinclair:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, NM. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. During the inventory, seven prehistoric archeological sites were identified, with several of these sites occurring in the APE. The APE consists of: the proposed site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified.

As a consequence of the findings of adverse effects, on November 2, 2004, the NRC staff requested comments on a draft Memorandum of Agreement and Treatment Plan that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. Based on comments received, the Agreement (Enclosure 1) and Treatment Plan (Enclosure 2) have been revised accordingly and are hereby provided to you in their final form.

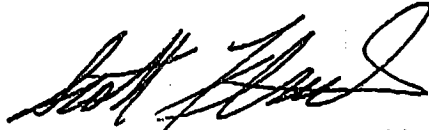
As the Ysleta del Sur Pueblo is identified as a concurring party on the Agreement, the NRC staff requests that the appropriate Tribal official sign and date the Agreement in the designated location. By signing, the Ysleta del Sur Pueblo is concurring on the stipulations in the Agreement. The NRC staff requests that the signed original of the Agreement (as provided) be returned to the NRC within 14 days of your receipt of this transmittal letter.

A.Sinclair

2

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Memorandum of Agreement (ML050530238)  
2. Treatment Plan (ML050480339)

Docket: 70-3103

cc: Section 106 Service List (copy of Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 25, 2005

The Honorable Alonso Chalepah, Chairman  
Apache Tribe of Oklahoma  
P.O. Box 1220  
Anadarko, OK 73005

SUBJECT: FINAL MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA  
ENERGY SERVICES NATIONAL ENRICHMENT FACILITY

Dear Chairman Chalepah:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, NM. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. During the inventory, seven prehistoric archeological sites were identified, with several of these sites occurring in the APE. The APE consists of: the proposed site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified.

As a consequence of the findings of adverse effects, on November 2, 2004, the NRC staff requested comments on a draft Memorandum of Agreement and Treatment Plan that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. Based on comments received, the Agreement (Enclosure 1) and Treatment Plan (Enclosure 2) have been revised accordingly and are hereby provided to you in their final form.

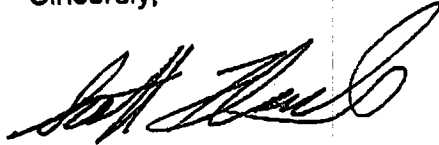
As the Apache Tribe of Oklahoma is identified as a concurring party on the Agreement, the NRC staff requests that the appropriate Tribal official sign and date the Agreement in the designated location. By signing, the Apache Tribe of Oklahoma is concurring on the stipulations in the Agreement. The NRC staff requests that the signed original of the Agreement (as provided) be returned to the NRC within 14 days of your receipt of this transmittal letter.

A.Chalepah

2

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: 1. Memorandum of Agreement (ML050530238)  
2. Treatment Plan (ML050480339)

Docket: 70-3103

cc: Bobby Jay, Cultural Resources Officer  
Section 106 Service List (copy of Agreement only)



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 25, 2005

Ms. Holly Houghten, Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, NM 88340

SUBJECT: FINAL MEMORANDUM OF AGREEMENT FOR THE PROPOSED LOUISIANA  
ENERGY SERVICES NATIONAL ENRICHMENT FACILITY

Dear Ms. Houghten:

As you are aware, Louisiana Energy Services (LES), proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, NM. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act, with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office (SHPO) and with regional Federally recognized Indian tribes.

In September 2003, Western Cultural Resource Management Inc. (WCRM), a LES contractor, performed a cultural resource inventory of the proposed project area. All portions of the Area of Potential Effect (APE) were included in the study area. During the inventory, seven prehistoric archeological sites were identified, with several of these sites occurring in the APE. The APE consists of: the proposed site area, including permanent and temporary building(s) footprints; parking and lay-down areas; and all site access roads. The proposed NEF site is located on land currently owned by the State of New Mexico. However, as part of a land exchange process involving the State, Lea County, and LES, the land for the proposed NEF would be deeded to LES. This land exchange process would be considered an adverse effect to the seven prehistoric archeological sites identified.

As a consequence of the findings of adverse effects, on November 2, 2004, the NRC staff requested comments on a draft Memorandum of Agreement and Treatment Plan that outline agreed-upon measures that LES would take to avoid, minimize, or mitigate these adverse effects. Based on comments received, the Agreement (Enclosure 1) and Treatment Plan (Enclosure 2) have been revised accordingly and are hereby provided to you in their final form.

As the Mescalero Apache Tribe is identified as a concurring party on the Agreement, the NRC staff requests that the appropriate Tribal official sign and date the Agreement in the designated location. By signing, the Mescalero Apache Tribe is concurring on the stipulations in the Agreement. The NRC staff requests that the signed original of the Agreement (as provided) be returned to the NRC within 14 days of your receipt of this transmittal letter.

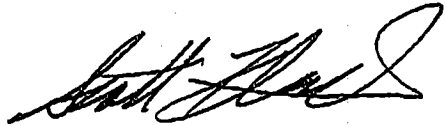


H.Houghten

2

If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



**Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards**

**Enclosure: 1. Memorandum of Agreement (ML050530238)  
2. Treatment Plan (ML050480339)**

**Docket: 70-3103**

**cc: Section 106 Service List (copy of Agreement only)**

**FINAL**

**MEMORANDUM OF AGREEMENT  
among the  
U.S. NUCLEAR REGULATORY COMMISSION  
NEW MEXICO STATE HISTORIC PRESERVATION OFFICER  
NEW MEXICO STATE LAND OFFICE  
LEA COUNTY  
and  
LOUISIANA ENERGY SERVICES  
regarding the  
MEASURES TO MITIGATE EFFECTS ON LA 140701, LA 140702, LA 140703, LA 140704,  
LA 140705, LA 140706, AND LA 140707  
in  
LEA COUNTY, New Mexico**

WHEREAS, the U.S. Nuclear Regulatory Commission (NRC), the lead Federal agency, has received an application from Louisiana Energy Services (LES), for the construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility (hereafter the undertaking), located in Lea County, New Mexico, as described in LES's application dated December 12, 2003, and revised February 27, 2004, July 30, 2004, and September 30, 2004; and,

WHEREAS, the approval or disapproval of the undertaking would be documented in a licensing action, according to NRC rules, regulations, and requirements; and,

WHEREAS, the New Mexico State Land Office (NMSLO), prior to the proposed undertaking, would convey trust lands to Lea County in exchange for a conveyance of non-trusts land by LES; and

WHEREAS, the undertaking's Area of Potential Effect (APE), as defined at 36 CFR 800.16(d) is shown in Figure 4 of An Intensive Cultural Resource Inventory of 543 Acres for the National Enrichment Facility Near Eunice, Lea County, New Mexico; and,

WHEREAS, pursuant to 36 CFR Part 800, the NRC has determined that the proposed project adversely affects LA 140701, LA 140702, LA 140703, LA 140704, LA 140705, LA 140706, and LA 140707, archaeological sites eligible for inclusion on the National Register of Historic Places (National Register) under criterion "d", and has consulted with the Advisory Council on Historic Preservation (Council), the State Historic Preservation Officer of New Mexico (SHPO), NMSLO, and LES on this Memorandum of Agreement (Agreement); and,

WHEREAS, pursuant to 36 CFR 800.3(f), the NRC has consulted with the Apache Tribe of Oklahoma, Kiowa Tribe of Oklahoma, Comanche Tribe of Oklahoma, Mescalero Apache, and Ysleta del Sur Pueblo regarding this Agreement; and,

WHEREAS, the NRC, as part of the National Environmental Policy Act review process, has sought public comments and notified the public of the potential effects of the undertaking on historic properties as required in 36 CFR Part 800 and has considered the applicable

requirements of Section 106 of the National Historic Preservation Act in the course of the consultation; and,

WHEREAS, LES has submitted to the SHPO a Treatment Plan for the archeological sites, which has been developed and prepared in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48 Fed. Reg. 44734-37) and the Council's Handbook, Treatment of Archaeological Properties; and,

NOW, THEREFORE, the signatories parties agree that the undertaking shall be administered in accordance with the following stipulations in order to consider the effect of the undertaking on historic properties and to satisfy Section 106 of the National Historic Preservation Act.

### **STIPULATIONS**

I. To the extent of its legal authority and in coordination with the SHPO and NMSLO, the NRC will ensure that the measures and procedures specified in the Treatment Plan, as approved by the SHPO, are implemented; this Agreement addresses all aspects of the Treatment Plan developed by LES.

II. LES will prepare a final report discussing the findings resulting from the Treatment Plan efforts. This report will be reviewed by the signatory and concurring parties within a 30-day comment period and any necessary revisions will be completed by LES.

#### III. Discovery

In the event that unrecorded or unanticipated properties that may be eligible for inclusion on the National Register are located during the Treatment Plan efforts, or it is recognized that such actions may affect known historic properties in an unanticipated manner, LES will terminate treatment in the vicinity of the property and will take all reasonable measures to avoid or minimize harm to the property until consultation with the signatory and concurring parties regarding significance and effect can be concluded. LES will notify the NRC, SHPO and the NMSLO at the earliest possible time and consult to develop actions that will take the effects of the undertaking into account. LES will further notify the NRC, SHPO, and NMSLO of any time constraints and they will mutually agree upon time frames for the consultation. These procedures will be addressed in the Treatment Plan.

#### IV. Contingency

LES shall prepare a draft nomination of the identified historic properties to the State Register of Cultural Properties prior to the land exchange. The draft nomination of these seven eligible archaeological sites shall be submitted to the SHPO, NMSLO, and Lea County for their review and files.

In the event that LES does not receive their NRC license for the National Enrichment Facility, Lea County shall formally submit the nomination to the Cultural Properties Review Committee for their consideration.

## V. Human Remains

If human remains are inadvertently discovered during construction activities, LES will notify the signatory parties and cease all construction within 300 feet in all directions of the human remains. Treatment and disposition of remains and associated grave goods will be consistent with applicable Federal and State laws including consultation with the appropriate Indian tribes. All of these sensitive objects will be treated with dignity and respect and consideration of the specific cultural and religious traditions applicable until their analysis is complete and their disposition has occurred. The limited analysis of human remains and associated funeral objects will be non-destructive unless otherwise agreed to by the culturally affiliated tribe(s).

## VI. Curation

LES shall provide for all records and materials resulting from data recovery efforts to be curated in accordance with standards and guidelines generated by 36 CFR Part 79. Artifacts will be curated at the Museum of New Mexico.

## VII. Confidentiality

All signatory and concurring parties shall ensure that shared data, including data concerning the precise location and nature of historic properties and properties of religious and cultural significance are protected from public disclosure to the greatest extent permitted by law, including conformance to Section 304 of the National Historic Preservation Act, as amended and Section 9 of the Archaeological Resources Protection Act and Executive Order No. 13007 on Indian Sacred Sites (Federal Register, Vol. 61 No. 104, May 24, 1996).

## VIII. Dispute Resolution

- A. Should any signatory party to this Agreement object within 30 calendar days to any action proposed or any document provided for review pursuant to this Agreement, the NRC shall consult with the objecting party to resolve the objection unless otherwise specified in this document. If NRC determines that the objection cannot be resolved, the NRC shall forward all documentation relevant to the dispute to the Council.
- B. The Council will, within 45 days after receipt of all pertinent documentation, either:
1. Provide the NRC with recommendations, (any comments provided by the Council and all comments from the parties to this Agreement will be taken into account by the NRC in reaching a final decision regarding the dispute.); or
  2. Notify the NRC that it will comment in accordance with 36 CFR Part 800.7 and proceed to comment. (Any Council comment provided in response to such a request will be taken into account by the NRC in accordance with 36 CFR Part 800.7(c)(4) with reference to the subject of the dispute.)
- C. Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute; the NRC's responsibility to carry out all actions under this Agreement that is not subject to dispute will remain unchanged.
- D. Should any concurring party to this Agreement object to any actions pursuant to this Agreement within 30 calendar days of initiation of that action, the NRC shall consult with the

objecting parties to resolve the objection. The objection must be identified specifically and the reasons for the objection documented. Any timely objections by a concurring party shall be resolved by the NRC in such a manner as it deems appropriate, upon consultation with the signatory and concurring parties.

#### IX. Termination

Any signatory party to this Agreement may terminate it by providing 30 calendar days notice, in writing, to the other parties, provided that the parties consult during the period prior to termination to seek agreement or amendments or other action that would avoid termination. If any Signatory individually terminates its participation in the Agreement, then the Agreement is terminated in its entirety. In the event of termination, the Signatories will comply with 36 CFR Part 800 Subpart B.

#### X. Amendment

Any signatory to this Agreement pursuant to 36 CFR 800.6(c)(1) may request that it be amended, whereupon the Signatories will consult in accordance with 36 CFR Part 800.6(c)(7) to consider such amendment.

#### XI. Failure to carry out the terms of the Agreement

In the event that the terms of this Agreement are not carried out, the NRC shall comply with 36 CFR 800.3 through 800.6 with regard to individual actions covered by this Agreement.

#### XII. Term of this Agreement

In the event that the terms of this Agreement are not carried out within two (2) years from the date of its execution, this agreement shall be null and void, unless the signatories agree in writing to an extension for carrying out its terms.

#### XIII. Execution of this Agreement

Execution and implementation of this Agreement evidences that the NRC has afforded the Council a reasonable opportunity to comment on the undertaking and its effects on historic properties and that the NRC has taken into account the effects of the undertaking on historic properties.

**SIGNATORY PARTIES:**

U.S. NUCLEAR REGULATORY COMMISSION

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE HISTORIC PRESERVATION OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE LAND OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

LEA COUNTY

By: \_\_\_\_\_

Date: \_\_\_\_\_

LOUISIANA ENERGY SERVICES

By: \_\_\_\_\_

Date: \_\_\_\_\_

**CONCURRING PARTIES:**

APACHE TRIBE OF OKLAHOMA

By: \_\_\_\_\_

Date: \_\_\_\_\_

KIOWA TRIBE OF OKLAHOMA

By: \_\_\_\_\_

Date: \_\_\_\_\_

COMANCHE TRIBE OF OKLAHOMA

By: \_\_\_\_\_

Date: \_\_\_\_\_

MESCALERO APACHE TRIBE

By: \_\_\_\_\_

Date: \_\_\_\_\_

YSLETA DEL SUR PUEBLO

By: \_\_\_\_\_

Date: \_\_\_\_\_



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

April 01, 2005

Mr. Alan Stanfill  
Senior Program Analyst  
Advisory Council on Historic Preservation  
12136 West Bayaud Avenue, Suite 330  
Lakewood, CO 80228

**SUBJECT: FINAL MEMORANDUM OF AGREEMENT AND TREATMENT PLAN FOR THE PROPOSED LOUISIANA ENERGY SERVICES NATIONAL ENRICHMENT FACILITY**

Dear Mr. Stanfill:

As you are aware, Louisiana Energy Services (LES) proposes to construct and operate the National Enrichment Facility (NEF), a gas centrifuge uranium enrichment facility, near Eunice, New Mexico. By letter dated February 17, 2004, the U.S. Nuclear Regulatory Commission (NRC) staff initiated the consultation process required by Section 106 of the National Historic Preservation Act (NHPA), with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office and with regional Federally-recognized Indian tribes.

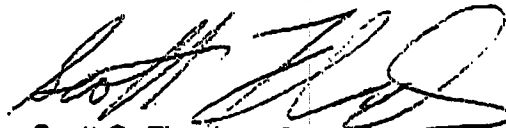
In a letter dated June 24, 2004, the NRC staff informed the Advisory Council on Historic Preservation (Council) of its intent to develop a Memorandum of Agreement (Agreement) with the New Mexico State Historic Preservation Officer, the New Mexico State Land Office, Lea County, and LES to ensure that the proposed NEF Project is undertaken in accordance with the requirements of Section 106 of the NHPA (36 CFR Part 800). In your letter of response dated November 8, 2004, you indicated that the Council did not need to participate in consultation to resolve potential adverse impacts to cultural resources; however, the NRC would need to file the completed Agreement (signed by all Signatories) with the Council to complete the requirements of Section 106 of the NHPA.

The purpose of this letter is to inform the Council that the Signatories have completed the development of the Agreement and Treatment Plan for protection of cultural resources at the proposed NEF site. Accordingly, pursuant to the requirements of 36 CFR 800.6(b)(iv), the NRC staff is filing the Agreement and the Treatment Plan (enclosed) with the Council. By copy of this letter, the other Signatories to the Agreement are provided with a signed copy of the Agreement.



If you have any questions or comments, please contact Melanie Wong, Project Manager for the environmental review of the proposed project, at (301) 415-6262. Thank you for your assistance.

Sincerely,



Scott C. Flanders, Deputy Director  
Environmental and Performance  
Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Nuclear Material Safety  
and Safeguards

Enclosures: Final Memorandum of Agreement  
Treatment Plan (ML050480339)

Docket: 70-3103

cc: Section 106 Service List (copy of Agreement only)

cc: Section 106 Service List

Jan Biella  
Deputy State Historic Preservation Officer  
State of New Mexico  
Department of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87501

James Brown  
Mayor  
City of Eunice  
P.O. Box 147  
Eunice NM 88231

Alonso Chalepah  
Chairman  
Apache Tribe of Oklahoma  
P.O. Box 1220  
Anadarko, OK 73005

Claydean Claiborne  
Mayor  
City of Jal  
P.O. Drawer 340  
Jal, NM 88252

Clay Clarke  
Assistant General Counsel  
New Mexico Environmental Department  
1190 St. Francis Drive  
Santa Fe, NM 87502-6110

The Honorable Wallace Coffey  
Director of Environment  
Comanche of Oklahoma  
P.O. Box 908  
Lawton, OK 73502

Ron Curry  
Cabinet Secretary  
New Mexico Environmental Department  
1190 St. Francis Drive  
Santa Fe, NM 87502-6110

James R. Curtiss  
Winston & Strawn  
1400 L Street, N.W.  
Washington, DC 20005-3502

David Eck

Cultural Resource Specialist  
New Mexico State Land Office  
P.O. Box 1148  
Santa Fe, NM 87504

Stephen R. Farris  
Assistant Attorney General  
P.O. Box 1508  
Santa Fe, NM 87504-1508

James Ferland  
President  
Louisiana Energy Services  
One Sun Plaza  
100 Sun Avenue, NE  
Suite 204  
Albuquerque, NM 87109

William Floyd  
Manager  
Radiation Protection Program  
New Mexico Environment Department  
Radiation Protection Department  
1190 St. Francis Drive  
P.O. Box 26110  
Santa Fe, NM 87502

Tannis L. Fox  
Attorney  
New Mexico Environmental Department  
1190 St. Francis Drive  
Santa Fe, NM 87502-6110

Glen Hackler  
City Manager  
City of Andrews  
111 Logsdon  
Andrews, TX 79714

Troy Harris  
Mayor  
City of Lovington  
214 South Love  
P.O. Box 1269  
Lovington, NM 88260

cc: Section 106 Service List

2

Peter S. Hastings  
Licensing & Safety Analysis Manager  
Duke Cogema Stone & Webser  
128 South Tryon Street  
FC12A  
Charlotte, NC 28202

The Honorable Billy Evan Horse  
Chairman  
Kiowa Tribe of Oklahoma  
P.O. Box 369  
Carnegie, OK 73015

Holly B.E. Houghten  
Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, NM 88340

Bobby Jay  
Cultural Resources Officer  
Apache Tribe of Oklahoma  
P.O. Box 1220  
Anadarko, OK 73005

Rod Krich  
Vice President  
Licensing Projects  
Exelon General Co.  
4300 Winfield Road  
Warrenville, IL 60555

Lindsay A. Lovejoy, Jr.  
Attorney-at-Law  
Nuclear Information and Resource Service  
618 Paseo de Peralta  
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Santa Fe, NM 87501

Patricia A. Madrid  
N.M. Attorney General  
P.O. Box 1508  
Santa Fe, NM 87504-1508

Melissa Y. Mascarenas

Legal Assistant  
New Mexico Environmental Department  
1190 St. Francis Drive  
Santa Fe, NM 87502-6110

Peter Miner  
Licensing Manager  
U.S. Enrichment Corporation - Licensing  
Projects  
6903 Rockledge Drive  
Bethesda, MD 20817-1818

Monty Newman  
Mayor  
City of Hobbs  
300 North Turner  
Hobbs, NM 88240

Don Palmrose  
Senior Nuclear Safety Engineer  
ATL International, Inc.  
20010 Century Blvd.  
Suite 500  
Germantown, MD 20874

David M. Pato  
Assistant Attorney General  
P.O. Box 1508  
Santa Fe, NM 87504-1508

Richard Ratliff  
Chief  
Texas Department of Health-Bureau of  
Radiation Control  
1100 West 49<sup>th</sup> Street  
Austin, TX 78756-3189

Betty Rickman  
Mayor  
Town of Tatum  
P.O. Box 416  
Tatum, NM 88267-0416

The Honorable Arturo Sinclair  
Governor

cc: Section 106 Service List

2

Ysleta del Sur Pueblo  
P.O. Box 17579, Ysleta Station  
El Paso, TX 79917

Glenn Smith  
Deputy Attorney General  
P.O. Box 1508  
Santa Fe, NM 87504-1508

The Honorable George Tahboun  
Vice-Chairman  
Kiowa Tribe of Oklahoma  
P.O. Box 369  
Carnegie, OK 73015

Harry Teague  
Commissioner  
Lea County  
P.O. Box 1500  
Hobbs, NM 88241

Derrith Watchman-Moore  
Deputy Secretary  
New Mexico Environmental Department  
P.O. Box 26110  
Santa Fe, NM 87502-6110

Phillip A. Young  
Preservation Planning Coordinator  
State of New Mexico  
Department of Cultural Affairs  
Historic Preservation Division  
228 East Palace Avenue  
Room 320  
Santa Fe, NM 87501

**FINAL**

**MEMORANDUM OF AGREEMENT  
among the  
U.S. NUCLEAR REGULATORY COMMISSION  
NEW MEXICO STATE HISTORIC PRESERVATION OFFICER  
NEW MEXICO STATE LAND OFFICE  
LEA COUNTY  
and  
LOUISIANA ENERGY SERVICES  
regarding the  
MEASURES TO MITIGATE EFFECTS ON LA 140701, LA 140702, LA 140703, LA 140704,  
LA 140705, LA 140706, AND LA 140707  
in  
LEA COUNTY, New Mexico**

WHEREAS, the U.S. Nuclear Regulatory Commission (NRC), the lead Federal agency, has received an application from Louisiana Energy Services (LES), for the construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility (hereafter the undertaking), located in Lea County, New Mexico, as described in LES's application dated December 12, 2003, and revised February 27, 2004, July 30, 2004, and September 30, 2004; and,

WHEREAS, the approval or disapproval of the undertaking would be documented in a licensing action, according to NRC rules, regulations, and requirements; and,

WHEREAS, the New Mexico State Land Office (NMSLO), prior to the proposed undertaking, would convey trust lands to Lea County in exchange for a conveyance of non-trusts land by LES; and

WHEREAS, the undertaking's Area of Potential Effect (APE), as defined at 36 CFR 800.16(d) is shown in Figure 4 of An Intensive Cultural Resource Inventory of 543 Acres for the National Enrichment Facility Near Eunice, Lea County, New Mexico; and,

WHEREAS, pursuant to 36 CFR Part 800, the NRC has determined that the proposed project adversely affects LA 140701, LA 140702, LA 140703, LA 140704, LA 140705, LA 140706, and LA 140707, archaeological sites eligible for inclusion on the National Register of Historic Places (National Register) under criterion "d", and has consulted with the Advisory Council on Historic Preservation (Council), the State Historic Preservation Officer of New Mexico (SHPO), NMSLO, and LES on this Memorandum of Agreement (Agreement); and,

WHEREAS, pursuant to 36 CFR 800.3(f), the NRC has consulted with the Apache Tribe of Oklahoma, Kiowa Tribe of Oklahoma, Comanche Tribe of Oklahoma, Mescalero Apache, and Ysleta del Sur Pueblo regarding this Agreement; and,

WHEREAS, the NRC, as part of the National Environmental Policy Act review process, has sought public comments and notified the public of the potential effects of the undertaking on historic properties as required in 36 CFR Part 800 and has considered the applicable

requirements of Section 106 of the National Historic Preservation Act in the course of the consultation; and,

WHEREAS, LES has submitted to the SHPO a Treatment Plan for the archeological sites, which has been developed and prepared in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48 Fed. Reg. 44734-37) and the Council's Handbook, Treatment of Archaeological Properties; and,

NOW, THEREFORE, the signatory parties agree that the undertaking shall be administered in accordance with the following stipulations in order to consider the effect of the undertaking on historic properties and to satisfy Section 106 of the National Historic Preservation Act.

### STIPULATIONS

I. To the extent of its legal authority and in coordination with the SHPO and NMSLO, the NRC will ensure that the measures and procedures specified in the Treatment Plan, as approved by the SHPO, are implemented; this Agreement addresses all aspects of the Treatment Plan developed by LES.

II. LES will prepare a final report discussing the findings resulting from the Treatment Plan efforts. This report will be reviewed by the signatory and concurring parties within a 30-day comment period and any necessary revisions will be completed by LES.

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A. Should any signatory party to this Agreement object within 30 calendar days to any action proposed or any document provided for review pursuant to this Agreement, the NRC shall consult with the objecting party to resolve the objection unless otherwise specified in this document. If NRC determines that the objection cannot be resolved, the NRC shall forward all documentation relevant to the dispute to the Council.

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objecting parties to resolve the objection. The objection must be identified specifically and the reasons for the objection documented. Any timely objections by a concurring party shall be resolved by the NRC in such a manner as it deems appropriate, upon consultation with the signatory and concurring parties.

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Execution and implementation of this Agreement evidences that the NRC has afforded the Council a reasonable opportunity to comment on the undertaking and its effects on historic properties and that the NRC has taken into account the effects of the undertaking on historic properties.



**SIGNATORY PARTIES:**

U.S. NUCLEAR REGULATORY COMMISSION

By: 

Date: 1 April 2005

NEW MEXICO STATE HISTORIC PRESERVATION OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE LAND OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

LEA COUNTY

By: \_\_\_\_\_

Date: \_\_\_\_\_

LOUISIANA ENERGY SERVICES

By: \_\_\_\_\_

Date: \_\_\_\_\_

**SIGNATORY PARTIES:**

U.S. NUCLEAR REGULATORY COMMISSION

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE HISTORIC PRESERVATION OFFICE

By: *Katherine Stuch*

Date: *8 March 2005*

NEW MEXICO STATE LAND OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

LEA COUNTY

By: \_\_\_\_\_

Date: \_\_\_\_\_

LOUISIANA ENERGY SERVICES

By: \_\_\_\_\_

Date: \_\_\_\_\_

**SIGNATORY PARTIES:**

U.S. NUCLEAR REGULATORY COMMISSION

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE HISTORIC PRESERVATION OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE LAND OFFICE

By: Patrick A. Lyons / PAK

Date: 3/7/05

LEA COUNTY

By: \_\_\_\_\_

Date: \_\_\_\_\_

LOUISIANA ENERGY SERVICES

By: \_\_\_\_\_

Date: \_\_\_\_\_

**SIGNATORY PARTIES:**

U.S. NUCLEAR REGULATORY COMMISSION

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE HISTORIC PRESERVATION OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE LAND OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

LEA COUNTY

By: 

Date: 3-22-05

LOUISIANA ENERGY SERVICES

By: \_\_\_\_\_

Date: \_\_\_\_\_

**SIGNATORY PARTIES:**

U.S. NUCLEAR REGULATORY COMMISSION

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE HISTORIC PRESERVATION OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

NEW MEXICO STATE LAND OFFICE

By: \_\_\_\_\_

Date: \_\_\_\_\_

LEA COUNTY

By: \_\_\_\_\_

Date: \_\_\_\_\_

LOUISIANA ENERGY SERVICES

By: *F. M. Garcia*

Date: *3/3/05*

**CONCURRING PARTIES:**

APACHE TRIBE OF OKLAHOMA

By: \_\_\_\_\_

Date: \_\_\_\_\_

KIOWA TRIBE OF OKLAHOMA

By: \_\_\_\_\_

Date: \_\_\_\_\_

COMANCHE TRIBE OF OKLAHOMA

By: \_\_\_\_\_

Date: \_\_\_\_\_

MESCALERO APACHE TRIBE

By: \_\_\_\_\_

Date: \_\_\_\_\_

YSLETA DEL SUR PUEBLO

By: \_\_\_\_\_

Date: \_\_\_\_\_

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### **B.3 Other Consultation Letters**



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# United States Department of the Interior

Bureau of Land Management  
Carlsbad Field Office  
620 E. Greene Street  
Carlsbad, NM 88220  
www.blm.gov

IN REPLY REFER TO:  
1790

MAR 16 2004

Ms. Melanie Wong  
Chief, Rules and Directives Branch  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Dear Ms Wong:

The U.S. Bureau of Land Management (BLM), Carlsbad Field Office appreciates the opportunity to provide technical assistance and participate in the scoping process for the proposed Gas Centrifuge Uranium Enrichment Facility as published in the Federal Register (Vol. 69, No. 23 - Wednesday, February 4, 2004). The BLM understands that the following locations are being considered by Louisiana Energy Services for location of the proposed facility:

- 1) Section 32, T21S, R38E - preferred by LES;
- 2) Section 24, T21S, R27E; and
- 3) Section 8, T22S, R31E.

Following are issues regarding the preferred location and identified alternative locations:

- 1) While the BLM does not manage any of the resources in section 32 the BLM does manage much of the subsurface minerals in adjacent sections and would be interested in how the proposed facility would affect management of those minerals.
- 2) The BLM manages both the surface and subsurface resources in the W $\frac{1}{4}$ , SW $\frac{1}{4}$ , Section 24 and therefore would have a strong interest in proposed facilities or management actions affecting that parcel of land as well as nearby federal land and mineral resources.
- 3) The BLM manages both the surface and subsurface resources in Section 8 and therefore would have a strong interest in proposed facilities or management actions affecting that parcel of land and adjacent federal land and mineral resources.

If the locations identified as alternatives (see #s 2 & 3 above) are carried forward through the National Environmental Policy Act (NEPA) analysis, the BLM is requesting formal cooperating agency status, according to the Council on Environmental Quality (CEQ) regulations for implementing NEPA. Please contact our office to establish the appropriate agreement documentation. However, if only the preferred alternative is analyzed, then the BLM role will be as an interested party and requests that the agency and Carlsbad Office, specifically, be kept informed through the process and provided NEPA documents to review as they are produced.

Please keep the Carlsbad Field Office (CFO) of the Bureau of Land Management (BLM) involved in the evaluation of this proposed action. The CFO-BLM contact for this project will be Peg Sorensen at 505-234-5983 or [peg\\_sorensen@blm.gov](mailto:peg_sorensen@blm.gov). Again, thank you for the opportunity to provide comments.

Sincerely,

Leslie Theiss  
Carlsbad Field Manager



United States Department of the Interior  
NATIONAL PARK SERVICE  
INTERMOUNTAIN REGION  
Intermountain Support Office  
12795 West Alameda Parkway  
PO Box 25287  
Denver, Colorado 80225-0287



March 9, 2004

U.S. Nuclear Regulatory Commission  
Washington DC, 20555-0001  
Rules and Directives Branch  
Mail Stop T6-D59, Attn: Chief

Subject: Comments on the Notice of Intent to Prepare an Environmental Impact Statement for Louisiana Energy Services Gas Centrifuge Uranium Enrichment Facility

To Whom It May Concern:

The National Park Service has reviewed the subject Notice of Intent based on the assumption that the project is near the city of Eunice in Lea County, New Mexico. We have reviewed this project in relation to any possible conflicts with the Land and Water Conservation Fund (L&WCF) and the Urban Park and Recreation Recovery programs, and find that the following L&WCF projects may be adversely affected:

35-00035, Eunice Municipal Park	35-00770, Marshall Memorial Park
35-00177, Eunice Municipal Recreation Park	35-00970, Marshall Park Sprinklers
35-00215, Eunice Municipal Golf Course	35-00987, Marshall Park Improvements
35-00358, Eunice Neighborhood Park	35-00989, Stevens Park Improvements
35-00527, Eunice Tennis Court Renovation	35-01096, Marshall Park Trail

We recommend you consult directly with the official who administers the L&WCF program in the State of New Mexico to determine any potential conflicts with Section 6(f)(3) of the L&WCF Act (Public Law 88-578, as amended). This section states: "No property acquired or developed with assistance under this section shall, without the approval of the Secretary [of the Interior], be converted to other than public outdoor recreation uses." The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location."

The administrator for the L&WCF program in New Mexico is Ms. Sandra Massengill, Planner Director, Department Energy, Minerals & Natural Resources, 1220 S. Saint Francis Drive, Santa Fe, New Mexico 87505-4000. Ms. Massengill's phone number is: (505) 476-3392.

Thank you again for the opportunity to comment on this project. If you have any questions, please contact Jane Eeu, Outdoor Recreation Planner, in our Midwest Regional Office at (402) 221-7270.

Sincerely,

Cheryl Eckhardt  
NEPA/106 Specialist

TAKE PRIDE<sup>®</sup>  
IN AMERICA 

**Zeitoun, Abe**

---

-----Original Message-----

**From:** Massengill, Sandra [mailto:SMASSENGILL@state.nm.us]  
**Sent:** Monday, May 24, 2004 12:47 PM  
**To:** Zeitoun, Abe  
**Subject:** FW: Land & Water Conservation Fund Consultation

FYI

-----Original Message-----

**From:** Massengill, Sandra  
**Sent:** Monday, May 24, 2004 10:47 AM  
**To:** 'rabousleman'  
**Subject:** RE: Land & Water Conservation Fund Consultation

Thanks so much for the response.

-----Original Message-----

**From:** rabousleman [mailto:rabousleman@leaco.net]  
**Sent:** Monday, May 24, 2004 7:43 AM  
**To:** Massengill, Sandra  
**Subject:** Re: Land & Water Conservation Fund Consultation

Sandra:

The Eunice parks are not affected by the proposed NEF plant. The plant location is approximately five miles east of Eunice. All parks are located in the City except one which is located about five miles west of the City.

If you need other information, give me a call.

Ron

-----Original Message-----

**From:** Massengill, Sandra  
**Sent:** Monday, May 03, 2004 11:18 AM  
**To:** 'rabousleman@leaco.net'  
**Subject:** FW: Land & Water Conservation Fund Consultation

Could you please verify that the Eunice Parks funded with LWCF funds is not affected by the proposed NEF facility so I can forward your response to Mr.. Zeitoun? Thanks!

-----Original Message-----

**From:** Zeitoun, Abe [mailto:AZeitoun@atlintl.com]  
**Sent:** Thursday, April 01, 2004 12:33 PM  
**To:** smassengill@state.nm.us  
**Subject:** FW: Land & Water Conservation Fund Consultation

Dear Ms. Sandra Massengill,

In reference to our telephone conversation yesterday, please find attached the maps for Eunice and the maps that shows the proposed National Enrichment Facility in relation to the city of Eunice. The National Park Service raised concern that the construction and operation of the proposed facility may conflict with Section 6(f)(3) of the L&WCF program that you administer for the State of New Mexico. Projects cited in the National Park Service letter were: 035, 177, 215, 358, 527, 770, 970, 987, 989, and 1096. Please advise.

*Thank You*

*Abe Zeitoun*

*Corporate Vice President  
ATL International, Inc.  
20010 Century Blvd., Suite 500  
Germantown, MD 20874  
(301) 515-6770 Voice  
(301) 972-6904 fax*

This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the sender.

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## APPENDIX C DOSE METHODOLOGY AND IMPACTS

### C.1 Introduction

This appendix presents the methodology, assumptions, data, and results for the potential impacts on individual workers and members of the public resulting from routine or normal operations and accidents from the Louisiana Energy Services (LES) proposed National Enrichment Facility (NEF), including a description of how radioactive material, such as uranium, results in radiation doses and a comparison of these doses to applicable standards.

The consequence of internal and external radiation exposure due to the deposition of energy from radioactive material in body tissues is represented as absorbed dose. Absorbed dose is quantified as energy absorbed per unit of tissue mass. The biological effect on individual tissues is estimated by multiplying the absorbed dose by a factor that accounts for the relative biological effect of differing types of radiation. This modified tissue dose is called dose equivalent. Dose equivalent can represent external radiation (i.e., radiation absorbed through the skin from a source external to the body) or internal radiation (i.e., radiation absorbed by internal tissues of the body due to inhalation or ingestion). The effect on the whole body from external and/or internal radiation is represented as a risk-weighted sum of the set of tissue dose equivalents. This dose, called the effective dose equivalent (EDE), can be integrated over a period of years to account for the accumulated effect from a single year's exposure. The time-integrated measure of effect for internal radiation is called the committed effective dose equivalent (CEDE). CEDEs are combined with dose estimates for external exposure to calculate a measure of effect for both exposure modes, called the total effective dose equivalent (TEDE) (ANL, 2004).

#### C.1.1 Regulatory Limits

Title 10, "Energy," of the *U.S. Code of Federal Regulations* (10 CFR) Part 20 provides the regulatory limits for occupational doses and radiation dose for individual members of the public. For occupational doses, 10 CFR § 20.1201 states that licensees must limit the occupational dose to individual adults to an annual limit, which is the more limiting of:

- The TEDE being equal to 0.05 sievert (5 rems).
- The sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 0.5 sievert (50 rems).

Additionally, the annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities are:

- A lens dose equivalent of 0.15 sievert (15 rems).
- A shallow-dose equivalent of 0.5 sievert (50 rem) to the skin of the whole body or to the skin of any extremity.

In addition to the annual occupational dose limits, 10 CFR § 20.1201 would limit the soluble uranium intake by an individual to 10 milligrams in a week because of chemical toxicity.

An explicit TEDE limit of 1.0 millisievert per year (100 millirem per year) from all sources is provided for individual members of the public. This limit includes both internal and external doses through all

pathways (including food). External dose rates cannot exceed 0.02 millisievert (2 millirem) in any one hour. Further, LES would be subject to the generally applicable standards in 10 CFR § 20.1101 and 40 CFR Part 190. 40 CFR Part 190 requires that routine releases from uranium fuel-cycle facilities to the general environment would not result in annual doses exceeding 0.25 millisievert (25 millirem) to the whole body, 0.75 millisievert (75 millirem) to the thyroid, and 0.25 millisievert (25 millirem) to any other organ.

## C.2 Pathway Assessment

Exposure to uranium processed by the proposed NEF could occur from routine operations as a result of small controlled releases to the atmosphere from the uranium enrichment process lines and decontamination and maintenance of equipment, releases of radioactive liquids to surface water, and direct radiation from the uranium material. Radioactive material released to the atmosphere, surface water, and groundwater is dispersed during transport through the environment and transferred to human receptors through inhalation, ingestion, and direct exposure pathways. Therefore, evaluation of impacts requires consideration of potential receptors, source terms, environmental transport, exposure pathways, and conversion of estimates of intake to dose.

Under the proposed action, the major source of occupational exposure would be expected to be from direct radiation from the uranium hexafluoride ( $UF_6$ ) with the largest exposure source being the cylinders (empty and full) that hold the  $UF_6$ . These cylinders are as follows:

- Type 48Y cylinders containing either the feed material (natural  $UF_6$ ) or the depleted uranium hexafluoride ( $DUF_6$ ) called uranium byproduct cylinders (UBCs), or empty with residual material.
- Type 48X cylinders containing the feed material or empty with residual material.
- Type 30 product cylinders holding the enriched  $UF_6$  for shipping to nuclear fuel manufacturers.

In addition to direct radiation, there could be the potential for serious internal exposure from long-term contact with  $UF_6$  leaking from the process equipment and acute exposure resulting from accidents.

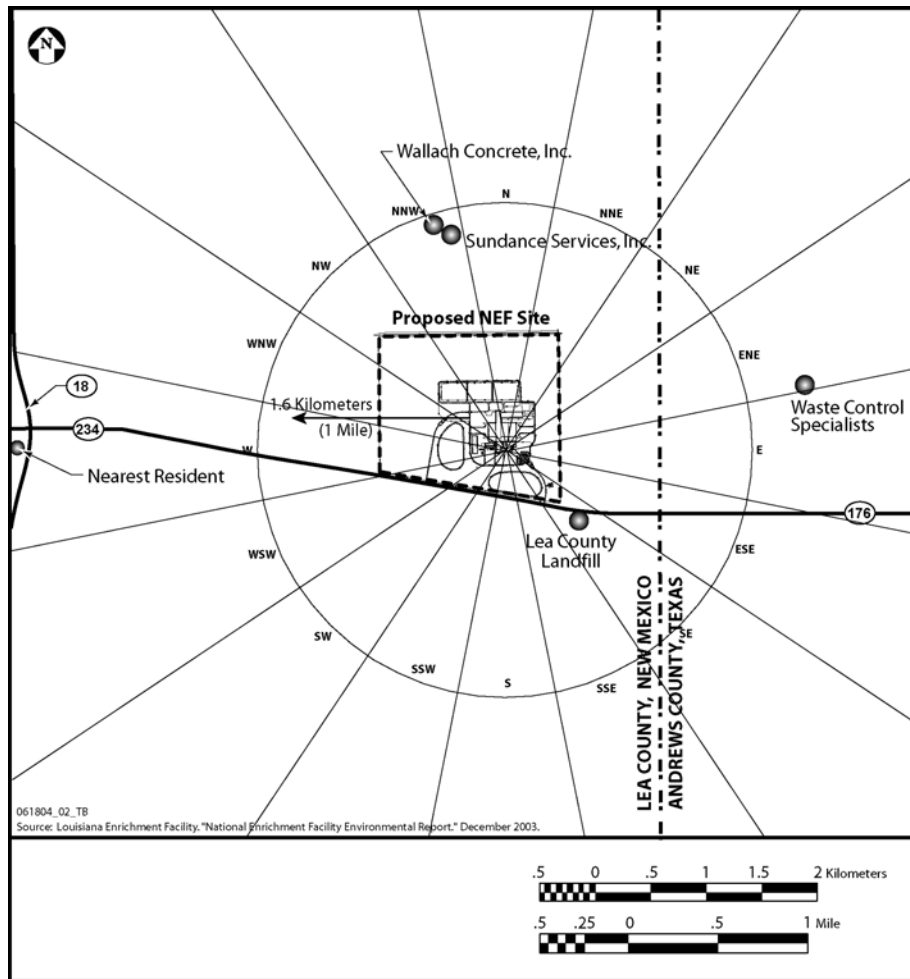
The major source of exposure to the general public would be expected to come from atmospheric releases. Such releases would be primarily controlled through the Technical Services Building and Separations Building gaseous effluent vent systems. The principal function of the gaseous effluent vent system is to protect both the operator during the connection/disconnection of  $UF_6$  process equipment and the surrounding population and environment by collecting and cleaning all potentially hazardous gases from the plant prior to release to the atmosphere. In addition, the Centrifuge Test and Postmortem Facilities would have an exhaust filtration system that would serve the same purpose as the gaseous effluent vent system. The Technical Services Building heating, ventilation, and air-conditioning system would perform a confinement ventilation function for potentially contaminated areas in the building. Members of the public, if close enough, could be affected by direct radiation and skyshine (radiation reflected from the atmosphere).

The principal source for direct radiation offsite would be from the storage of UBCs filled with  $DUF_6$  that could be stored within the site boundaries of the proposed NEF. Direct radiation and skyshine from the  $UF_6$  within the Separations Building (i.e., the gaseous centrifuge cascades) would be undetectable because most of the direct radiation associated with this uranium would be almost completely absorbed by the heavy process lines, walls, equipment, and tanks that would be employed in the gaseous centrifuge cascades.

### C.2.1 Receptors of Concern

LES determined distances to the site boundary using guidance from the U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.145 (NRC, 1983). The distance to the nearest resident was determined using global positioning system measurements. Figure C-1 shows the locations of the release points and locations of receptors of concern. The nearest resident is located 4,233 meters (2.6 mi) west of the proposed NEF gaseous effluent vent system stacks at a permanent residence. There are four industrial sites near the proposed NEF that are also considered for their potential exposures from gaseous releases, namely Wallach Concrete, Inc., Sundance Services, Inc., the Lea County Landfill, and Waste Control Specialists (WCS). The nearest resident is assumed to be present the entire year (8,766 hours), and workers are assumed to be present for an 8-hour workday, 5 days a week for 50 weeks a year (2,000 hours per year). Table C-1 presents the receptors and estimated distances.

**Table C-1 Estimated Distances for Receptors of Concern**



**Figure C-1 Locations of Release Points and Individual Receptors (LES, 2005a)**

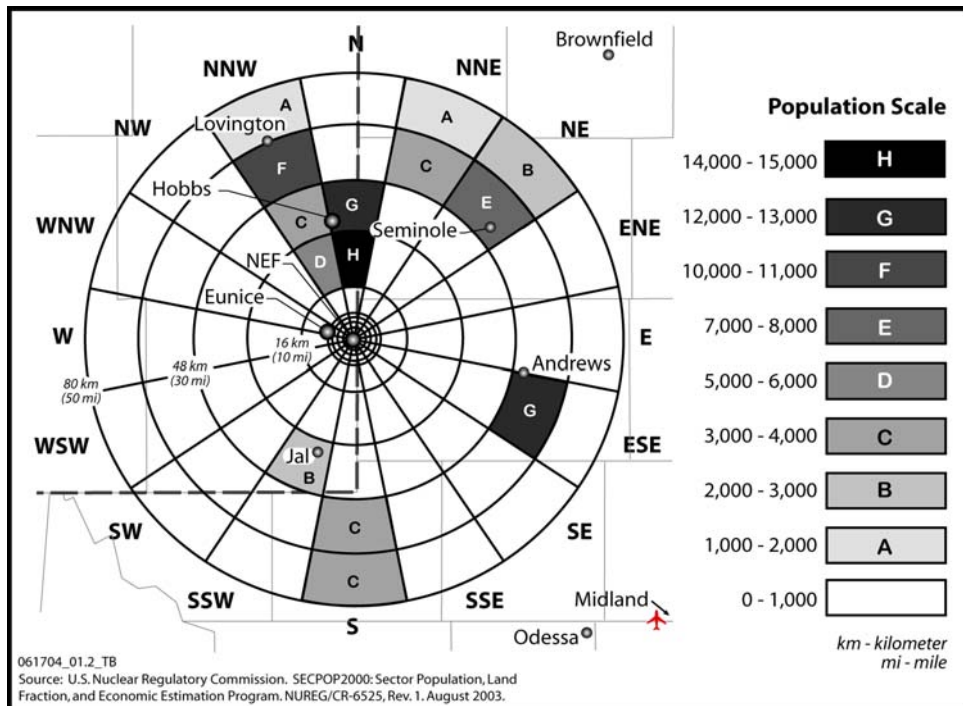


**Table C-1 Estimated Distances for Receptors of Concern**

Receptor	Direction from Proposed NEF	Estimated Distance from Airborne Effluent Releases meters (miles)	Estimated Distance from UBC Storage Pad Edge to Receptor meters (miles)
Nearest Resident	West	4,233 (2.6)	—
Wallach Concrete, Inc.	North-Northwest	1,867 (1.2)	1,033 (0.6)
Sundance Specialists, Inc.	North-Northwest	1,706 (1.1)	885 (0.6)
Waste Control Specialists	East-Northeast	1,513 (0.9)	783 (0.5)
Lea County Landfill	Southeast	917 (0.6)	—

— No values given since receptor too distant or not in direct path.  
 Source: LES, 2005a.

The radiological assessment in this Environmental Impact Statement (EIS) determines impacts to a population within 80 kilometers (50 miles) and to a maximum exposed individual whose exposure would bound all foreseeable impacts related to the proposed NEF site operation. The total population within 80 kilometers (50 miles) is 94,758 people as calculated by SECPOP2000, a sector population, land fraction, and economic estimation program prepared for NRC based on Census 2000 data (NRC, 2003a). Figure C-2 presents the population distribution, and Table C-2 presents population data for each of 16 downwind sectors at 10 distance intervals.



**Figure C-2 Population within 80 Kilometers (50 Miles) of the Proposed NEF (NRC, 2003a)**

**Table C-2 Public Population in Sectors Surrounding the Proposed NEF**

<b>Sector</b>	<b>0-1 mi (0-1.6 km)</b>	<b>1-2 mi (1.6-3.2 km)</b>	<b>2-3 mi (3.2-4.8 km)</b>	<b>3-4 mi (4.8-6.4 km)</b>	<b>4-5 mi (6.4-8.1 km)</b>	<b>5-10 mi (8.1-16.1 km)</b>	<b>10-20 mi (16.1-32.2 km)</b>	<b>20-30 mi (32.2-48.3 km)</b>	<b>30-40 mi (48.3-64.4 km)</b>	<b>40-50 mi (64.4-80.5 km)</b>
N	0	0	0	0	0	9	14,637	12,616	273	222
NNE	0	0	0	0	0	0	69	217	4,760	1,120
NE	0	0	0	0	0	0	49	995	7,464	2,809
ENE	0	0	0	0	0	0	7	430	972	46
E	0	0	0	0	0	0	7	45	351	41
ESE	0	0	0	0	0	0	0	105	12,351	60
SE	0	0	0	0	0	0	23	18	20	848
SSE	0	0	0	0	0	0	0	19	8	18
S	0	0	0	0	0	0	4	37	3,369	3,754
SSW	0	0	0	4	0	6	4	2,033	11	12
SW	0	0	0	0	0	17	12	3	1	3
WSW	0	0	0	0	15	34	9	13	2	8
W	0	0	11	53	2,099	484	13	2	4	21
WNW	0	0	0	0	104	35	20	0	9	8
NW	0	0	0	5	2	3	223	33	43	83
NNW	0	0	0	0	0	0	5,044	4,543	10,565	1,391

mi - mile.

km - kilometer.

### **C.2.2 Exposure Pathways Parameters**

Guidance on acceptable exposure models for the pathways of concern has been published in NRC Regulatory Guide 1.109 (NRC, 1977a) and incorporated into a variety of computer codes. GENII v. 1.485 (Napier et al., 1988) is used to estimate collective radiation doses (person-rem) to members of the public resulting from post-accident inhalation and ingestion of soluble uranium compounds. The exposure pathways analyzed include inhalation of soluble uranium carried by wind, external radiation from radioactivity deposited on the ground downwind of the proposed NEF, and ingestion of contaminated food (produce, meat, and dairy products). The ingestion parameters used to estimate radiological doses to the public are described in Table C-3. For releases of uranium compounds, the northern sectors would have the highest collective doses because Hobbs, New Mexico, is a large population center in the prevailing downwind direction.

**Table C-2 Public Population in Sectors Surrounding the Proposed NEF**

<b>Sector</b>	<b>0-1 mi (0-1.6 km)</b>	<b>1-2 mi (1.6-3.2 km)</b>	<b>2-3 mi (3.2-4.8 km)</b>	<b>3-4 mi (4.8-6.4 km)</b>	<b>4-5 mi (6.4-8.1 km)</b>	<b>5-10 mi (8.1-16.1 km)</b>	<b>10-20 mi (16.1-32.2 km)</b>	<b>20-30 mi (32.2-48.3 km)</b>	<b>30-40 mi (48.3-64.4 km)</b>	<b>40-50 mi (64.4-80.5 km)</b>
N	0	0	0	0	0	9	14,637	12,616	273	222
NNE	0	0	0	0	0	0	69	217	4,760	1,120
NE	0	0	0	0	0	0	49	995	7,464	2,809
ENE	0	0	0	0	0	0	7	430	972	46
E	0	0	0	0	0	0	7	45	351	41
ESE	0	0	0	0	0	0	0	105	12,351	60
SE	0	0	0	0	0	0	23	18	20	848
SSE	0	0	0	0	0	0	0	19	8	18
S	0	0	0	0	0	0	4	37	3,369	3,754
SSW	0	0	0	4	0	6	4	2,033	11	12
SW	0	0	0	0	0	17	12	3	1	3
WSW	0	0	0	0	15	34	9	13	2	8
W	0	0	11	53	2,099	484	13	2	4	21
WNW	0	0	0	0	104	35	20	0	9	8
NW	0	0	0	5	2	3	223	33	43	83
NNW	0	0	0	0	0	0	5,044	4,543	10,565	1,391

mi - mile.

km - kilometer.

### **C.2.2 Exposure Pathways Parameters**

Guidance on acceptable exposure models for the pathways of concern has been published in NRC Regulatory Guide 1.109 (NRC, 1977a) and incorporated into a variety of computer codes. GENII v. 1.485 (Napier et al., 1988) is used to estimate collective radiation doses (person-rem) to members of the public resulting from post-accident inhalation and ingestion of soluble uranium compounds. The exposure pathways analyzed include inhalation of soluble uranium carried by wind, external radiation from radioactivity deposited on the ground downwind of the proposed NEF, and ingestion of contaminated food (produce, meat, and dairy products). The ingestion parameters used to estimate radiological doses to the public are described in Table C-3. For releases of uranium compounds, the northern sectors would have the highest collective doses because Hobbs, New Mexico, is a large population center in the prevailing downwind direction.

**Table C-3 Ingestion Parameters Used in GENII to Calculate  
Collective Radiological Dose to the Public**

**Parameter Values for Consumption of Terrestrial Food**

Food Type	General Population			
	Growing Time (days)	Yield kg/m <sup>2</sup> (lbs/ft <sup>2</sup> )	Holdup Time (days)	Consumption Rate kg/yr (lbs/yr)
Leafy Vegetables	90	1.5 (0.3)	14	15 (33)
Root Vegetables	90	4 (0.8)	14	140 (309)
Fruit	90	2 (0.4)	14	64 (141)
Grains/Cereals	90	0.8 (0.2)	180	72 (159)

**Parameter Values for Consumption of Animal Products**

Food Type	Consumption Rate kg/yr (lbs/yr)	Holdup Time (days)	Type	Diet Fraction	Growing Time (days)	Yield kg/m <sup>2</sup> (lbs/ft <sup>2</sup> )	Storage Time (days)
Beef	70 (154)	34	Stored Feed	0.25	90	0.8 (0.2)	180
			Fresh Forage	0.75	45	2 (0.4)	100
Poultry	8.5 (19)	34	Stored Feed	1	90	0.8 (0.2)	180
			Fresh Forage	---	---	---	---
Milk	230 (507)	3	Stored Feed	0.25	45	2 (0.4)	100
			Fresh Forage	0.75	30	1.5 (0.3)	0
Eggs	20 (44)	18	Stored Feed	1	90	0.8 (0.2)	180
			Fresh Forage	---	---	---	---

kg/m<sup>2</sup> - kilograms per square meter.

lbs/ft<sup>2</sup> - pounds per square feet.

km/yr - kilometers per year.

lbs/yr - pounds per year.

“Holdup Time” - the time between harvest and consumption of the food; this time includes processing, transportation, and storage of the food.

**C.2.3 Airborne Release Parameters**

LES provided information on release parameters at the proposed NEF (LES, 2005a). Table C-4 presents design information for each of the effluent release points. The primary release pathways for radioactivity discharged from the facility would be via the Technical Services Building and Separation Building gaseous effluent vent systems. Both of these exhaust stacks, as well as the Technical Services Building Confinement Ventilation System stack, would be located on the Technical Services Building roof. For the proposed NEF, 63 percent of the uranium discharged would be released via the Technical Services Building gaseous effluent vent system, with the remaining 37 percent estimated for the Separations

Building gaseous effluent vent system. Only trace amounts of uranium would be associated with the Technical Services Building Confinement Ventilation System and the Centrifuge Assembly Building Centrifuge Test and Postmortem Facility exhausts and, as such, would not be expected to release any detectable radioactivity.

**Table C-4 Effluent Release Point Design Parameters**

<b>Release Point</b>	<b>Stack Exit Area m<sup>2</sup> (ft<sup>2</sup>)</b>	<b>Exit Height m (ft)</b>	<b>Building Height m (ft)</b>	<b>Adjacent Building Height m (ft)</b>	<b>Exit Velocity m/sec (ft/min)</b>	<b>Exit Temperature</b>
TSB GEVS	0.29 (3.14)	13 (42.6)	10 (32.8)	10 (32.8)	18.3 (3,600)	Room temp.
SB GEVS	0.13 (1.40)	13 (42.6)	10 (32.8)	10 (32.8)	23.4 (4,600)	Room temp.
CAB CT&PM	0.13 (1.40)	15 (49.2)	12 (39.4)	12 (39.4)	20.3 (4,000)	Room temp.
TSB CVS	0.29 (3.14)	13 (42.6)	10 (32.8)	10 (32.8)	20.3 (4,000)	Room temp.

TSB GEVS - Technical Services Building Gaseous Effluent Vent System.

SB GEVS - Separation Building Gaseous Effluent Vent System.

CAB CT&PM - Centrifuge Assembly Building; Centrifuge Test and Postmortem Facility.

TSB CVS - Technical Services Building Confinement Ventilation System.

m -meter.

m<sup>2</sup> - square meter.

ft - feet.

m/sec - meters per second.

ft/min - feet per minute.

Source: LES, 2005a.

The primary component of atmospheric dispersion is mechanical mixing produced by temperature and wind velocity gradients. For projected normal operational releases, the methods of Regulatory Guide 1.111 (NRC, 1977b) are used to estimate concentrations of released material at a range of distances and directions from the release point. These methods use the Gaussian plume dispersion model that is implemented in the XOQDOQ computer code and was applied in this analysis (Sagendorf et al., 1982).

The atmospheric dispersion model XOQDOQ is intended to provide estimates of atmospheric transport and dispersion of gaseous effluents in routine releases from nuclear facilities. XOQDOQ is based on the theory that material released to the atmosphere will be normally distributed (Gaussian distribution) about the plume centerline. In predicting concentrations for longer time periods, the horizontal plume distribution is assumed to be evenly distributed within the directional sector, the so-called sector average model. A straight-line trajectory is assumed between the point of release and all receptors.

The atmospheric dispersion modeling results indicate that the maximum annual average air concentrations would occur at the north sector site boundary approximately 1,014 meters (0.6 mile) north of the Technical Services Building stack with an elevated atmospheric dispersion factor ( $P/Q$ ) of  $2.3 \times 10^{-6}$  seconds per cubic meter. Therefore, the individual assumed to be located at the northern sector boundary is the maximally exposed individual for the air pathway. The atmospheric dispersion modeling predicts that the annual average air concentration of releases beyond the site boundary are all less than the

northern sector boundary. Concentrations per unit release quantity (i.e., P/Q) predicted by using this model for the other receptors of concern are summarized in Table C-5.

**Table C-5 Summary of Atmospheric Dispersion Factors**

Receptor	Location	TSB P/Q (s/m <sup>3</sup> )	SB P/Q (s/m <sup>3</sup> )	Exposure Time (hours)
Nearest Resident	4,233 m (2.6 mi) west	1.4×10 <sup>-7</sup>	1.4×10 <sup>-7</sup>	8,766 hours
Lea County Landfill Worker	917 m (0.6 mi) southeast	1.0×10 <sup>-6</sup>	1.0×10 <sup>-6</sup>	2,000 hours
Wallach Concrete, Inc.	1,867 m (1.2 mi) north-northwest	1.1×10 <sup>-6</sup>	1.3×10 <sup>-6</sup>	2,000 hours
Sundance Services, Inc.	1,706 m (1.1 mi) north-northwest	1.3×10 <sup>-6</sup>	1.4×10 <sup>-6</sup>	2,000 hours
Waste Control Specialists	1,513 m (0.9 mi) east-northeast	4.9×10 <sup>-7</sup>	5.0×10 <sup>-7</sup>	2,000 hours

TSB - Technical Services Building.

SB - Separations Building.

s/m<sup>3</sup> - seconds per cubic meter.

m - meter.

mi - mile.

To convert seconds per cubic meter (s/m<sup>3</sup>) to seconds per cubic foot (s/ft<sup>3</sup>), multiply by 0.028.

### C.3 Radiation Exposures from Normal Operation

Members of the public may be exposed to radioactive material dispersed in the environment through inhalation of air, ingestion of drinking water, ingestion of terrestrial foods and animal products, inadvertent ingestion of soil, and direct irradiation from nuclides deposited on the ground or present in surface water.

LES estimated the expected isotopic release mix resulting from the estimated annual release of 10 grams (0.022 pound) of uranium as shown in Table C-6 (LES, 2005a; LES, 2004a). These values of gaseous effluent are based on operational experience at the Urenco Capenhurst Limited enrichment facility in the United Kingdom. For purposes of the radiological impact analysis, the bounding annual releases to the atmosphere from the proposed NEF site are estimated to be 8.9×10<sup>6</sup> becquerels (240 microcuries). The 8.9×10<sup>6</sup> becquerels (240 microcuries) is a bounding annual release estimate based upon a prior NRC estimate for a 1.5 million separative work unit (SWU) plant (NRC, 1994). The bounding annual release would also be conservative because it is approximately 35 times larger than the expected gaseous source term of 253.1 kilobecquerels per year (6.84 microcuries per year) as identified in Table C-6. The proposed NEF design is based upon the prior design but with a doubling of the enrichment capacity to 3 million SWU. The expected isotopic release resulting from the bounding annual release of 8.9×10<sup>6</sup> becquerels (240 microcuries) of uranium from the Technical Services Building and Separations Building Gaseous Effluent Vent Systems is also shown in Table C-6. For gaseous effluents resulting from the sublimation of UF<sub>6</sub>, no significant amount of radioactive particulate material (uranium or its radioactive decay daughters) would be expected to be introduced into the process ventilation system and released to the environment after Gaseous Effluent Vent System filtration (LES, 2005a).

**Table C-6 Annual Effluent Releases**

Radionuclide	Estimated Releases <sup>a</sup>		Bounding Releases	
	TSB GEVS kBq/yr (: Ci/yr)	SB GEVS kBq/yr (: Ci/yr)	TSB GEVS kBq/yr (: Ci/yr)	SB GEVS kBq/yr (: Ci/yr)
Uranium-234	77.7 (2.10)	45.5 (1.23)	2,738 (74.0)	1,591 (43.0)
Uranium-235	3.59 (0.097)	2.11 (0.057)	125.8 (3.4)	74.0 (2.0)
Uranium-236	0.48 (0.013)	0.30 (0.008)	17.0 (0.46)	11.1 (0.3)
Uranium-238	77.7 (2.10)	45.5 (1.23)	2,738 (74.0)	1,591 (43.0)
Total	159.5 (4.31)	93.6 (2.53)	5,619 (151.86)	3,267 (88.3)

<sup>a</sup> Source: LES, 2005a. Equivalent to 10 grams (0.022 pound) uranium.  
 TSB GEVS - Technical Services Building Gaseous Effluent Vent System.  
 SB GEVS - Separation Building Gaseous Effluent Vent System.  
 kBq/yr - kilobecquerels per year.  
 : Ci/yr - microcuries per year.

**C.3.1 Exposure to Members of the Public**

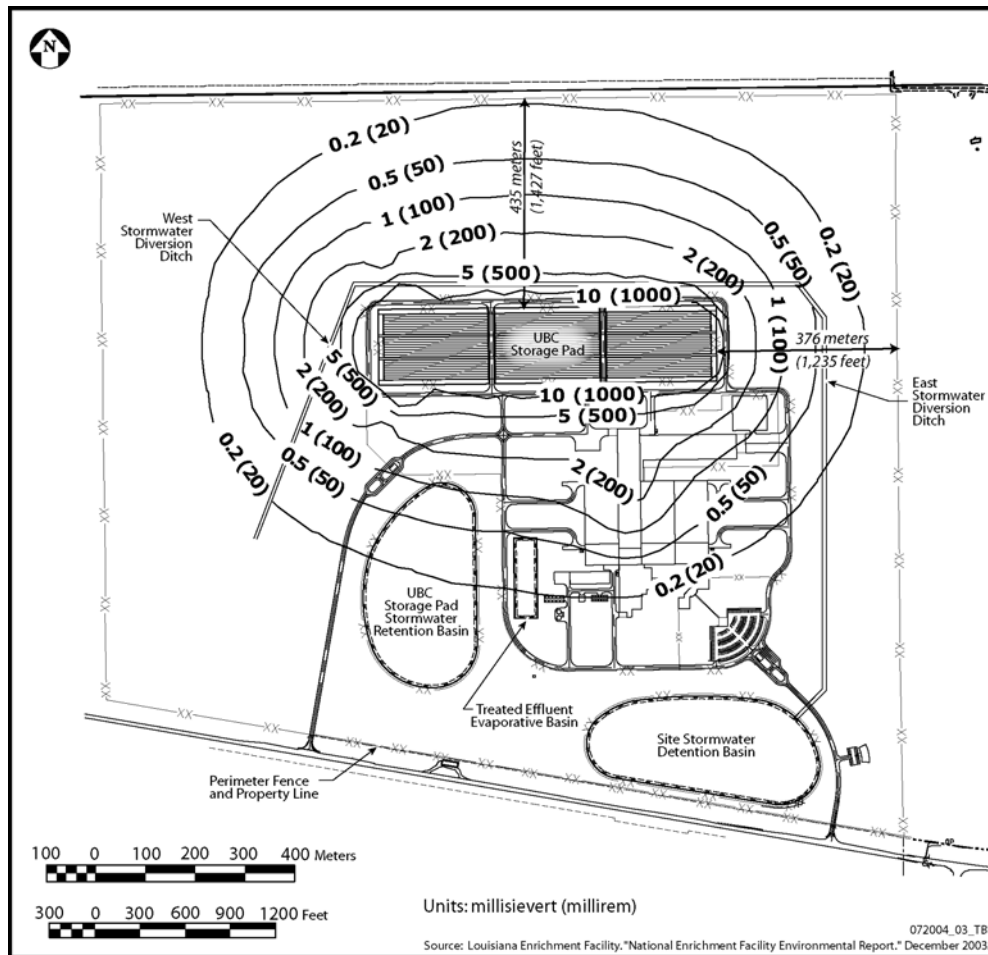
Radioactive material would be released to the atmosphere from the proposed NEF site through stack releases from the Technical Services Building Gaseous Effluent Vent System, Separations Building Gaseous Effluent Vent System, and from the potential resuspension of contaminated soil within the Treated Effluent Evaporative Basin. While a member of the public would not be expected to spend a significant amount of time at the site boundary closest to the UBC Storage Pad, this possibility is included in this impact assessment. The expected exposure pathways include inhalation of air and direct exposure from material deposited on the ground. In addition to these expected routes of exposure, members of the public may also consume food containing deposited radionuclides and inadvertently ingest resuspended soil from the ground or on local sources of food (e.g., leafy vegetables, carrots, potatoes, and beef from nearby grazing livestock). Potential effective dose equivalents for the maximally exposed adult individuals of Table C-5 and for the population are provided in Table C-7. The general population within 80 kilometers (50 miles) of the proposed NEF would receive a collective dose of 0.014 person-rem, equivalent to  $8.4 \times 10^{-6}$  latent cancer fatalities from normal operations.

LES calculated the dose isopleths for the case of a 30-year stockpile of UBCs with 2,000 hours of exposure as shown in Figure C-3 (LES, 2005a). The greatest dose from direct radiation would be for a receptor on the northern site boundary at centerline of the northern edge of the UBC Storage Pad. Because the nearest resident would be 4,233 meters (2.6 miles) from the UBC Storage Pad, with a reduction in dose rates on the order of  $6 \times 10^{-8}$  due to distance alone, the potential impact of direct radiation from stored cylinders on the surrounding population is considered to be negligible. However, three industrial sites would be in direct line-of-sight and within 1.6 kilometers (1 mile) of the UBC Storage Pad. Using the 0.2-millisievert (20-millirem) isopleths from Figure C-3, the direct radiation for these receptors is estimated for reduction in dose versus distance for 2,000 hours per year and provided in Table C-7.

It is possible that contaminated soil at the bottom of the Treated Effluent Evaporative Basin could be resuspended into the air. To analyze the potential for health impacts due to resuspension, the NRC staff assumed that 0.57 kilograms (1.3 pounds) per year of uranium for 30 years would settle into the Treated Effluent Evaporative Basin soil (LES, 2005a). As a result,  $27.4 \times 10^6$  becquerels (7.4 millicuries) of uranium was assumed to accumulate in the basins. The contaminated soil would have a resuspension

factor of  $4 \times 10^{-6}$  per hour. This could result in an additional annual effective dose of  $1.7 \times 10^{-6}$  millisieverts ( $1.7 \times 10^{-4}$  millirem) to the nearest resident, with the largest offsite dose at the south site boundary of  $1.7 \times 10^{-5}$  millisieverts ( $1.7 \times 10^{-3}$  millirem) (LES, 2005a). The resuspension factor for soils could be as high as  $9 \times 10^{-5}$  per hour for areas that are fairly open to the prevailing winds (DOE, 1994). Because the Treated Effluent Evaporative Basin would be excavated below ground with a net or other suitable material covering the basin, the ability of prevailing winds to resuspend contaminated soils would be expected to be less than that assumed by LES, and the resulting impacts are considered conservative.

Normal operations at the proposed NEF would have SMALL impacts to public health. The total annual dose from all exposure pathways would be significantly less than the regulatory requirement of 1 millisievert (0.1 rem) of 10 CFR § 20.1301. The most significant impact is from direct radiation exposure



**Figure C-3 2,000-Hour Dose Isopleths for a 30-Year Stockpile of Uranium Byproduct Cylinders (LES, 2005a)**

to receptors close to the UBC Storage Pad (filled and empty Type 48Y cylinders). The results are based on conservative assumptions, and it is anticipated that actual exposure levels will be less than those presented in Table C-7.



**Table C-7 Radiological Impacts to Members of the Public Associated  
With Operation of the Proposed NEF**

<b>Receptor</b>	<b>Location from Proposed NEF Stacks</b>	<b>Airborne Pathway CEDE</b>	<b>Direct Radiation <sup>a</sup></b>	<b>Total Annual Impact</b>
Population, Person-Sv (person-rem)	Within 80.5 km (50 mi) of Proposed NEF	$1.4 \times 10^{-4}$ ( $1.4 \times 10^{-2}$ )	N/A	$1.4 \times 10^{-4}$ ( $1.4 \times 10^{-2}$ )
Highest Boundary (Stack Releases), mSv (mrem)	Northern Boundary 1,010 m (0.6 mi)	$5.3 \times 10^{-5}$ ( $5.3 \times 10^{-3}$ )	0.189 (18.9)	0.189 (18.9)
Nearest Resident <sup>b</sup> , mSv (mrem)	4,233 m (2.6 mi) west	$1.3 \times 10^{-5}$ ( $1.3 \times 10^{-3}$ )	N/A	$1.3 \times 10^{-5}$ ( $1.3 \times 10^{-3}$ )
Lea County Landfill Worker, mSv (mrem)	917 m (0.57 mi) southeast	$1.9 \times 10^{-5}$ ( $1.9 \times 10^{-3}$ )	N/A	$1.9 \times 10^{-5}$ ( $1.9 \times 10^{-3}$ )
Wallach Concrete, Inc. mSv (mrem)	1,867 m (1.16 mi) north-northwest	$2.2 \times 10^{-5}$ ( $2.2 \times 10^{-3}$ )	0.021 (2.1)	0.021 (2.1)
Sundance Services, Inc., mSv (mrem)	1,706 m (1.06 mi) north-northwest	$2.6 \times 10^{-5}$ ( $2.6 \times 10^{-3}$ )	0.026 (2.6)	0.026 (2.6)
Waste Control Specialists, mSv (mrem)	1,513 m (0.94 mi) east-northeast	$9.3 \times 10^{-6}$ ( $9.3 \times 10^{-4}$ )	0.021 (2.1)	0.017 (1.7)

<sup>a</sup> Direct radiation from the maximum number of UBCs over the lifetime of the proposed NEF.

<sup>b</sup> Includes airborne contamination from the Treated Effluent Evaporative Basin.

Sv - sievert.

mSv - millisievert.

mrem - millirem.

km - kilometer.

mi - mile.

For comparison to the effects from a similar facility, the Urenco enrichment facility in Capenhurst, United Kingdom (total capacity of 2.96 million SWU), can be considered. The Ministry of Agriculture, Fisheries and Food of the Scottish Environment Protection Agency monitors gaseous and liquid emissions from the Capenhurst facility and annually estimates radiological impacts. According to available reports from 1998 through 2002, a radiation dose to the maximum exposed individual was estimated to be less than 0.005 millisievert (0.5 millirem) per year for ingestion of terrestrial food contaminated via gaseous effluents (LES, 2005a). The highest radiation dose to the maximum exposed individual was estimated to be less than 0.011 millisievert (1.1 millirem) per year for ingestion of liquids being released from the Capenhurst site, assuming children played near the brook along the site and ingested water and sediment (LES, 2004a). Therefore, the proposed NEF will have less of an impact to the public than the Capenhurst facility because, unlike at Capenhurst, members of the public would not be directly exposed to liquid discharges or by the site boundary for extended periods of time. More importantly, both sets of annual doses are significantly below the U.S. regulatory requirement of 1 millisievert (100 millirem) (10 CFR Part 20) or 0.25 millisievert (25 millirem) for uranium fuel-cycle facilities (40 CFR Part 190).

### C.3.2 Occupational Exposure Due to Normal Operation

The regulations of 10 CFR Part 20 not only require an NRC licensee to have an effective radiation protection program (10 CFR § 20.1101) but also require annual reports on the facility's occupational exposures (10 CFR § 20.2206) that the NRC gathers, evaluates, and presents in new volumes of NUREG-0713. By analyzing the sources of radiation and having an effective and efficient radiation protection program to determine the potential occupational dose rates, a licensee can determine whether any special administrative controls need to be applied to a specific individual or site-wide to maintain workers below the regulatory and company-set exposure limits. In addition to estimates of the occupational exposure, a comparison to the historical exposure data from similar facilities can demonstrate the effectiveness of the administrative controls (i.e., the radiation protection program) and/or the level of impacts that would be expected from a similar facility. In addition to the occupational exposure data from NUREG-0713 for the current U.S. enrichment facilities, the historical data from the Urenco Almelo and Capenhurst facilities would also be used for a comparison of impacts.

Tables C-8 and C-9 present the estimated occupational dose rates and annual exposures for various locations or buildings within the proposed NEF site and representative workers, respectively. Sections 4.7.6 and 4.8.1 of the Safety Analysis Report (LES, 2005b) describe the personnel-monitoring program for internal exposure from intake of soluble uranium. An annual administrative limit of 10 millisieverts (1,000 millirem) that includes external radiation sources and internal exposure from no more than 10 milligrams of soluble uranium in a week would be applied for comparison with the LES occupational exposure results, the historical data for past occupational exposures at U.S. enrichment facilities are shown in Table C-10, while comparisons to historical data for European and U.S. enrichment facilities are shown in Tables C-11 and C-12.

The estimated occupational dose rate for an empty used  $UF_6$  cylinder is higher than for a full  $UF_6$  cylinder for two reasons. First, after  $UF_6$  is vaporized and removed from a cylinder, the radioactive uranium daughter products that build up due to the radioactive decay of uranium collect at the bottom and form a "heel." The radiation emitted from the uranium daughter products consist of a greater quantity of gamma radiation than that produced by only uranium. Second, uranium is a good shield material for gamma radiation. When the cylinder is full of  $UF_6$ , the uranium daughters are distributed throughout the cylinder and must pass through a significant amount of uranium (thus can be stopped or absorbed by the uranium). It is only the uranium daughters near the inner surface of the cylinder that can readily escape from the cylinder and contribute to a nearby person's radiation exposure. Because the empty cylinder no longer has the high shielding capability of the  $UF_6$  and the heel concentrates the more highly radioactive uranium daughters near the inner cylinder surface, the radiation levels of the empty  $UF_6$  cylinders are higher than the levels of full cylinders.

**Table C-8 Estimated Occupational Dose Rates for Various Locations or Buildings  
Within the Proposed NEF**

<b>Location</b>	<b>Dose Rate, mSv/hr (mrem/hr)</b>
Plant General Area (Excluding Separations Building Modules)	< 0.0001 (< 0.01)
Separations Building Module - Cascade Halls	0.0005 (0.05)
Separations Building Module - UF <sub>6</sub> Handling Area and Process Services Area	0.001 (0.1)
Empty Used UF <sub>6</sub> Shipping Cylinder	0.1 (10.0) on contact 0.010 (1.0) at 1 meter (3.3 feet)
Full UF <sub>6</sub> Shipping Cylinder	0.05 (5.0) on contact 0.002 (0.2) at 1 meter (3.3 feet)

mSv/hr - millisieverts per hour; mrem/hr - millirems per hour.  
Source: LES, 2005a.

**Table C-9 Estimated Occupational Annual Exposures for Various Occupations  
Within the Proposed NEF**

<b>Position</b>	<b>Annual Dose Equivalent<sup>a</sup> mSv (mrem)</b>
General Office Staff	< 0.05 (< 5.0)
Typical Operations and Maintenance Technician	1 (100)
Typical Cylinder Handler	3 (300)

<sup>a</sup> Average worker exposure at Urenco Capenhurst facility during 1998 through 2002 was approximately 0.2 mSv (20 mrem).  
mSv - millisievert; mrem - millirem.  
Source: LES, 2005a.

**Table C-10 Annual CEDE and TEDE for Uranium Enrichment Plants  
Within the United States for 1997 - 2002**

<b>Year</b>	<b>Number with Meas. CEDE</b>	<b>Collective CEDE (person-rem)</b>	<b>Avg. Meas. CEDE (rem)</b>	<b>Number Meas. Exposure</b>	<b>Total Number Monitored</b>	<b>Number with Meas. Dose</b>	<b>Total Collective TEDE (person-rem)</b>	<b>Avg. Meas. TEDE (rems)</b>
1997	36	0.314	0.01	5,705	6,296	591	30.003	0.051
1998	58	0.242	0	5,713	6,150	437	23.621	0.054
1999	22	0.445	0.02	5,119	5,559	440	20.124	0.046
2000	69	0.587	0.01	4,015	5,016	1002	28.356	0.028
2001	53	0.108	0	3,670	4,015	345	10.325	0.030
2002	40	0.208	0.01	3,190	3,683	493	20.601	0.042

To convert rem to sievert, multiply by 0.01.  
Sources: NRC, 1998a; NRC, 1999; NRC, 2000; NRC, 2001a; NRC, 2002; NRC, 2003b.

**Table C-11 Comparison of Annual Maximum TEDE for Capenhurst and U.S. Enrichment Facilities**

<b>Year</b>	<b>Capenhurst Maximum TEDE Sv (rem)</b>	<b>Highest Whole Body Doses at U.S. Enrichment Facilities Sv (rem) <sup>a</sup></b>
1998	0.0031 (0.31)	0.0025-0.005 (0.25-0.5)
1999	0.0022 (0.22)	0.0025-0.005 (0.25-0.5)
2000	0.0028 (0.28)	0.001-0.0025 (0.1-0.25)
2001	0.0027 (0.27)	0.001-0.0025 (0.1-0.25)
2002	0.0023 (0.23)	0.0025-0.005 (0.25-0.5)

<sup>a</sup> NUREG-0713 provides 12 dose ranges and the respective number of workers with whole body doses in that range. The value given in this column is the highest whole body dose range for that year.

<sup>b</sup> Five-year average (1998-2002) using the average TEDE from Table 4.13.2.2-1 of the Safety Analysis Report.

Sv - Seivert.

Sources: LES, 2005a; LES, 2005b; NRC, 1999; NRC, 2000; NRC, 2001a; NRC, 2002; NRC, 2003b.

**Table C-12 Comparison of Annual Average TEDE for Almelo, Capenhurst, and U.S. Enrichment Facilities**

<b>Almelo TEDE Sv (rem)</b>	<b>Capenhurst TEDE Sv (rem)</b>	<b>U.S. Enrichment Facilities Sv (rem)</b>
0.0004 (0.04)	0.0002 (0.02)	0.0004 (0.04) <sup>a</sup>

<sup>a</sup> Five-year average (1998-2002) using the average TEDE from Table 4.13.2.2-1 of the Safety Analysis Report.

Sv - Seivert.

Sources: LES, 2005a; LES, 2005b; NRC, 1999; NRC, 2000; NRC, 2001a; NRC, 2002; NRC, 2003b.

The LES occupational exposure analysis, as collaborated by the historical exposure data, demonstrates that a properly administered radiation protection program at the proposed NEF should maintain the radiological occupational impacts well below the regulatory limits of 10 CFR § 20.1201. Therefore, the impacts from occupational exposure at the proposed NEF would be considered SMALL.

#### **C.4 Public and Occupational Health Impacts from Accidents During Operations**

The operation of the proposed NEF would involve risks to workers, the public, and the environment from potential accidents. The regulations in 10 CFR Part 70, Subpart H, “Additional Requirements for Certain Licensees Authorized to Possess a Critical Mass of Special Nuclear Material,” require that each applicant or licensee evaluate, in an Integrated Safety Analysis Summary, its compliance with certain performance requirements. The purpose of this section of this EIS is to summarize the methods and results used to independently evaluate the consequences of potential accidents identified in LES’s Integrated Safety Analysis. The accidents evaluated are a representative selection of the types of accidents that are possible at the proposed NEF.

## C.4.1 Accident Analysis Methodology

The analytical methods used in this consequence assessment are based on NRC guidance for analysis of nuclear fuel-cycle facility accidents (NRC, 1990; NRC, 1991; NRC, 1998b; NRC, 2001b). With the exception of the criticality accident, the hazards evaluated involve the release of UF<sub>6</sub> vapor from process systems that are designed to confine UF<sub>6</sub> during normal operations. As described below, UF<sub>6</sub> vapor poses a chemical and radiological risk to workers, the public, and the environment. LES has committed to various preventive and mitigative measures to significantly reduce these risks.

### C.4.1.1 Selection of Representative Accident Scenarios

The Safety Analysis Report and Emergency Plan (LES, 2005b; LES, 2004b) describe potential accidents that could occur at the proposed NEF. Accident descriptions are provided for two groups according to the severity of the accident consequences: high-consequence events and intermediate-consequence events. The accident types are summarized in the Emergency Plan as follows:

#### High-Consequence Events

- Natural phenomena.
  - Earthquake.
  - Tornado.
  - Flood.
- Inadvertent nuclear criticality.
- Fires propagating between areas.
- Fires involving excessive transient combustibles.
- Heater controller failure.
- Overfilled cylinder heated to ambient temperature.
- Product liquid sampling autoclave heater failure followed by reheat.
- Open sample manifold purge valve and blind flange.
- Pump exhaust plugged (worker).
- UF<sub>6</sub> subsampling unit hot box heater controller failure.
- Empty UF<sub>6</sub> cold trap (UF<sub>6</sub> release).
- Cylinder valve/connection failure during pressure test.
- Chemical dump trap failure.
- Worker evacuation.

#### Intermediate-Consequence Events

- Carbon trap failure.
- Pump exhaust plugged (public).
- Spill of failed centrifuge parts.
- Dropped contaminated centrifuge.
- Fire in ventilated room.

The NRC staff selected a subset of the potential accident scenarios for detailed evaluation to encompass the range of possible accidents. The accident scenarios selected vary in severity from high to low consequence events and include accidents initiated by natural phenomena, operator error, and equipment failure. The accident scenarios evaluated are as follows:

- Generic Inadvertent Nuclear Criticality.
- Hydraulic Rupture of a UF<sub>6</sub> Cylinder in the Blending and Liquid Sampling Area.
- Natural Phenomena Hazard–Earthquake.
- Fire in a UF<sub>6</sub> Handling Area.
- Process Line Rupture in a Product Low-Temperature Takeoff Station.

### C.4.1.2 Source-Term Methodology

NRC staff evaluated the chemical and radiological hazard to workers, the public and the environment from accidental releases of UF<sub>6</sub> vapor at the facility. For most accidents, the UF<sub>6</sub> vapor is assumed to escape its primary confinement system and enter an occupied room at the proposed NEF. It is assumed that UF<sub>6</sub> would mix instantaneously with the air in the room.

For a constant release rate of UF<sub>6</sub>, the time-dependent concentration, C(t), of UF<sub>6</sub> in a room or workshop at the proposed NEF would be (NRC, 1990):

$$\frac{dC(t)}{dt} = \frac{R}{V'} - \frac{Q_v f_v C(t)}{V'} \quad \text{Eq. C-1}$$

where R = constant UF<sub>6</sub> release rate, grams/second  
 V' = k × f × V, the effective room volume, cubic meters  
 V = actual room volume, cubic meters  
 k = mixing efficiency (from National Fire Protection Association 69 [NFPA, 2002], Appendix D), unitless  
 f = room free air fraction, unitless  
 Q<sub>v</sub> = room ventilation rate, cubic meters per second  
 f<sub>v</sub> = the fraction of Q<sub>v</sub> exhausted to the atmosphere  
 (1-f<sub>v</sub> is recycled back into the room)  
 t = time elapsed since start of release, seconds

The values of mixing efficiency, k, and room free-air fraction, f, are assumed to be 0.3 and 0.8, respectively. The mixing efficiency is conservatively based on Table D-1 of National Fire Protection Association 69 (NFPA, 2002), and is for ventilation systems with forced-air supplies and single exhaust openings comprised of grills and registers. The value of 0.8 is assumed to account for the volume of equipment that replaces free air inside the facility. Room volumes and ventilation flow rates were provided by LES (LES, 2004c). The fraction of air exhaust is 10 percent, which is consistent with the heating, ventilation, and air-conditioning descriptions in Chapters 3 and 4 of the Safety Analysis Report (LES, 2005a).

A solution to Equation C-1 is:

$$C_1(t) = \frac{R}{Q_v f_v} \left[ 1 - e^{-\frac{Q_v f_v t}{V'}} \right] \quad \text{Eq. C-2}$$

Equation C-2 defines the concentration, C<sub>1</sub>(t), during the period that UF<sub>6</sub> is released at a steady-state rate, R, into a room. After T<sub>1</sub> = 30 minutes, it is assumed that either the entire material at risk would be released or the release would be stopped when operators intervene. The assumption that operators or affected individuals downwind would respond within 30 minutes is consistent with conservative self-protective criteria used by NRC to evaluate emergency preparedness (NRC, 1988). After T<sub>1</sub> = 30 minutes, the room would be ventilated until UF<sub>6</sub> is cleared from the room and exhausted to the environment. The room concentration, C<sub>2</sub>(t), after all the material escapes to the room, or the release is stopped is:

$$C_2(t) = \frac{R}{Q_v f_v} \left[ 1 - e^{-\frac{Q_v f_v T_1}{V'}} \right] e^{-\frac{Q_v f_v t}{V'}} \quad \text{Eq. C-3}$$

For the seismic event, LES has proposed safety-related equipment (i.e., Items Relied on for Safety) that shut down the heating, ventilation, and air-conditioning systems in certain process areas. With no forced ventilation, the primary means by which UF<sub>6</sub>, compound uranyl fluoride (UO<sub>2</sub>F<sub>2</sub>) particulate matter, and hydrogen fluoride vapor enters the environment would be from small cracks and openings in the building.

The volumetric leak rate from small cracks and openings in a building is calculated by evaluating Poiseuille's Law (Baker et al., 1987):

$$Q_L = -\left(\frac{12\eta dL_s}{C\rho W}\right) + \sqrt{\left(\frac{12\eta dL_s}{C\rho W}\right)^2 + \frac{C_{p,a}v^2W^2L_s^2}{C}} \quad \text{Eq. C-4}$$

where  $Q_L$  = volumetric leak rate, cubic meters per second  
 $L_s$  = perimeter length of all exterior doors, meters  
 $W$  = width of the opening between door and frame, meters  
 $\mathbf{O}$  = coefficient of viscosity of air =  $1.81 \times 10^{-5}$  N-seconds per square meter at  $T = 20^\circ\text{C}$  ( $68^\circ\text{F}$ )  
 $d$  = thickness of doors, meters  
 $C = 1.5$   
 $\mathbf{D}$  = density of air = 1.183 kilograms per cubic meter at  $T = 25^\circ\text{C}$  ( $77^\circ\text{F}$ )  
 $v$  = wind speed, meters per second

The value of  $C_{p,a}$  depend on the location of the door or opening relative to the direction of the wind (Blevins, 2003):

where  $C_{p,a} = 0.9$  for windward side of the building  
 $C_{p,a} = -0.3$  for leeward side of the building  
 $C_{p,a} = -0.4$  for building sides orthogonal to the wind direction

For this assessment, each exterior door in affected process areas of the building is assumed to have a  $W = 0.2$  centimeter (.08 inch) opening around both sides and the top, and a  $W = 0.3$  centimeter (.12 inch) opening at the bottom. The thickness of all doors,  $d$ , is estimated to be 5 centimeters (2 inches). The perimeter length of doors is estimated from drawings in the Safety Analysis Report (LES, 2005a).

The wind speed,  $v$ , assumed for the building leakage calculations was chosen with consideration of the wind speed and stability class assumed in the derivation of the maximum atmospheric dispersion factor,  $\mathbf{P/S}$ . The highest  $\mathbf{P/S}$  calculated for the controlled area boundary is  $5.4 \times 10^{-5}$  seconds per cubic meter. With corrections for building wake and low wind speed plume meander, the wind speed for F class stability conditions for which a  $\mathbf{P/S} = 5.4 \times 10^{-5}$  seconds per cubic meter would be derived is 1.75 meters per second (5.7 feet per second). Therefore, a bounding value of  $v = 2$  meters per second (6.6 feet per second) is used to estimate building leakage.

Solid UO<sub>2</sub>F<sub>2</sub> produced by the reaction of UF<sub>6</sub> with water vapor (i.e., humidity) forms a fine powder that will settle by gravity. Therefore, in addition to removal by exfiltration through door cracks to the environment, solid UO<sub>2</sub>F<sub>2</sub> will also be removed from the air by settling on the floor and equipment of the affected process area. The concentration in the building is calculated as:

$$C_L(t) = C_{L,o} e^{-\frac{1}{V}(Q_L + v_d A)t} \quad \text{Eq. C-5}$$

where  $v_d$  = settling velocity of UO<sub>2</sub>F<sub>2</sub> particles in air, meters per second  
 $A$  = floor area of the affected process area, square meters

From Table 12.4 of DOE/TIC-27601 (DOE, 1984), the settling velocity of fine uranium compounds estimated to be approximately 0.0001 centimeter per second (0.0002 feet per minute). The floor areas of the affected process areas are estimated from drawings in the Safety Analysis Report (LES, 2005a).

#### C.4.1.3 NRC Performance Requirements

The performance requirements in 10 CFR Part 70, Subpart H, define acceptable levels of risk of accidents at nuclear fuel-cycle facilities, such as the proposed NEF. The regulations in Subpart H require that LES reduce the risks of credible high-consequence and intermediate-consequence events. Threshold consequence values that define the high- and intermediate-consequence events for the proposed NEF are described in Table C-13 (LES, 2005a).

**Table C-13 Definition of High- and Intermediate-Consequence Events at the Proposed NEF**

<b>Receptor</b>	<b>Intermediate Consequence</b>	<b>High Consequence</b>
Worker - Radiological	> 25 rem (0.25 Sv)	> 100 rem (1 Sv)
Worker - Chemical (10-minute exposure)	> 19 mg U/m <sup>3</sup> * > 78 mg HF/m <sup>3</sup>	> 146 mg U/m <sup>3</sup> * > 139 mg HF/m <sup>3</sup>
Environment at the Restricted Area Boundary	> 5.4 mg U/m <sup>3</sup> or 24-hour average release greater than 5,000 times the values in Tables 2 of Appendix B of 10 CFR Part 20	N/A
Individual at the Controlled Area Boundary - Radiological	> 5 rem (0.05 Sv)	> 25 rem (0.25 Sv)
Individual at the Controlled Area Boundary - Chemical (30-minute exposure)	> 2.4 mg U/m <sup>3</sup> > 0.8 mg HF/m <sup>3</sup>	> 13 mg U/m <sup>3</sup> > 28 mg HF/m <sup>3</sup>

Sv - sievert; HF - hydrogen fluoride; U - uranium.  
mg - milligram.  
m<sup>3</sup> - cubic meters.

\* Limits on uranium intake are also defined for workers in the immediate proximity of the release. These limits are 10 mg and 40 mg uranium for intermediate and high consequence events, respectively.

#### C.4.1.4 Consequence Assessment Methodology for Acute Health Effects

Accident consequences were evaluated for the proposed NEF facility worker, the environment outside the restricted area boundary, an individual at the controlled area boundary, and the public beyond the controlled area boundary. As stated above, the analytical methods used in this consequence assessment are based on NRC guidance for analysis of nuclear fuel-cycle facility accidents (NRC, 1990; NRC, 1991; NRC, 1998b; NRC, 2001b).

##### Facility Worker Uranium Intake and Exposure to Hydrogen Fluoride

The accident consequences to a facility worker include the risks of toxicological effects of uranium intake, radiation dose from uranium intake, and exposure to hydrogen fluoride concentration in air. The amount of uranium a facility worker could inhale (uranium intake) is calculated by assuming the worker is exposed to C<sub>1</sub>(t) until T<sub>1</sub> = 10 minutes after the start of the release (LES, 2005a). By T<sub>1</sub> = 10 minutes, a



worker is assumed to successfully escape the affected room. The staff calculated uranium concentration for comparison with the proposed levels in Table C-13. For a 10-minute exposure period, uranium concentration limits are more restrictive than the intake limits that are described in the footnote to Table C-13. The worker is assumed to inhale at a constant breathing rate of  $3.33 \times 10^{-4}$  cubic meters per second (20 liters per minute), which is consistent with the breathing rate used by NRC in 10 CFR Part 20, Appendix B, for Reference Man performing “light work.” Similarly, the hydrogen fluoride concentration to which a facility worker could be exposed is calculated by evaluating the time-averaged hydrogen fluoride concentration during the first  $T_1 = 10$  minutes.

For the uranium intake and hydrogen fluoride exposure calculations, it is assumed that sufficient moisture (i.e., humidity) is present in the room to completely convert released  $UF_6$  gas to  $UO_2F_2$  particulate matter and hydrogen fluoride vapor. This assumption results in a conservative estimate of the concentration of hydrogen fluoride vapor that would be present in both the affected room of the proposed NEF and downwind.

### Restricted Area Boundary 24-Hour Average Uranium Concentration

In accordance with 10 CFR Part 70, Subpart H, LES must reduce the environmental risks of accidents. The environmental consequences of accidents are evaluated at the restricted area boundary. At the proposed NEF, the restricted area boundary would be a fenced area inside the controlled area that would include the process buildings and the UBC Storage Pad (LES, 2004c). To evaluate whether accidents would exceed the environmental performance requirement, the 24-hour average uranium concentration is calculated at the restricted area boundary. It is assumed that the points of release are the stacks on the roof of the Technical Services Building.

The total source term for the first phase of the event (before the release is stopped) is  $S_1$ . The residual source term from the time that the release is stopped,  $T_1$ , until the source is either depleted, or until 24 hours has elapsed, is  $S_2$ .

$$S_1 = \int_0^{T_1} S_1(t) dt = \int_0^{T_1} C_1(t) dt \times Q_v \times f_v = R \left[ T_1 - \frac{V'}{Q_v f_v} \left\{ 1 - e^{-\frac{Q_v f_v T_1}{V'}} \right\} \right], \text{ for } 0 < t \leq T_1$$

Eqs. C-6, C-7

$$S_2 = \int_{T_1}^{T_2} S_2(t) dt = \int_{T_1}^{T_2} C_2(t) dt \times Q_v \times f_v = R \left[ 1 - e^{-\frac{Q_v f_v T_1}{V'}} \right] \left[ \frac{V'}{Q_v f_v} \left\{ 1 - e^{-\frac{Q_v f_v (T_2 - T_1)}{V'}} \right\} \right], \text{ for } T_1 < t \leq T_2$$

To compare downwind concentrations with the applicable performance requirement, the uranium concentration downwind is calculated as a 24-hour average. For the restricted area boundary and the controlled area boundary, the atmospheric dispersion factor (**P/S**) for various distances from the proposed NEF process buildings to the boundary in each downwind sector is calculated using ARCON96 (NRC, 1997). The distance to the restricted area boundary and controlled area boundary in each compass sector, the persistence of the wind in each direction, and **P/S** values calculated using ARCON96 are presented in Table C-14. The highest **P/S** at the restricted area boundary, which would result in the highest downwind concentration, occurs directly east of the Technical Services Building. Therefore, the concentration at the restricted area boundary is calculated for wind blowing to the east.

The downwind concentration at the restricted area boundary is calculated for the downwind sector with the highest atmospheric dispersion factor (**P/S**<sub>RAB</sub>) using Equation C-8.

$$U, \frac{mg}{m^3} \Big|_{RAB} = \frac{\left[ \int_0^{T_1} S_1(t) dt + \int_{T_1}^{T_2=24hr} S_2(t) dt \right]}{\int_0^{T_2=24hr} dt}, \frac{g}{s} \times \frac{X}{S} \Big|_{RAB}, \frac{s}{m^3} \times 10^3 \frac{mg}{g} \times 0.68 \frac{mg U}{mg UF_6} \quad \text{Eq. C-8}$$

**Table C-14 Accident Values of Atmospheric Dispersion Factors for the Proposed NEF Boundaries**

Direction from Facility	Distance from Proposed NEF		Frequency of Wind (percent)	RAB P/S (s/m <sup>3</sup> )	CAB P/S (s/m <sup>3</sup> )
	RAB meters (feet)	CAB meters (feet)			
S	160 (524)	417 (1,368)	5.66	2.64×10 <sup>-4</sup>	4.84×10 <sup>-5</sup>
SSW	168 (552)	417 (1,368)	3.98	2.40×10 <sup>-4</sup>	4.80×10 <sup>-5</sup>
SW	210 (690)	422 (1,384)	4.91	1.69×10 <sup>-4</sup>	5.37×10 <sup>-5</sup>
WSW	261 (856)	503 (1,650)	4.87	1.14×10 <sup>-4</sup>	4.08×10 <sup>-5</sup>
W	261 (856)	769 (2,522)	6.29	1.14×10 <sup>-4</sup>	2.37×10 <sup>-5</sup>
WNW	278 (911)	1,071 (3,513)	5.52	9.96×10 <sup>-5</sup>	1.46×10 <sup>-5</sup>
NW	757 (2,484)	1,072 (3,516)	7.52	2.12×10 <sup>-5</sup>	1.34×10 <sup>-5</sup>
NNW	639 (2,098)	995 (3,264)	10.80	2.35×10 <sup>-5</sup>	1.13×10 <sup>-5</sup>
N	589 (1,932)	995 (3,264)	20.40	2.67×10 <sup>-5</sup>	1.18×10 <sup>-5</sup>
NNE	530 (1,739)	754 (2,473)	7.35	3.08×10 <sup>-5</sup>	1.77×10 <sup>-5</sup>
NE	463 (1,518)	581 (1,906)	5.46	3.78×10 <sup>-5</sup>	2.61×10 <sup>-5</sup>
ENE	362 (1,187)	540 (1,771)	4.68	4.96×10 <sup>-5</sup>	2.61×10 <sup>-5</sup>
E	109 (359)	540 (1,771)	4.45	4.49×10 <sup>-4</sup>	2.68×10 <sup>-5</sup>
ESE	101 (331)	540 (1,771)	2.42	4.26×10 <sup>-4</sup>	2.54×10 <sup>-5</sup>
SE	143 (469)	487 (1,597)	2.69	2.76×10 <sup>-4</sup>	3.10×10 <sup>-5</sup>
SSE	185 (607)	417 (1,368)	3.04	1.70×10 <sup>-4</sup>	3.95×10 <sup>-5</sup>

RAB - restricted area boundary.

CAB - controlled area boundary.

s/m<sup>3</sup> - seconds per cubic meter.

To convert seconds per cubic meter (s/m<sup>3</sup>) to seconds per cubic foot (s/ft<sup>3</sup>), multiply by 0.028.

#### Controlled Area Boundary Uranium Intake and Hydrogen Fluoride Exposure

The accident consequences to an individual at the controlled area boundary include the risks of toxicological effects of uranium intake, radiation dose from uranium intake, and exposure to hydrogen fluoride concentration in air. The uranium concentration at the controlled area boundary is calculated for

the downwind sector with the highest atmospheric dispersion factor ( $P/S|_{CAB}$ ). The highest  $P/S$  at the controlled area boundary, which would result in the highest downwind concentration, occurs southwest of the Technical Services Building. Therefore, the accident consequences at the controlled area boundary are calculated for wind blowing to the southwest.

The 30-minute average uranium concentration at the CAB is calculated using Equation C-9.

$$[U], 30 \text{ min} = \frac{\left[ \int_0^{T_1} S_1(t) dt + \int_{T_1}^{T_2=24hr} S_2(t) dt \right], g}{1,800 s}, \frac{g}{s} \times \frac{X}{S}|_{CAB}, \frac{s}{m^3} \times 10^3 \frac{mg}{g} \times 0.68 \frac{mg U}{mg UF_6} \quad \text{Eq. C-9}$$

Similarly, the unmitigated 30-minute average HF concentration is:

$$[HF], 30 \text{ min} = \frac{\left[ \int_0^{T_1} S_1(t) dt + \int_{T_1}^{T_2=24hr} S_2(t) dt \right], g}{1,800 s}, \frac{g}{s} \times \frac{X}{S}|_{CAB}, \frac{s}{m^3} \times 10^3 \frac{mg}{g} \times 0.23 \frac{mg HF}{mg UF_6} \quad \text{Eq. C-10}$$

#### C.4.1.5 Consequence Assessment Methodology for Chronic Health Effects

Earlier studies have indicated that if fatality from suffocation caused by edema (swelling) in the lungs does not occur, the swelling resulting from hydrogen fluoride exposure will subside and recovery should be complete. Thus, acute sublethal inhalation of hydrogen fluoride is not expected to have long-term effects (NRC, 1991). Therefore, the post-accident chronic health effects evaluated are limited to the toxicological and radiological health effects to members of the public offsite resulting from exposure to uranium compounds.

Human toxicological effects of exposure to soluble uranium compounds have also been previously reviewed by the NRC (NRC, 1991). It was concluded that a single acute intake of 10 milligrams of soluble uranium would produce in humans either minimal or nondetectable effects, either short-term or long-term. Therefore, if an accident could not result in acute intakes above 10 milligrams of soluble uranium in any individual at or just beyond the site (controlled area) boundary, then no long-term health effects would be expected among the exposed population further downwind. At the proposed NEF, only one type of event is capable of causing toxicological effects among the offsite public from exposure to soluble uranium—the rupture of a large  $UF_6$  cylinder from inadvertent overheating or overfilling. The protective measures proposed by LES to prevent this type of event are described in section 4.2.13.2 of chapter 4 of this EIS.

GENII v. 1.485 (Napier et al., 1988) is used to estimate collective radiation doses (person-rem) to members of the public resulting from post-accident inhalation and ingestion of soluble uranium compounds. The same exposure pathways, ingestion parameters, and demographic information used for section 4.2.12 of chapter 4 of this EIS are applied to estimate radiological doses to the public from accidents. The pathway assessment is provided in section C.2. The meteorological data are taken from the nearby Midland-Odessa National Weather Station.

For dose calculations to the public, it is assumed that individuals downwind spend 100 percent of the time inside the passing plume (i.e., not sheltered). For releases of uranium compounds, the north sector would have the highest collective doses because Hobbs, New Mexico, is a large population center in the prevailing downwind direction.

## C.4.2 Accident Analyses

### C.4.2.1 Inadvertent Nuclear Criticality

An inadvertent nuclear criticality at the proposed NEF would result from the unintended accumulation of enriched uranium, leading ultimately to a self-sustaining or runaway nuclear chain reaction. A criticality accident could release large amounts of heat and radiation. A criticality accident could also produce radioactive fission products, such as isotopes of noble gases like xenon and krypton, radioiodine, and radiocesium. At the proposed NEF, one process area for which this accident is postulated is the Decontamination Workshop.

Specifically, the accumulation of uranium in the citric acid tank could cause a criticality accident. For this to occur, the operator would have to fail to control the uranium mass in the tank. A criticality in the solution in the tank could produce an initial burst of  $1.0 \times 10^{18}$  fissions, followed by 47 bursts of  $1.92 \times 10^{17}$  fissions per burst, for a total of about  $1 \times 10^{19}$  fissions in 8 hours (NRC, 1998b).

The source term (ST) for the inadvertent nuclear criticality was determined using the five-factor formula:

$$ST = MAR \times DR \times ARF \times RF \times LPF \quad \text{Eq. C-11}$$

where

- MAR = material at risk
- DR = damage ratio
- ARF = airborne release fraction
- RF = respirable fraction
- LPF = leak path factor

For the criticality accident, the material at risk (MAR) is the amount of fission product radioactivity that would accumulate during the event (NRC, 1998b). The damage ratio (DR) is 1, since all of the solution in the tank would be involved in the event. The atmospheric release fraction (ARF) for noble gases is 100 percent. The ARF for radioiodine is 0.25, and the ARF for other fission products is  $5 \times 10^{-4}$  (NRC, 1998b). The respirable fraction is assumed to be 100 percent. A leak path factor (LPF) of 0.001 is used for radioiodine and fission products other than noble gases, since the Technical Services Building gaseous effluent vent system is equipped with high efficiency particulate air and charcoal filters (LES, 2005a).

The results of the consequence assessment are presented in Table C-15. Industry experience with this type of criticality accident indicates that a worker located in the immediate vicinity of the reaction is not likely to survive the accident. However, with increasing distance from the accident, the radiation doses would be lower, and the probability that a worker could survive increases. At the proposed NEF, workers would have direct access to vessels and other process equipment in which criticality events would be possible. Therefore, the accident has been qualitatively evaluated as a high consequence event for the worker.

The environmental consequence is evaluated using the sum-of-the-fractions rule. The concentration at the restricted area boundary of each fission product radionuclide generated during a hypothetical uranium solution criticality event (NRC, 1998b) is compared to 5,000 times the corresponding values in Appendix B to 10 CFR Part 20. The fractions thus generated (i.e., calculated fission product concentrations divided by their Appendix B limits) are added to yield one value. If that value is less than 1, the accident consequences to the environment are low. Since the sum presented in Table C-14 is less than 1, the postulated criticality event is estimated to be a low consequence to the environment.

**Table C-15 Health Effects Resulting from Inadvertent Nuclear Criticality**

Worker (egress after 10 min.)	Environment at RAB (Ratio)	Individual at CAB, SW Direction	Collective Dose, West Direction	
			person-rem	LCFs
High	0.66 <sup>a</sup>	0.14 rem <sup>b</sup> (.0014 Sv)	44	0.03

<sup>a</sup> Pursuant to 10 CFR § 70.61(c)(3), this value is the sum of the fractions of individual fission product radionuclide concentrations over 5,000 times the concentration limits that appear in 10 CFR Part 20, Appendix B, Table 2.

<sup>b</sup> The dose to the individual at the controlled area boundary is the sum of internal and external doses from fission products released from the Technical Service Buildings Gaseous Effluent Vent System stack.

RAB - restricted area boundary.

CAB - controlled area boundary.

LCF - latent cancer fatalities.

Sv - sievert.

To convert rem to sievert, multiply by 0.01.

A maximally exposed individual at the controlled area boundary in the southwest direction would receive a TEDE of 0.14 rem (0.0014 sievert). This is a low consequence to this individual. Similarly, the low collective dose to the offsite population in the west sector (Eunice) means that the risk of health effects to the offsite public (latent cancer) from this accident is low. The west sector would have the highest radiation doses following a criticality accident, because the city of Eunice, New Mexico, lies in closer proximity to the proposed NEF than other population centers. Also, short-lived radionuclides formed during the criticality accident would not have completely decayed before reaching Eunice. Larger population centers in the north sector, such as the city of Hobbs, New Mexico, would receive lower collective doses because the short-lived fission products would decay during the time the plume travels from the proposed NEF.

In accordance with the performance requirements of 10 CFR Part 70, Subpart H, LES has either identified Items Relied on for Safety to reduce the risk to the proposed NEF worker from all criticality accidents or identified safe-by-design components that meet criteria such that they are high unlikely to fail.

#### **C.4.2.2 Hydraulic Rupture of a UF<sub>6</sub> Cylinder in the Blending and Liquid Sampling Area**

At the Product Blending System in the Blending and Liquid Sampling Area of the Separations Building, Type 30B (2.5-ton [2.3-metric ton]) cylinders would be filled with product to customer specifications. The transfer of product to Type 30B cylinders would begin by heating a 14-ton (13-metric ton) Type 48Y cylinder containing product UF<sub>6</sub> inside a Blending Donor Station to no more than 61°C (142°F). The heated UF<sub>6</sub> gas would be transferred by piping from the heated Type 48Y cylinder to a Blending Receiver Station containing a Type 30B cylinder. The Blending Receiver Station would be cooled, which would allow the UF<sub>6</sub> gas to desublime to a solid inside the Type 30B cylinder, completing the transfer.

An accident is postulated wherein the Blending Donor Station heater controller fails, causing the blending donor heater within the station to remain on. Were this to occur, the product cylinder could overheat and

the cylinder could hydraulically rupture due to the expansion of the liquid UF<sub>6</sub>. Upon cylinder rupture, the entire contents of the Type 48Y product cylinder (12,501 kilograms [27,560 pounds] of UF<sub>6</sub>) would be released within the Blending Donor Station. Since the station enclosure is not airtight, the UF<sub>6</sub> would be released to the Blending and Liquid Sampling Area. The UF<sub>6</sub>, when in contact with air, would produce hydrogen fluoride gas and UO<sub>2</sub>F<sub>2</sub>. The release into the building would then be released to the environment. The heating, ventilation, and air-conditioning is conservatively assumed to be operating at the maximum ventilation flow rate. Significant quantities of hydrogen fluoride and UO<sub>2</sub>F<sub>2</sub> would be carried by the prevailing wind beyond the controlled area boundary.

The results of the consequence assessment are presented in Table C-16 and show the health and environmental consequences of this accident would be high.

**Table C-16 Health Effects Resulting from Hydraulic Rupture of a UF<sub>6</sub> Cylinder**

Worker (egress after 10 minutes)		Environment at RAB	Individual at CAB, SW Direction		Collective Dose, North Direction	
U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	U mg/m <sup>3</sup>	U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	person-rem	LCFs
High		44	250 (0.97)	86	12,000	7

RAB - restricted area boundary.

CAB -controlled area boundary.

HF - hydrogen fluoride.

LCF - latent cancer fatalities.

U - uranium.

mg - milligram.

m<sup>3</sup> - cubic meters.

To convert rem to sievert, multiply by 0.01.

The health and environmental consequences of this accident are high. A worker in the vicinity of the Blending Donor Station would be exposed within seconds to lethal UF<sub>6</sub>, UO<sub>2</sub>F<sub>2</sub>, and hydrogen fluoride concentrations. The environmental consequences are higher than the 5.4 milligrams uranium per cubic meter threshold for an intermediate consequence. An individual located on the controlled area boundary in the southwest sector would suffer high consequences from both uranium and hydrogen fluoride exposure. The collective dose to the offsite population in the north sector indicates a risk of several latent cancer fatalities in the population in the years following the accident.

In accordance with the performance requirements of 10 CFR Part 70, Subpart H, LES has identified Items Relied on for Safety to reduce the risk to the proposed NEF workers, the public, and the environment from the effects of this accident. To prevent this accident, LES would rely on fail-safe, hard-wired, high-temperature heater trips and redundant, independent, fail-safe, capillary high temperature heater trips. Each control would be tested annually to ensure its availability and reliability to serve its intended safety function on demand. The purpose of these controls would be to ensure that the accident is highly unlikely to occur. In addition, there have been no similar heater control failures at the Urenco facilities in Europe in over 30 years of operation.

In addition to Items Relied on for Safety, LES has committed to an Emergency Plan that includes certain mitigating actions to reduce the consequences of the event. For example, in response to an alarm that indicates the release of UF<sub>6</sub>, a control-room operator could secure the heating, ventilation, and air

conditioning systems for the affected area. The action to secure the heating, ventilation, and air-conditioning within minutes of the accident would considerably reduce the risk to the public and the environment.

### **C.4.2.3 Natural Phenomena Hazard—Earthquake**

An earthquake is postulated to breach all UF<sub>6</sub> piping systems and lead to a release of approximately 860 kilograms (1,896 pounds) of UF<sub>6</sub> (LES, 2005a). The value used for the peak horizontal and vertical accelerations is 0.15g. The rationale for selecting the design-basis earthquake is found in LES's ISA Summary. The staff evaluated this accident for the Blending and Liquid Sampling Area, UF<sub>6</sub> Handling Areas, and the Cascade Halls. LES has committed to ensure the affected process buildings can withstand the design-basis earthquake. Therefore, for this evaluation, the staff assumed that the buildings would remain intact. LES would also install and maintain an electrical trip system for select heating, ventilation, and air-conditioning systems in process areas with large inventories of gaseous UF<sub>6</sub>. The trip system would detect earthquakes and secure the heating, ventilation, and air-conditioning units. Therefore, for this evaluation, it is also assumed that the heating, ventilation, and air-conditioning in affected process buildings would be shut down.

The results of the consequence assessment are presented in Table C-17 for a worker located in one of the Cascade Halls during the earthquake. Depending on the location of the worker when the event occurs, the large quantity of UF<sub>6</sub> which could be released would result in a high consequence to this individual before he or she could escape the room. However, for seismic events, the worker is assumed to evacuate the area of concern upon detection of a seismic event, which results in a reduced exposure time and an acceptable risk. The consequences to the environment would be low. The maximally exposed individual at the controlled area boundary in the southwest direction would not be expected to suffer any observable health effects. Similarly, the low collective dose to the offsite population in the north sector means that the risk of health effects to the offsite public (latent cancer) from this accident would be low.

**Table C-17 Health Effects Resulting from an Earthquake**

Worker (egress after 10 minutes)		Environment at RAB	Individual at CAB, SW Direction		Collective Dose, North Direction	
U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	U mg/m <sup>3</sup>	U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	person-rem	LCFs
Low		0.11	0.64 (0.0017)	0.22	14	0.008

RAB - restricted area boundary. CAB - controlled area boundary.  
 HF - hydrogen fluoride. LCF - latent cancer fatalities.  
 U - uranium. mg - milligram.  
 m<sup>3</sup> - cubic meter.  
 To convert rem to sievert, multiply by 0.01.

#### C.4.2.4 Fire in a UF<sub>6</sub> Handling Area

A fire involving transient combustible material is postulated to breach a UF<sub>6</sub> transfer manifold containing feed vapor from five feed stations in a single UF<sub>6</sub> Handling Area. The release would involve approximately 3.4 kilograms (7.5 pounds) of UF<sub>6</sub> vapor.

The results of the consequence assessment are presented in Table C-18. The consequences of this accident are low for the environment, the individual at the CAB, and the public offsite. For the facility worker, the consequences are intermediate for acute chemical exposure to uranium. However, for fires, the worker is assumed to evacuate the area of concern once the fire is detected, which would result in an exposure time much shorter than 10 minutes, thus resulting in acceptable risk.

**Table C-18 Health Effects Resulting from Fire in a UF<sub>6</sub> Handling Area**

Worker (egress after 10 minutes)		Environment at RAB	Individual at CAB, SW Direction		Collective Dose, North Direction	
U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	U mg/m <sup>3</sup>	U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	person-rem	LCFs
59 (0.020 rem)	20	0.012	0.070 (0.000072)	0.024	0.92	0.0006

RAB - restricted area boundary. CAB - controlled area boundary.  
 HF - hydrogen fluoride. LCF - latent cancer fatalities.  
 U - uranium. mg - milligram.  
 m<sup>3</sup> - cubic meter.  
 To convert rem to sievert, multiply by 0.01.

In accordance with the performance requirements of 10 CFR Part 70, Subpart H, LES has identified Items Relied on for Safety to ensure the risk of this type of accident remains low. To reduce the magnitude of fires resulting from the presence of transient combustible material, LES would rely on administrative



controls. The purpose of these controls is to prevent large fires that could result in the release of large inventories of UF<sub>6</sub>.

#### C.4.2.5 Process Line Rupture in a Product Low-Temperature Takeoff Station

Cold traps and chemical traps would be used at the proposed NEF to remove residual UF<sub>6</sub> and hydrogen fluoride from process lines prior to discharging exhaust gases from these lines to the gaseous effluent vent system. An accident could occur if a product vent subsystem carbon trap became saturated with UF<sub>6</sub> caused by a small UF<sub>6</sub> leak through a product cold trap valve. Were this to occur, a UF<sub>6</sub> plug could form on the discharge of the vacuum pump, causing high pressure in the vacuum pump and thus failing seals leading to a release of approximately 1.0 kilogram (2 pounds) of UF<sub>6</sub> vapor to the UF<sub>6</sub> Handling Area.

The results of the consequence assessment are presented in Table C-19 and show that the consequences of this accident are low for the proposed NEF worker, the environment, the individual at the controlled area boundary, and the public offsite.

**Table C-19 Acute Health Effects Resulting from Process Line Rupture in a Product Low-Temperature Takeoff Station**

Worker (egress after 10 minutes)		Environment at RAB	Individual at CAB, SW Direction		Collective Dose, NNW Direction	
U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	U mg/m <sup>3</sup>	U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	person- rem	LCFs
17 (0.022 rem)	5.8	0.0035	0.020 (0.000078 rem)	0.0069	0.97	0.0006

RAB - restricted area boundary.

CAB - controlled area boundary.

HF - hydrogen fluoride.

LCF - latent cancer fatalities.

U - uranium.

mg - milligram.

m<sup>3</sup> - cubic meter.

To convert rem to sievert, multiply by 0.01.

In accordance with the performance requirements of 10 CFR Part 70, Subpart H, LES has identified Items Relied on for Safety to ensure the risk of this type of accident remains low. For this accident, a preventive measure is a fail-safe, hard-wired, high-carbon trap weight trip of the vacuum pump. This equipment would be tested annually to ensure its availability and reliability to serve its intended safety function.

#### C.4.3 Consequence Assessment for Land and Biota Effects

The hydraulic rupture of a UF<sub>6</sub> cylinder is used to demonstrate the potential impacts that an accident at the proposed NEF would have on the surrounding land and biota. This accident releases the maximum quantity of UF<sub>6</sub> and thus bounds the impacts of all of the accidents described in this appendix.

As described in section C.4.2, the postulated rupture could release up to 12,500 kilograms (27,600 pounds) of UF<sub>6</sub> into the Blending Donor Station and then to the Sampling Area. The release into the building would then be released into the atmosphere. The consequences of such a release on the

surrounding land and biota are considered by analogy with the consequences from a similar accident that occurred at the Sequoyah Fuels Corporation in January 1986 (NRC, 1986). A rupture of a cylinder containing 13,380 kilograms (29,500 pounds) of UF<sub>6</sub> was caused by a supervisor taking actions contrary to operating procedures. The rupture resulted in the release of UF<sub>6</sub> outside of the building. The release formed a cloud consisting of the chemical products of UF<sub>6</sub> reacting with the moisture in the air to create UO<sub>2</sub>F<sub>2</sub> and hydrogen fluoride. It was estimated that 75 percent of the release occurred over 5 minutes with the remaining 25 percent of the release occurring over the subsequent 40 minutes. The plume was transported along with the wind which was blowing at 8 meters per second (18 miles per hour) with atmospheric stability class D.

Areas over which the release products from this accident at Sequoyah Fuels Corporation were deposited were estimated in NUREG-1189 (NRC, 1986). Uranium deposition of 13,600 milligrams per square meter (0.045 ounces per square foot) was found onsite while an area of 7.68 square kilometers (2.97 square miles) was found to encompass uranium depositions of 1.36 milligrams per square meter ( $4.5 \times 10^{-6}$  ounces per square foot). Soil concentration action levels of 40 micrograms per gram for uranium and 350 micrograms per gram for fluoride were established based on health considerations.

Deposition rates were converted to soil concentration by assuming that the deposited material mixes with the upper centimeter (inch) of soil having a typical density of 2 grams per cubic centimeter (about 125 pounds per cubic foot). Uranium soil concentrations were then found to exceed the action level within an area of approximately 0.32 square kilometers (0.20 square miles). This area extended approximately 1 kilometer (0.6 miles) from the release location. The fluoride soil concentration action level was found to not extend offsite.

Cattle located onsite were examined by veterinarians and showed no ill effects from the release. Their urine samples did indicate elevated levels of fluoride and uranium. Animals on farms beyond Sequoyah Fuels Corporation were considered free to move to slaughter in the normal manner. The highest levels of uranium and fluoride were contained onsite. The effects on vegetation of the lower levels found offsite were expected to be insignificant.

These effects at Sequoyah Fuels Corporation are expected to be somewhat greater than the effects that would result if a similar (bounding) accident were to occur at the proposed NEF. The quantity of UF<sub>6</sub> subject to release at the proposed NEF would be approximately 93 percent of that at Sequoyah Fuels Corporation. The release rates from the proposed NEF would be less than those at Sequoyah Fuels Corporation because the former release would be from building ventilation rather than directly outside. At the proposed NEF, somewhat less than half of the released material would enter the environment outside of the building in the first 30 minutes after the rupture. This lower release rate to the environment would result in lower environmental concentrations in the site vicinity. Winds at the proposed NEF could be expected to result in at least as much dispersion as the winds at Sequoyah Fuels Corporation did during the accident. The wind speed at the proposed NEF would be greater than 7 meters per second (15.7 miles per hour) 72.2 percent of the time (see section 3.5.2.4, Winds and Atmospheric Stability, of this EIS); the atmospheric stability would be class D or less stable 65.8 percent of the time. Lesser wind speeds or more stable atmospheric conditions would result in less dispersion and elevated soil concentrations extending further, although not spreading as much laterally.

#### **C.4.4 Accident Analysis Summary**

A representative subset of the potential accidents that could occur at the proposed NEF was selected and evaluated with the summary of the five potential accidents given in Table C-20. The accident consequences vary in magnitude and include accidents initiated by natural phenomena, operator error, and equipment failure. Analytical results indicate that accidents at the proposed NEF pose acceptably low risks. The most significant accident consequences are those associated with the release of UF<sub>6</sub> caused by rupturing an overfilled and/or overheated cylinder. The proposed NEF design would reduce the risk (likelihood) of this event by using redundant heater controller trips. In addition, the proposed NEF Emergency Plan addresses this type of event and all other lower-risk, high-consequence, and intermediate-consequence events. The NRC staff concludes that through the combination of plant design, passive and active engineered controls (Items Relied on for Safety), and administrative controls, accidents at the proposed NEF would pose an acceptably low risk to workers, the environment, and the public.

**Table C-20 Summary of Health Effects Resulting from Accidents at the Proposed NEF**

Accident	Worker <sup>a</sup>		Environment at RAB	Individual at CAB, SW Direction		Collective Dose		
	U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	U mg/m <sup>3</sup>	U mg/m <sup>3</sup> (rem)	HF mg/m <sup>3</sup>	Direction	person- rem	LCFs
Inadvertent Nuclear Criticality	High <sup>b</sup>		0.66 <sup>c</sup>	(0.14 <sup>d</sup> )	---	West	44	0.03
Hydraulic Rupture of a UF <sub>6</sub> Cylinder	High <sup>b</sup>		44	250 (0.97)	86	North	12,000	7 <sup>e</sup>
Earthquake	Low		0.11	0.64 (0.0017)	0.13	North	19	0.008
Fire in a UF <sub>6</sub> Handling Area	59 (0.020)	20	0.012	0.070 (0.000072)	0.024	North	0.92	0.0006
Process Line Rupture	17 (0.022)	5.8	0.0035	0.020 (0.000078)	0.0069	North	0.97	0.0006

<sup>a</sup> Worker exits after 10 minutes.

<sup>b</sup> High consequence could lead to a fatality.

<sup>c</sup> Pursuant to 10 CFR § 70.61(c)(3), this value is the sum of the fractions of individual fission product radionuclide concentrations over 5,000 times the concentration limits that appear in 10 CFR Part 20, Appendix B, Table 2.

<sup>d</sup> The dose to the individual at the controlled area boundary is the sum of internal and external doses from fission products released from the Technical Services Buildings Gaseous Effluent Vent System stack.

<sup>e</sup> Though the consequences of the rupture of a liquid-filled UF<sub>6</sub> cylinder would be high, redundant heater controller trips would make this event highly unlikely.

RAB - restricted area boundary.

CAB - controlled area boundary.

HF - hydrogen fluoride.

LCF - latent cancer fatalities.

U - uranium.

mg - milligram.

m<sup>3</sup> - cubic meter.

To convert rem to sievert, multiply by 0.01.

## C.5 References

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## APPENDIX D TRANSPORTATION METHODOLOGY, ASSUMPTION, AND IMPACTS

### D.1 Introduction

This appendix presents the methodology, assumptions, and results for the transportation of radioactive materials to and from the proposed National Enrichment Facility (NEF). Also included is the transportation of the converted triuranium octaoxide ( $U_3O_8$ ) and calcium fluoride ( $CaF_2$ ) (if necessary) resulting from the conversion of the depleted uranium hexafluoride ( $DUF_6$ ). The  $CaF_2$  is generated during the conversion process from the neutralization of hydrofluoric acid. However, if the conversion process is performed at a potential facility at Metropolis, Illinois, the hydrofluoric acid would be reused at that facility. Louisiana Energy Services (LES) has proposed to use only trucks for the transport of radioactive shipments; however, this appendix also assumes that rail transport would be a viable option.

Briefly, the impact assessment determines the following: the origin and destination of each type of radioactive material, the amount of material in each shipment, the mode of shipment (truck or rail), the route to be used, and impacts to the environment from these shipments. In this process, the WebTragis and RADTRAN 5 computer codes were used extensively and are discussed in more detail later (ORNL, 2003; Neuhauser and Kanipe, 2003). The appendix is organized into separate sections that describe the radioactive materials, the shipping routes, the dose assessments, and the results.

### D.2 Radioactive Material Description

The radioactive materials transported to and from the proposed NEF are subject to both U.S. Nuclear Regulatory Commission (NRC) (10 Code of Federal Regulations [CFR] Part 71) and U.S. Department of Transportation (49 CFR Parts 171-173) shipping regulations. All shipments of  $UF_6$  can be transported in Type A shipping containers that also have thermal protection (e.g., overpack or other protective assembly) that meet the requirements of 49 CFR § 173.420 and 10 CFR § 71.73(c)(4). Shipments of the product material are required to have fissile controls in addition to the thermal protection. However, in this assessment of the radiological impacts, any reduction in exposures due to the presence of a thermal and/or fissile overpack is ignored.

Several different types of radioactive materials are proposed for shipment. Table D-1 presents the composition of four different types of containers proposed for the shipment of feed, product, depleted uranium, and waste. Figures D-1 through D-3 are diagrams and Tables D-2 through D-4 are the specifications for the Type 30B, 48X, and 48Y cylinders, respectively. One year of decay was included as a conservative assumption to account for a delay in shipping between the generation of the natural  $UF_6$  and any radioactive shipments.

Three other radioactive materials requiring transportation that result from the conversion of  $DUF_6$  are depleted  $U_3O_8$ ,  $CaF_2$ , and empty Type 48Y cylinders. Assuming no change in isotopic concentration of the four uranium isotopes, the  $U_3O_8$  material would have the same curie content as the  $DUF_6$ . The  $CaF_2$  could have about 55 becquerels (1.5 picocuries) per gram of depleted uranium as a radioactive contaminate (DOE, 2004a; DOE 2004b). The empty Type 48Y cylinders would contain residues, or heels, that would remain after evacuation of the  $UF_6$ . For this analysis, NRC staff assumes the empty Type 48Y cylinders would be shipped from the proposed NEF and the adjacent private conversion facility to the feed material suppliers using the same routes for shipping feed material to the proposed NEF. Based on a 11,340-kilogram (25,000-pound) amount of processed material, Table D-5 presents the curie inventory of the converted  $U_3O_8$  and  $CaF_2$ . This amount of material presents the approximate net load that a truck could reasonably haul without obtaining special permits.

The radionuclide data and shipping container characteristics for input into RADTRAN 5 were obtained from the U.S. Department of Energy's (DOE's) *A Resource Handbook on DOE Transportation Risk Assessment* (DOE, 2002) and the NRC's NUREG-0170 (NRC, 1977).

**Table D-1 Curie Inventory in Selected Shipping Containers for Truck Transportation<sup>a</sup>**

Radionuclide	Feed Material (Natural Uranium as UF <sub>6</sub> )		Product (Enriched Uranium as UF <sub>6</sub> )	Depleted Uranium (DUF <sub>6</sub> )	Residue (Heels)	Solid Waste
	Type 48Y Cylinder	Type 48X Cylinder	Type 30B Cylinder	Type 48Y Cylinder	Type 48Y Cylinder	55-Gallon Drum
Tl-207	4.28×10 <sup>-8</sup>	3.29×10 <sup>-8</sup>	5.74×10 <sup>-8</sup>	2.05×10 <sup>-8</sup>	1.39×10 <sup>-8</sup>	6.84×10 <sup>-12</sup>
Tl-208	1.75×10 <sup>-15</sup>	1.35×10 <sup>-15</sup>	2.35×10 <sup>-15</sup>	8.35×10 <sup>-16</sup>	1.25×10 <sup>-15</sup>	2.80×10 <sup>-19</sup>
Pb-210	5.52×10 <sup>-11</sup>	4.25×10 <sup>-11</sup>	8.71×10 <sup>-11</sup>	2.48×10 <sup>-11</sup>	4.49×10 <sup>-11</sup>	8.82×10 <sup>-15</sup>
Pb-211	4.29×10 <sup>-8</sup>	3.30×10 <sup>-8</sup>	5.75×10 <sup>-8</sup>	2.05×10 <sup>-8</sup>	1.39×10 <sup>-8</sup>	6.86×10 <sup>-12</sup>
Pb-212	4.87×10 <sup>-15</sup>	3.75×10 <sup>-15</sup>	6.53×10 <sup>-15</sup>	2.32×10 <sup>-15</sup>	3.47×10 <sup>-15</sup>	7.79×10 <sup>-19</sup>
Pb-214	5.45×10 <sup>-9</sup>	4.20×10 <sup>-9</sup>	8.61×10 <sup>-9</sup>	2.45×10 <sup>-9</sup>	1.91×10 <sup>-9</sup>	8.72×10 <sup>-13</sup>
Bi-210	5.52×10 <sup>-11</sup>	4.25×10 <sup>-11</sup>	8.71×10 <sup>-11</sup>	2.48×10 <sup>-11</sup>	4.38×10 <sup>-11</sup>	8.82×10 <sup>-15</sup>
Bi-211	4.29×10 <sup>-8</sup>	3.30×10 <sup>-8</sup>	5.75×10 <sup>-8</sup>	2.05×10 <sup>-8</sup>	1.39×10 <sup>-8</sup>	6.86×10 <sup>-12</sup>
Bi-212	4.87×10 <sup>-15</sup>	3.75×10 <sup>-15</sup>	6.53×10 <sup>-15</sup>	2.32×10 <sup>-15</sup>	3.47×10 <sup>-15</sup>	7.79×10 <sup>-19</sup>
Bi-214	5.45×10 <sup>-9</sup>	4.20×10 <sup>-9</sup>	8.61×10 <sup>-9</sup>	2.45×10 <sup>-9</sup>	1.91×10 <sup>-9</sup>	8.72×10 <sup>-13</sup>
Po-210	1.79×10 <sup>-11</sup>	1.38×10 <sup>-11</sup>	2.82×10 <sup>-11</sup>	8.04×10 <sup>-12</sup>	2.32×10 <sup>-11</sup>	2.86×10 <sup>-15</sup>
Po-211	1.20×10 <sup>-10</sup>	9.25×10 <sup>-11</sup>	1.61×10 <sup>-10</sup>	5.75×10 <sup>-11</sup>	3.90×10 <sup>-11</sup>	1.92×10 <sup>-14</sup>
Po-212	3.12×10 <sup>-15</sup>	2.40×10 <sup>-15</sup>	4.18×10 <sup>-15</sup>	1.49×10 <sup>-15</sup>	2.22×10 <sup>-15</sup>	4.99×10 <sup>-19</sup>
Po-214	5.45×10 <sup>-9</sup>	4.20×10 <sup>-9</sup>	8.60×10 <sup>-9</sup>	2.45×10 <sup>-9</sup>	1.91×10 <sup>-9</sup>	8.71×10 <sup>-13</sup>
Po-215	4.29×10 <sup>-8</sup>	3.30×10 <sup>-8</sup>	5.75×10 <sup>-8</sup>	2.05×10 <sup>-8</sup>	1.39×10 <sup>-8</sup>	6.86×10 <sup>-12</sup>
Po-216	4.87×10 <sup>-15</sup>	3.75×10 <sup>-15</sup>	6.53×10 <sup>-15</sup>	2.32×10 <sup>-15</sup>	3.47×10 <sup>-15</sup>	7.79×10 <sup>-19</sup>
Po-218	5.45×10 <sup>-9</sup>	4.20×10 <sup>-9</sup>	8.61×10 <sup>-9</sup>	2.45×10 <sup>-9</sup>	1.91×10 <sup>-9</sup>	8.72×10 <sup>-13</sup>
Rn-219	4.29×10 <sup>-8</sup>	3.30×10 <sup>-8</sup>	5.75×10 <sup>-8</sup>	2.05×10 <sup>-8</sup>	1.39×10 <sup>-8</sup>	6.86×10 <sup>-12</sup>
Rn-220	4.87×10 <sup>-15</sup>	3.75×10 <sup>-15</sup>	6.53×10 <sup>-15</sup>	2.32×10 <sup>-15</sup>	3.47×10 <sup>-15</sup>	7.79×10 <sup>-19</sup>
Rn-222	5.45×10 <sup>-9</sup>	4.20×10 <sup>-9</sup>	8.61×10 <sup>-9</sup>	2.45×10 <sup>-9</sup>	1.91×10 <sup>-9</sup>	8.72×10 <sup>-13</sup>
Fr-223	5.92×10 <sup>-10</sup>	4.56×10 <sup>-10</sup>	7.94×10 <sup>-10</sup>	2.83×10 <sup>-10</sup>	2.09×10 <sup>-10</sup>	9.47×10 <sup>-14</sup>
Ra-223	4.29×10 <sup>-8</sup>	3.30×10 <sup>-8</sup>	5.75×10 <sup>-8</sup>	2.05×10 <sup>-8</sup>	1.39×10 <sup>-8</sup>	6.86×10 <sup>-12</sup>
Ra-224	4.87×10 <sup>-15</sup>	3.75×10 <sup>-15</sup>	6.53×10 <sup>-15</sup>	2.32×10 <sup>-15</sup>	3.47×10 <sup>-15</sup>	7.79×10 <sup>-19</sup>
Ra-226	5.45×10 <sup>-9</sup>	4.20×10 <sup>-9</sup>	8.61×10 <sup>-9</sup>	2.45×10 <sup>-9</sup>	1.93×10 <sup>-9</sup>	8.72×10 <sup>-13</sup>
Ra-228	4.37×10 <sup>-14</sup>	3.37×10 <sup>-14</sup>	5.86×10 <sup>-14</sup>	2.09×10 <sup>-14</sup>	1.48×10 <sup>-14</sup>	6.99×10 <sup>-18</sup>
Ac-227	4.29×10 <sup>-8</sup>	3.30×10 <sup>-8</sup>	5.75×10 <sup>-8</sup>	2.05×10 <sup>-8</sup>	1.51×10 <sup>-8</sup>	6.86×10 <sup>-12</sup>

Radionuclide	Feed Material (Natural Uranium as UF <sub>6</sub> )		Product (Enriched Uranium as UF <sub>6</sub> )	Depleted Uranium (DUF <sub>6</sub> )	Residue (Heels)	Solid Waste
	Type 48Y Cylinder	Type 48X Cylinder	Type 30B Cylinder	Type 48Y Cylinder	Type 48Y Cylinder	55-Gallon Drum
Ac-228	4.37×10 <sup>-14</sup>	3.37×10 <sup>-14</sup>	5.86×10 <sup>-14</sup>	2.09×10 <sup>-14</sup>	1.48×10 <sup>-14</sup>	6.99×10 <sup>-18</sup>
Th-227	4.23×10 <sup>-8</sup>	3.26×10 <sup>-8</sup>	5.67×10 <sup>-8</sup>	2.02×10 <sup>-8</sup>	1.42×10 <sup>-8</sup>	6.77×10 <sup>-12</sup>
Th-228	4.87×10 <sup>-15</sup>	3.75×10 <sup>-15</sup>	6.53×10 <sup>-15</sup>	2.32×10 <sup>-15</sup>	3.53×10 <sup>-15</sup>	7.79×10 <sup>-19</sup>
Th-230	2.52×10 <sup>-5</sup>	1.94×10 <sup>-5</sup>	3.97×10 <sup>-5</sup>	1.13×10 <sup>-5</sup>	3.01×10 <sup>-6</sup>	4.03×10 <sup>-9</sup>
Th-231	1.29×10 <sup>-1</sup>	9.91×10 <sup>-2</sup>	1.73×10 <sup>-1</sup>	6.16×10 <sup>-2</sup>	0	2.06×10 <sup>-5</sup>
Th-232	8.74×10 <sup>-13</sup>	6.73×10 <sup>-13</sup>	1.17×10 <sup>-12</sup>	4.17×10 <sup>-13</sup>	1.04×10 <sup>-13</sup>	1.40×10 <sup>-16</sup>
Th-234	2.8	2.15	5.10×10 <sup>-1</sup>	2.81	1.06×10 <sup>-5</sup>	4.47×10 <sup>-4</sup>
Pa-231	2.72×10 <sup>-6</sup>	2.10×10 <sup>-6</sup>	3.65×10 <sup>-6</sup>	1.30×10 <sup>-6</sup>	3.28×10 <sup>-7</sup>	4.36×10 <sup>-10</sup>
Pa-234m	2.8	2.15	5.10×10 <sup>-1</sup>	2.81	1.06×10 <sup>-5</sup>	4.47×10 <sup>-4</sup>
Pa-234	3.64×10 <sup>-3</sup>	2.80×10 <sup>-3</sup>	6.63×10 <sup>-4</sup>	3.65×10 <sup>-3</sup>	1.38×10 <sup>-8</sup>	5.82×10 <sup>-7</sup>
U-234	2.8	2.15	4.42	1.26	9.01×10 <sup>-8</sup>	4.47×10 <sup>-4</sup>
U-235	1.29×10 <sup>-1</sup>	9.91×10 <sup>-2</sup>	1.73×10 <sup>-1</sup>	6.16×10 <sup>-2</sup>	0	2.06×10 <sup>-5</sup>
U-236	1.77×10 <sup>-2</sup>	1.36×10 <sup>-2</sup>	2.38×10 <sup>-2</sup>	8.46×10 <sup>-3</sup>	0	2.83×10 <sup>-6</sup>
U-238	2.8	2.15	5.10×10 <sup>-1</sup>	2.81	0	4.47×10 <sup>-4</sup>

<sup>a</sup>Includes 1-year decay and in-growth.

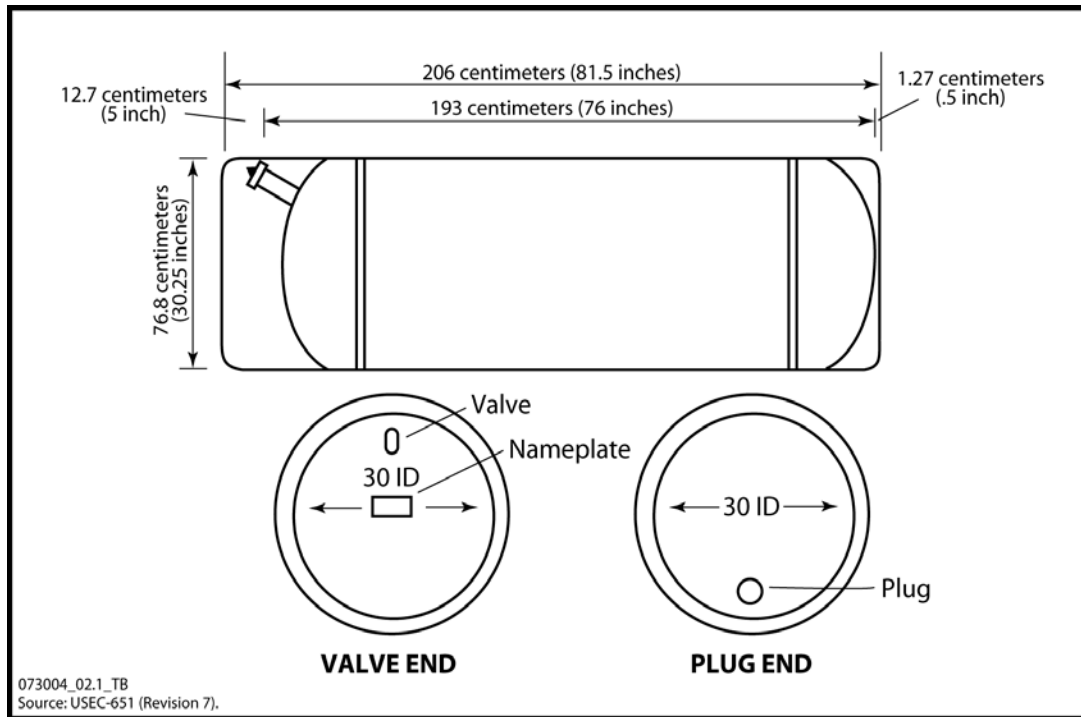
To convert from curies to becquerels multiply by 3.7×10<sup>10</sup>.

Source: LES, 2004.

**Table D-2 Type 30B Cylinder Specifications**

Parameter	Value
Nominal Diameter	76 centimeters (30 inches)
Nominal Length	206 centimeters (81 inches)
Wall Thickness	1.27 centimeters (0.5 inch)
Nominal Tare Weight	635 kilograms (1,400 pounds)
Maximum Net Weight	2,300 kilograms (5,000 pounds)
Nominal Gross Weight	2,900 kilograms (6,400 pounds)
Minimum Volume	736 liters (26 cubic feet)
Basic Material of Construction	Steel: ASTM A-516
Service Pressure	1,380 kiloPascals gage (200 pounds per square inch gage)
Hydrostatic Test Pressure	2,760 kiloPascals gage (400 pounds per square inch gage)
Isotopic Content Limit	5.0 percent uranium-235 ( <sup>235</sup> U) (maximum with moderation control)
Valve Used	2.54-centimeter valve (1-inch valve)

Source: USEC, 1995.

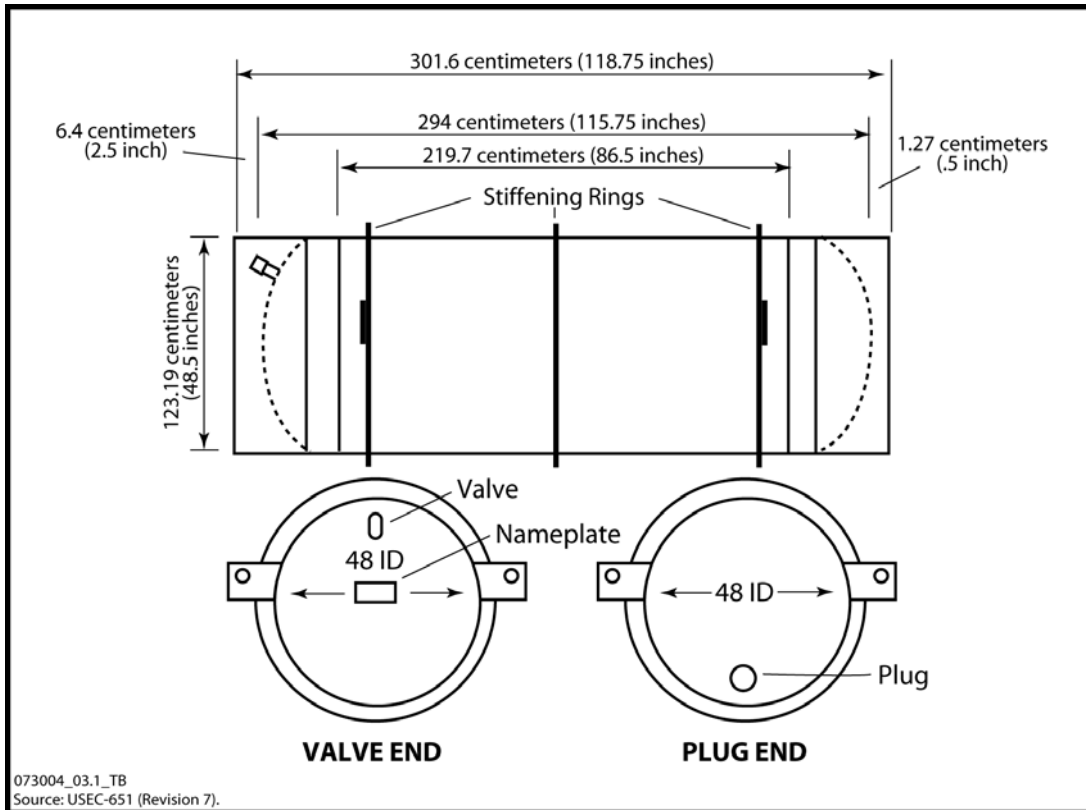


**Figure D-1 Schematic of a Type 30B Cylinder (USEC, 1995)**

**Table D-3 Type 48X Cylinder Specifications**

Parameter	Value
Nominal Diameter	122 centimeters (48 inches)
Nominal Length	302 centimeters (119 inches)
Wall Thickness	1.6 centimeters (0.625 inch)
Nominal Tare Weight	2,000 kilograms (4,500 pounds)
Maximum Net Weight	9,540 kilograms (21,000 pounds)
Nominal Gross Weight	11,600 kilograms (25,500 pounds)
Minimum Volume	3.048 cubic meters (108.9 cubic feet)
Basic Material of Construction	Steel: ASTM A-516
Service Pressure	1,380 kiloPascals gage (200 pounds per square inch gage)
Hydrostatic Test Pressure	2,760 kiloPascals gage (400 pounds per square inch gage)
Isotopic Content Limit	4.5 percent <sup>235</sup> U (maximum with moderation control for transport, 5.0% for in-plant use)
Valve Used	2.54-centimeter valve (1-inch valve)

Source: USEC, 1995.

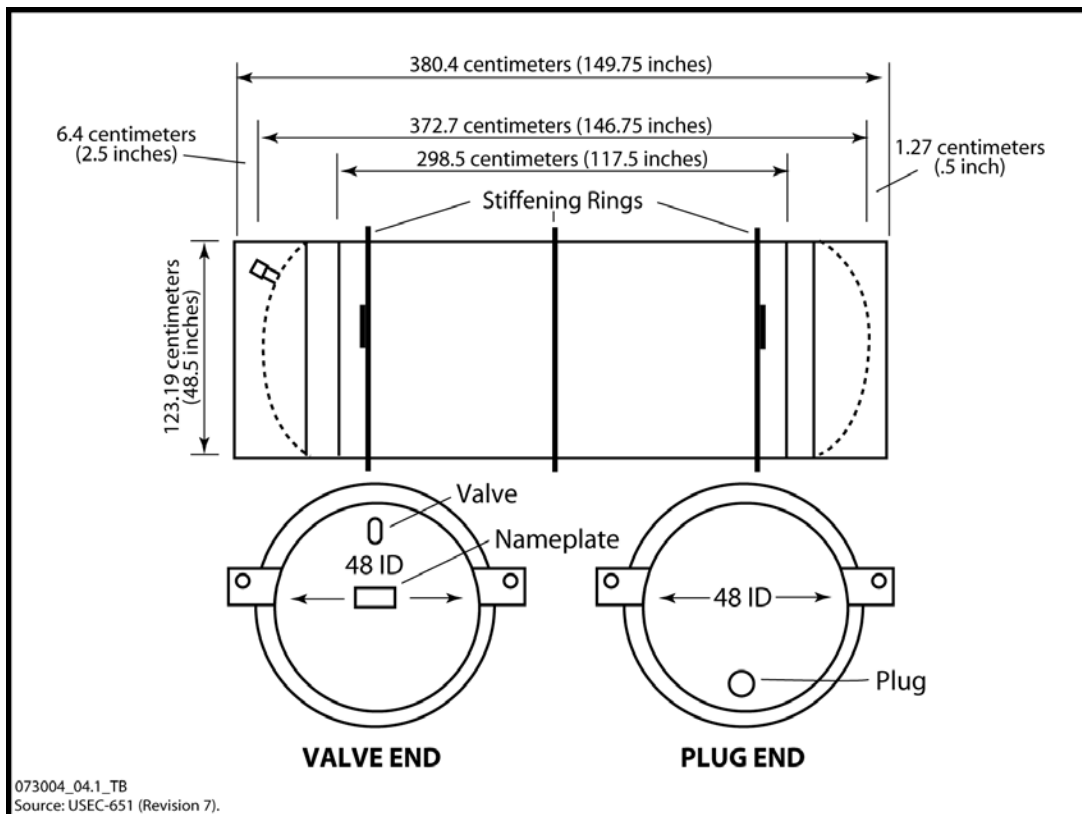


**Figure D-2 Schematic of a Type 48X Cylinder (USEC, 1995)**

**Table D-4 Type 48Y Cylinder Specifications**

Parameter	Value
Nominal Diameter	122 centimeters (48 inches)
Nominal Length	380 centimeters (150 inches)
Wall Thickness	1.6 centimeters (0.625 inches)
Nominal Tare Weight	2,359 kilograms (5,200 pounds)
Maximum Net Weight	12,500 kilograms (27,560 pounds)
Nominal Gross Weight	14,860 kilograms (32,760 pounds)
Minimum Volume	4.04 cubic meters (142.7 cubic feet)
Basic Material of Construction	Steel: ASTM A-516
Service Pressure	1,380 kiloPascals gage (200 pounds per square inch gage)
Hydrostatic Test Pressure	2,760 kiloPascals gage (400 pounds per square inch gage)
Isotopic Content Limit	4.5 percent <sup>235</sup> U (maximum with moderation control)
Valve Used	2.54-centimeter valve (1-inch valve)

Source: USEC, 1995.



**Figure D-3 Schematic of a Type 48Y Cylinder (USEC, 1995)**

**Table D-5 Curie Content of U<sub>3</sub>O<sub>8</sub> and CaF<sub>2</sub> Based on 11,340-Kilogram (25,000-Pound) Amounts**

Radionuclide	Curie Content	
	U <sub>3</sub> O <sub>8</sub> <sup>a, b</sup>	CaF <sub>2</sub> <sup>a, c</sup>
Uranium-234	4.47	1.70×10 <sup>-5</sup>
Uranium-235	0.218	5.82×10 <sup>-9</sup>
Uranium-236	0.03	1.72×10 <sup>-7</sup>
Uranium-238	9.94	9.05×10 <sup>-10</sup>

<sup>a</sup> Based on the DUF<sub>6</sub> radionuclide concentration.

<sup>b</sup> Based on a material conversion of 1.18 pounds of U<sub>3</sub>O<sub>8</sub> per pound of uranium in UF<sub>6</sub>.

<sup>c</sup> Based on the material conversion of 2.05 pound of CaF<sub>2</sub> per pound of F in UF<sub>6</sub> and 1.5 picocurie contamination of depleted uranium per gram of CaF<sub>2</sub>.

To convert from curies to becquerels, multiply by 3.7×10<sup>10</sup>.

The NRC staff reviewed the number of shipments and the number of packages per truck based on the amount of materials being shipped to or from the proposed NEF. The NRC staff assumed that the contents of a railcar have the equivalent content of four trucks. Table D-6 presents the number of packages and number of trucks or railcars that would be required for the transport.

**Table D-6 Number of Packages and Number of Trucks or Railcars Required for the Transport**

Material	Type of Container	Number of		
		Containers	Trucks	Railcars
Natural UF <sub>6</sub>	Type 48X <sup>a</sup>	890 <sup>a</sup>	890 <sup>a</sup>	223
	Type 48Y <sup>a</sup>	690 <sup>a</sup>	690 <sup>a</sup>	173
Enriched UF <sub>6</sub>	Type 30B <sup>a</sup>	350 <sup>a</sup>	117 <sup>a</sup>	30
DUF <sub>6</sub>	Type 48Y <sup>a</sup>	627 <sup>a</sup>	627 <sup>a</sup>	157
Depleted U <sub>3</sub> O <sub>8</sub>	11,340-kg (25,000-lb) bulk bags <sup>b</sup>	547	547	137
CaF <sub>2</sub>	11,340-kg (25,000-lb) bulk bags <sup>b</sup>	461	461	116
Solid Waste	55 gallon drums <sup>a</sup>	480 <sup>a</sup>	8 <sup>a</sup>	2
Empty Cylinders <sup>c</sup>	Type 48Y <sup>a</sup>	690	345	87

kg - kilogram.; lb - pound.

<sup>c</sup>Shipment of empty Type 48Y cylinders would be from the proposed NEF (63 empty cylinders per year) and the adjacent private conversion facility (627 empty cylinders per year).

Sources: <sup>a</sup> LES, 2005; <sup>b</sup> DOE, 2004a; DOE, 2004b.

Table D-7 provides a summary of information regarding estimates of the direct radiation near each type of shipping container (LES, 2004).

Note that in Table D-7, the external radiation levels for an empty cylinder are higher than those for a full cylinder. This occurs for two reasons. First, after UF<sub>6</sub> is vaporized and removed from a cylinder, the radioactive uranium daughter products that build up due to the radioactive decay of uranium collect at the bottom and form what is known as a “heel.” The nature of the radiation emitted from the uranium daughter products results in a greater release of gamma radiation than occurs from just uranium. Second, uranium is also a good shield material for gamma radiation. When the cylinder is full of UF<sub>6</sub>, the uranium daughters are distributed throughout the cylinder and emitted radiation must pass through a significant

amount of uranium (thus can be stopped or absorbed by the uranium). It is only gamma radiation from the uranium daughters near to the inner surface of the cylinder that can penetrate the cylinder and contribute to a nearby person's radiation exposure. Because the empty cylinder no longer has the high shielding capability of the UF<sub>6</sub> versus the remaining vapor, and the heel concentrates the more highly radioactive uranium daughters right next to the inner cylinder surface, the radiation levels of the empty UF<sub>6</sub> cylinder are higher than those for a full UF<sub>6</sub> cylinder.

**Table D-7 Direct Radiation Surrounding Shipping Containers**

<b>Item</b>	<b>Feed Material in Type 48X Cylinder</b>	<b>Feed Material in Type 48Y Cylinder</b>	<b>Product in Type 30B Cylinder</b>	<b>DUF<sub>6</sub> in Type 48Y Cylinder</b>	<b>Solid Waste in 55-gallon drum</b>	<b>Empty Type 48Y Cylinder</b>
Direct Radiation at 1 meter (mrem/hr)	0.26	0.29	0.19	0.28	0.0042	1.0
Direct Radiation at 2 meters (mrem/hr)	0.0722	0.0722	0.032	0.072	0.0013	0.26 (estimated)

mrem/hr - millirems per hour.

To convert from millirems to millisieverts, multiply by  $1 \times 10^{-2}$ .

Source: LES, 2004; LES, 2005.

The direct radiation from the DUF<sub>6</sub> cylinder was assumed to be representative of the direct radiation from the shipments of U<sub>3</sub>O<sub>8</sub> and CaF<sub>2</sub> via truck. The U<sub>3</sub>O<sub>8</sub> and CaF<sub>2</sub> were assumed to be shipped in bulk bags on a truck in 11,340-kilogram (25,000-pound) amounts. For shipments by railroad, a railcar could transport four times the amount that is proposed to be transported by truck. The direct radiation per cylinder was assumed to remain the same.

In addition to the radioactive materials released from containers of UF<sub>6</sub> (either natural, enriched, or depleted) during an accident, toxic chemicals could be released, as discussed in section D.5. The impacts are also discussed in section D.5.

### **D.3 Transportation Routes**

This section presents the various shipping routes for the radioactive material to and from the sites and from the U<sub>3</sub>O<sub>8</sub> conversion facility. WebTragis (ORNL, 2003) was used to generate the routing information for both the truck and railroad routes. WebTragis is a web-based version of Tragis (Transport Routing Analysis Geographic Information System) and is used to calculate highway, rail, or waterway routes within the United States. These routes are considered representative of the routes that would be used. Table D-8 presents a matrix of the shipping origins and destinations for the various radioactive materials.

For this Environmental Impact Statement (EIS), both truck and rail shipments were assumed to be valid modes of transport for each route. For some routes, the destination is not directly served by rail and it is assumed that the radioactive materials would be transferred to truck for delivery to the final destination. WebTragis generates routing distance, population density within 800 meters (0.5 mile), and for the truck routes, the number of rest stops and stops for State inspections. Tables D-9 and D-10 present the output from WebTragis to be used in the transportation assessment for truck and rail transport, respectively. For Port Hope, Ontario, an additional 241 kilometers (150 miles) of route distance and an inspection stop was added to the WebTragis output to account for that portion of the route located in Canada. Even though



transportation regulations by truck do not require restricted routing for the shipment of natural uranium, low-enriched uranium, or depleted uranium, routing restrictions were applied as follows:

- Highway Route Controlled Quantity preferred route with two drivers.
- Prohibit use of links prohibiting truck use.
- Prohibit use of ferry crossing; prohibit use of roads with hazardous materials prohibition.
- Prohibit use of roads with radioactive materials prohibition.

**Table D-8 Shipping Origins and Destinations**

Route	Feed Material (Natural UF <sub>6</sub> )	Product (Enriched UF <sub>6</sub> )	DUF <sub>6</sub>	Depleted U <sub>3</sub> O <sub>8</sub>	CaF <sub>2</sub>	Solid Waste	Empty Type 48Y Cylinder
Port Hope, ON, to NEF <sup>a</sup>	X						
Metropolis, IL, to NEF <sup>a</sup>	X						
NEF to Columbia, SC <sup>a</sup>		X					
NEF to Wilmington, NC <sup>a</sup>		X					
NEF to Richland, WA <sup>a</sup>		X					
NEF to Paducah, KY			X				
NEF to Portsmouth, OH			X				
NEF to Metropolis, IL <sup>a</sup>			X				
NEF to Clive, UT <sup>a</sup>				X <sup>b</sup>	X <sup>b</sup>	X	
NEF to Hanford, WA <sup>a</sup>				X <sup>b</sup>	X <sup>b</sup>	X	
NEF to Barnwell, SC <sup>a</sup>						X	
NEF to Oak Ridge, TN <sup>a</sup>						X	
Metropolis, IL, to Clive, UT				X			
Paducah, KY, to Clive, UT				X			
Portsmouth, OH, to Clive, UT				X			
Paducah, KY, to NTS, NV				X			
Portsmouth, OH, to NTS, NV				X			
Adjacent Conversion Facility to Port Hope, ON <sup>a</sup>							X
Adjacent Conversion Facility to Metropolis, IL <sup>a</sup>							X

<sup>a</sup> LES, 2005.

ON - Ontario, Canada.

NEF - proposed NEF.

IL - Illinois.

SC - South Carolina.

NC - North Carolina.

WA - Washington.

KY - Kentucky.

OH - Ohio.

UT - Utah.

TN - Tennessee.

NV - Nevada.

NTS - Nevada Test Site.

<sup>b</sup> As discussed in section 2.1.9, Option 1b, it was assumed that the conversion facility could be located within 6.4 kilometers (4.0 miles) of the proposed NEF.

**Table D-9 Distance, Density, and Stop Information Generated by WebTragis for Truck Routes**

Facility	Number of Stops		Link Type	Distance Per Trip		Population Density	
	Inspection	Rest		(km [mile])	(people/km <sup>2</sup> [mile <sup>2</sup> ])		
UF <sub>6</sub> Conversion Facility, Port Hope, Ontario, Canada	7	9	Rural	2,026.6	(1,259.3)	15.5	(40.6)
			Suburban	1,053.0	(654.3)	333.1	(872.0)
			Urban	129.9	(80.7)	2,276.8	(5,960.2)
UF <sub>6</sub> Conversion Facility, Metropolis, IL	3	4	Rural	1,329.1	(825.9)	12.6	(33.0)
			Suburban	414.8	(257.7)	320.9	(840.1)
			Urban	44.0	(27.3)	2,255.3	(5,903.9)
Fuel Fabrication Facility, Columbia, SC	5	6	Rural	1,557.8	(968.0)	24.5	(64.1)
			Suburban	689.5	(428.4)	318.2	(833.0)
			Urban	65.8	(40.9)	2,193.6	(5,742.4)
Fuel Fabrication Facility, Wilmington, NC	6	7	Rural	1,850.5	(1,149.8)	14.8	(38.7)
			Suburban	836.3	(519.7)	309.1	(809.2)
			Urban	69.4	(43.1)	2,191.9	(5,738.0)
Fuel Fabrication Facility, Richland, WA	7	9	Rural	2,950.9	(1,833.6)	7.6	(19.9)
			Suburban	501.8	(311.8)	342.3	(896.1)
			Urban	85.2	(52.9)	2,318.5	(6,069.4)
Barnwell, SC	5	6	Rural	1,549.8	(963.0)	14.1	(36.9)
			Suburban	644.2	(400.3)	321.6	(841.9)
			Urban	65.8	(40.9)	2,170.6	(5,682.2)
Hanford, WA	7	9	Rural	2,986.4	(1,855.7)	7.6	(19.9)
			Suburban	501.2	(311.4)	342.5	(896.6)
			Urban	85.0	(52.8)	2,316.6	(6,064.4)
Clive, UT	4	7	Rural	2,265.7	(1,407.8)	6.8	(17.8)
			Suburban	369.3	(229.5)	375.2	(982.2)
			Urban	84.5	(52.5)	2,359.3	(6,176.2)
Oak Ridge, TN	2	5	Rural	1,432.9	(890.4)	13.6	(35.6)
			Suburban	512.2	(318.3)	336.0	(879.6)
			Urban	69.7	(43.3)	2,264.6	(5,928.3)
DUF <sub>6</sub> Conversion Facility, Paducah, KY	4	5	Rural	1,348.0	(837.6)	12.6	(33.0)
			Suburban	418.4	(260.0)	319.2	(835.6)
			Urban	42.8	(26.6)	2,269.3	(5,940.6)
DUF <sub>6</sub> Conversion Facility, Portsmouth, OH	4	6	Rural	1,660.0	(1,031.5)	14.9	(39.0)
			Suburban	671.1	(417.0)	326.9	(855.8)
			Urban	78.8	(49.0)	2,249.1	(5,887.7)
Depleted U <sub>3</sub> O <sub>8</sub> from Metropolis, IL, to Clive, UT	8	8	Rural	2,615.2	(1,625.0)	11.3	(29.6)
			Suburban	562.3	(349.4)	315.2	(825.1)
			Urban	69.1	(42.9)	2,293.8	(6,004.7)

Facility	Number of Stops		Link Type	Distance Per Trip		Population Density	
	Inspection	Rest		(km [mile])	(people/km <sup>2</sup> [mile <sup>2</sup> ])		
Depleted U <sub>3</sub> O <sub>8</sub> from Paducah, KY, to NTS, NV	8	8	Rural	2,731.3	(1,697.2)	9.9	(25.9)
			Suburban	532.2	(330.7)	328.0	(858.6)
			Urban	85.5	(53.1)	2,377.6	(6,224.1)
Depleted U <sub>3</sub> O <sub>8</sub> from Portsmouth, OH, to NTS, NV	10	9	Rural	3,106.3	(1,930.2)	10.9	(28.5)
			Suburban	659.2	(409.6)	319.9	(837.4)
			Urban	99.4	(61.8)	2,396.6	(6,273.8)
Depleted U <sub>3</sub> O <sub>8</sub> from Paducah, KY, to Clive, UT	6	7	Rural	2,240.2	(1,392.0)	10.1	(26.4)
			Suburban	435.3	(270.5)	323.8	(847.6)
			Urban	55.1	(34.2)	2,238.4	(5,859.7)
Depleted U <sub>3</sub> O <sub>8</sub> from Portsmouth, OH, to Clive, UT	8	8	Rural	2,615.2	(1,625.0)	11.3	(29.6)
			Suburban	562.3	(349.4)	315.2	(825.1)
			Urban	69.1	(42.9)	2,293.8	(6,004.7)
ON - Ontario, Canada.	IL - Illinois.	SC - South Carolina.	NC - North Carolina.				
WA - Washington.	KY - Kentucky.	OH - Ohio.	UT - Utah.				
TN - Tennessee.	NV - Nevada.	NTS - Nevada Test Site.					

Source: Calculations using WebTragis (ORNL, 2003).

**Table D-10 Distance, Density Information Generated by WebTragis for Rail Routes**

Facility	Link Type	Distance Per Trip		Population Density	
		(km [mi])	(people/km <sup>2</sup> [mile <sup>2</sup> ])		
UF <sub>6</sub> Conversion Facility Port Hope, Ontario, Canada	Rural	2,361.0	(1,467.1)	11.3	(29.6)
	Suburban	769.3	(478.0)	436.3	(1,142.1)
	Urban	164.2	(102.0)	2,358.8	(6,174.9)
UF <sub>6</sub> Conversion Facility, Metropolis, IL	Rural	1,637.6	(1,017.6)	9.7	(25.4)
	Suburban	411.0	(255.4)	427.6	(1,119.4)
	Urban	56.4	(35.0)	2,148.4	(5,624.1)
Fuel Fabrication Facility, Columbia, SC	Rural	1,919.5	(1,192.7)	11.8	(30.9)
	Suburban	801.5	(498.0)	427.1	(1,118.1)
	Urban	122.1	(75.9)	2,169.1	(5,678.3)
Fuel Fabrication Facility, Wilmington, NC	Rural	2,150.7	(1,336.4)	12.0	(31.4)
	Suburban	878.0	(545.6)	424.0	(1,109.9)
	Urban	125.3	(77.9)	2,162.2	(5,660.2)
Fuel Fabrication Facility, Richland, WA	Rural	3,027.6	(1,881.3)	6.8	(17.8)
	Suburban	550.1	(341.8)	379.3	(992.9)
	Urban	168.2	(104.5)	2,567.5	(6,721.2)
Barnwell, SC	Rural	1,937.1	(1,203.7)	11.6	(30.4)
	Suburban	728.8	(452.9)	436.2	(1,141.9)
	Urban	129.5	(80.5)	2,210.2	(5,785.9)

Facility	Link Type	Distance Per Trip (km [mi])		Population Density (people/km <sup>2</sup> [mile <sup>2</sup> ])	
Hanford, WA	Rural	3,035.5	(1,886.2)	6.8	(17.8)
	Suburban	554.1	(344.3)	380.5	(996.1)
	Urban	171.0	(106.3)	2,560.2	(6,702.1)
Clive, UT	Rural	2,668.2	(1,657.9)	5.4	(14.1)
	Suburban	327.1	(203.3)	362.9	(950.0)
	Urban	82.2	(51.1)	2,496.7	(6,535.9)
Oak Ridge, TN	Rural	1,734.2	(1,077.6)	11.4	(29.8)
	Suburban	634.6	(394.3)	429.6	(1,124.6)
	Urban	97.5	(60.6)	2,158.5	(5,650.5)
DUF <sub>6</sub> Conversion Facility, Paducah, KY	Rural	1,441.2	(895.5)	10.2	(26.7)
	Suburban	425.4	(264.3)	440.0	(1,151.8)
	Urban	65.4	(40.6)	2,174.9	(5,693.5)
DUF <sub>6</sub> Conversion Facility, Portsmouth, OH	Rural	1,944.0	(1,207.9)	12.2	(31.9)
	Suburban	643.0	(399.5)	423.2	(1,107.9)
	Urban	117.7	(73.1)	2,269.2	(5,940.3)
Depleted U <sub>3</sub> O <sub>8</sub> from Metropolis, IL, to Clive, UT	Rural	2,489.1	(1,546.7)	7.1	(18.6)
	Suburban	343.2	(213.3)	363.9	(952.6)
	Urban	54.2	(33.7)	2,309.7	(6,046.3)
Depleted U <sub>3</sub> O <sub>8</sub> from Paducah, KY, to NTS, NV	Rural	2,935.8	(1,842.2)	6.3	(6.3)
	Suburban	360.2	(223.8)	430.7	(435.3)
	Urban	76.3	(47.4)	2,196.4	(2,219.9)
Depleted U <sub>3</sub> O <sub>8</sub> from Portsmouth, OH, to NTS, NV	Rural	3,191.9	(1,983.4)	7.8	(7.9)
	Suburban	494.3	(307.1)	365.1	(369.1)
	Urban	141.4	(87.9)	2,597.9	(2,625.9)
Depleted U <sub>3</sub> O <sub>8</sub> from Paducah, KY, to Clive, UT	Rural	2,513.3	(1,561.7)	7.2	(7.3)
	Suburban	360.5	(224.0)	371.3	(375.4)
	Urban	56.3	(35.0)	2,293.0	(2,317.5)
Depleted U <sub>3</sub> O <sub>8</sub> from Portsmouth, OH, to Clive, UT	Rural	2,669.1	(1,658.5)	8.4	(8.4)
	Suburban	503.0	(312.5)	392.1	(396.3)
	Urban	126.8	(78.8)	2,374.7	(2,400.3)

ON - Ontario, Canada.

IL - Illinois.

SC - South Carolina.

NC - North Carolina.

WA - Washington.

KY - Kentucky.

OH - Ohio.

UT - Utah.

TN - Tennessee.

NV - Nevada.

NTS - Nevada Test Site.

km - kilometer; km<sup>2</sup> - square kilometer.

Source: Calculations using WebTragis (ORNL, 2003).

## D.4 RADTRAN 5

The RADTRAN 5 computer code was used to estimate the impacts of the radioactive material shipments (Neuhauser and Kanipe, 2003). The potential impacts include health effects from the exposure to pollution from trucks or railroads, fatalities from truck or rail accidents, health effects from incident-free direct radiation to crew and surrounding populations along the transportation routes, and health effects from the release of radioactive material in transportation accidents. In addition to the WebTragis information, additional input parameters for RADTRAN 5 are required as discussed below.

### D.4.1 Accident Parameters

The amount of radioactive material released from a transportation accident depends on the packaging of the material and the severity of the accident. A method widely used to characterize the potential severity of transportation accidents is described in NUREG-0170 (NRC, 1977) and is also presented in DOE's *A Resource Handbook on DOE Transportation Risk Assessment* (DOE, 2002). The NRC method divided the spectrum of accident severities into eight categories with each category being subdivided into rural, suburban, and urban zones containing the fraction of occurrence of the severity class within each zone. Table D-11 presents the fractional occurrences for accidents.

**Table D-11 Fractional Occurrences for Accidents by Severity Category and Population Density Zone**

Accident Severity Category	Fractional Occurrences of Severity Category	Fractional Occurrence by Population Zone		
		Low (Rural)	Medium (Suburban)	High (Urban)
Truck				
I	0.55	0.1	0.1	0.8
II	0.36	0.1	0.1	0.8
III	0.07	0.3	0.4	0.3
IV	0.016	0.3	0.4	0.3
V	0.0028	0.5	0.3	0.2
VI	0.0011	0.7	0.2	0.1
VII	$8.50 \times 10^{-5}$	0.8	0.1	0.1
VIII	$1.50 \times 10^{-5}$	0.9	0.05	0.05
Rail				
I	0.5	0.1	0.1	0.8
II	0.3	0.1	0.1	0.8
III	0.18	0.3	0.4	0.3
IV	0.018	0.3	0.4	0.3
V	0.0018	0.5	0.3	0.2
VI	$1.30 \times 10^{-4}$	0.7	0.2	0.1
VII	$6.00 \times 10^{-5}$	0.8	0.1	0.1
VIII	$1.00 \times 10^{-5}$	0.9	0.05	0.05

Source: DOE, 2002.

Once the frequencies of the accidents are generated, the fractions controlling the amount that is airborne and respirable are required. These fractions are composed of three additional fractions: the package-release fraction, the fraction of material released that becomes airborne, and the fraction that is airborne which is respirable. These fractions were extracted from the DOE handbook (DOE, 2002). The Type A package fractions are given in Table D-12. These values are conservative because of the lack of data on package failure under severe conditions (DOE, 2002).

**Table D-12 Fraction of Package Released, Aerosolized, and Respirable**

<b>Accident Severity</b>	<b>Release</b>	<b>Respirable</b>	<b>Aerosolized</b>
Truck			
I	0	1	1
II	0.01	1	1
III	0.1	1	1
IV	1	1	1
V	1	1	1
VI	1	1	1
VII	1	1	1
VIII	1	1	1
Rail			
I	0	1	1
II	0.01	1	1
III	0.1	1	1
IV	1	1	1
V	1	1	1
VI	1	1	1
VII	1	1	1
VIII	1	1	1

<sup>a</sup> Assumed very conservative assumption of volatile solid.

Source: DOE, 2002, Tables 6.24 and 6.25.

To evaluate incident-free impacts, other input parameters that affect the exposure duration to the public and crew are required. Table D-13 presents the speed of the vehicle, size of crew, amount of time the package is stopped for driver rest, State inspections, population on adjacent traffic lanes or rail tracks, and other input parameters. The RADTRAN 5 input parameters not described in this appendix were set to the default values in RADTRAN 5.

**Table D-13 RADTRAN 5 Input Parameters**

<b>Item</b>	<b>Link Type</b>	<b>Truck Transport</b>	<b>Rail Transport</b>
Traffic Volume (vehicle)	Rural	2,400	1
	Suburban	760	1
	Urban	530	1
Vehicle Speed (mph)	Rural	55	40
	Suburban	25	25
	Urban	15	15
Number of People in Adjacent Vehicle		2	4
Size of Crew		2	5
Number of People Exposed at Rest Stop		25	N/A
Exposure Distance at Rest Stop (meters)		20	N/A
Vehicle Emission Rate (fatalities/km per 1 person/km <sup>2</sup> )		$8.36 \times 10^{-10}$	$1.2 \times 10^{-10}$
Vehicle Accident		$1.42 \times 10^{-8}$ (fatalities/kilometer)	$7.82 \times 10^{-8}$ (fatalities/ railcar-kilometer)

mph - miles per hour; km - kilometer; km<sup>2</sup> - square kilometer.

To convert from mph to km per hour, multiply by 1.61.

To convert from meters to feet, multiply by 3.28.

To convert from miles to kilometers, multiply by 1.61.

N/A - not applicable.

Source: DOE, 2002.

#### **D.4.2 RADTRAN 5 Results**

This section provides the detailed results of the RADTRAN 5 analyses. Tables D-14 through D-16 present the results by route and type of material being transported for one year by truck. Tables D-17 through D-19 present the results by route and type of material being transported for one year by rail. Tables D-14 and D-17 present the nonradiological impacts from the shipment of radioactive material. They present the estimated potential impact in terms of latent cancer fatalities from the vehicle emissions and fatalities resulting from traffic accidents. Tables D-15 and D-18 present the radiological impacts in terms of latent cancer fatalities from incident-free transport. Incident-free transport represents the transport of the radioactive shipment without a release from the shipment. Tables D-16 and D-19 present the radiological impacts from accidents during these shipments. Accident results include the impact (risk per year) from various accident scenarios that potentially could occur during the transport of the radioactive material. The results are presented in terms of risk, which means weighting the impact, of the various accident scenarios by the frequency that the accident scenario occurs.

Results are presented in terms of a range of values for each type of shipment. The range represents the impacts from the lowest to highest impact for the various proposed shipping routes. For example, for the feed/heel materials, the values represent one year of shipments from both Metropolis, Illinois, and Port Hope, Ontario, Canada and the return of the empty Type 48Y cylinders from the proposed NEF and adjacent private conversion facility. If some feed materials were provided from Metropolis and the

remaining amounts from Port Hope, the impacts would be somewhere between the low and high values (impacts could be evaluated by taking the fraction of material from Metropolis times the impacts from Metropolis plus the fraction of material from Port Hope times the impacts from Port Hope).

To evaluate the impact from transportation of radioactive materials, a scenario first has to be selected. Then the impacts from the various materials and routes should be summed. For example, the proposed NEF would receive feed material from Metropolis, Illinois, in Type 48Y cylinders. The product material would be shipped from the proposed NEF to Wilmington, North Carolina. The solid waste would be shipped from the proposed NEF to Clive, Utah, while the  $\text{DUF}_6$  would be shipped to Metropolis, Illinois. The converted  $\text{U}_3\text{O}_8$  would then be shipped to Clive, Utah, for disposal. The impacts from all these material routes should be summed to determine the impact for this scenario. The results that are labeled as “Total Impacts” contain the results of the impacts summed over each of the four types of material. Therefore, these impacts represent the range from the low to high impacts.

For both truck and rail transport, the nonradiological impacts (fatalities from either traffic and train accidents and latent cancer fatalities) dominate the impacts for each material-route combination.

**Table D-14 Nonradiological Fatalities from Truck Transportation of Radioactive Materials**

Material	Route	Occupational		Nonoccupational	
		Normal (LCFs)	Accident (Fatalities)	Normal (LCFs)	Accident (Fatalities)
Feed Material in Type 48X Cylinder	Port Hope, ON	$1 \times 10^{-2}$	$6 \times 10^{-2}$	1	$2 \times 10^{-1}$
Feed Material in Type 48Y Cylinder	Port Hope, ON	$8 \times 10^{-3}$	$5 \times 10^{-2}$	$8 \times 10^{-1}$	$2 \times 10^{-1}$
Feed Material in Type 48X Cylinder	Metropolis, IL	$5 \times 10^{-3}$	$4 \times 10^{-2}$	$4 \times 10^{-1}$	$2 \times 10^{-1}$
Feed Material in Type 48Y Cylinder	Metropolis, IL	$4 \times 10^{-3}$	$3 \times 10^{-2}$	$3 \times 10^{-1}$	$1 \times 10^{-1}$
Product in Type 30B Cylinder	Columbia, SC	$9 \times 10^{-4}$	$6 \times 10^{-3}$	$8 \times 10^{-2}$	$2 \times 10^{-2}$
Product in Type 30B Cylinder	Wilmington, NC	$1 \times 10^{-3}$	$7 \times 10^{-3}$	$8 \times 10^{-2}$	$3 \times 10^{-2}$
Product in Type 30B Cylinder	Richland, WA	$1 \times 10^{-3}$	$1 \times 10^{-2}$	$8 \times 10^{-2}$	$4 \times 10^{-2}$
$\text{DUF}_6$ in Type 48Y Cylinder	Paducah, KY	$4 \times 10^{-3}$	$3 \times 10^{-2}$	$3 \times 10^{-1}$	$1 \times 10^{-1}$
$\text{DUF}_6$ in Type 48Y Cylinder	Portsmouth, OH	$5 \times 10^{-3}$	$4 \times 10^{-2}$	$4 \times 10^{-1}$	$1 \times 10^{-1}$
$\text{DUF}_6$ in Type 48Y Cylinder	Metropolis, IL	$4 \times 10^{-3}$	$3 \times 10^{-2}$	$3 \times 10^{-1}$	$1 \times 10^{-1}$
Empty Type 48Y Cylinder	Metropolis, IL	$2 \times 10^{-3}$	$2 \times 10^{-2}$	$2 \times 10^{-1}$	$6 \times 10^{-2}$
Empty Type 48Y Cylinder	Port Hope, ON	$4 \times 10^{-3}$	$2 \times 10^{-2}$	$4 \times 10^{-1}$	$9 \times 10^{-2}$
Depleted $\text{U}_3\text{O}_8$ in Bulk Bags	Paducah, KY, to NTS, NV	$6 \times 10^{-3}$	$5 \times 10^{-2}$	$5 \times 10^{-2}$	$2 \times 10^{-1}$
Depleted $\text{U}_3\text{O}_8$ in Bulk Bags	Paducah, KY, to Clive, UT	$5 \times 10^{-3}$	$4 \times 10^{-2}$	$4 \times 10^{-2}$	$2 \times 10^{-1}$



Material	Route	Occupational		Nonoccupational	
		Normal (LCFs)	Accident (Fatalities)	Normal (LCFs)	Accident (Fatalities)
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH to NTS	7×10 <sup>-3</sup>	5×10 <sup>-2</sup>	6×10 <sup>-2</sup>	2×10 <sup>-1</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to Clive, UT	6×10 <sup>-3</sup>	5×10 <sup>-2</sup>	5×10 <sup>-2</sup>	2×10 <sup>-1</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Metropolis, IL, to Clive, UT	3×10 <sup>-3</sup>	2×10 <sup>-2</sup>	1×10 <sup>-1</sup>	8×10 <sup>-2</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Clive, UT	5×10 <sup>-3</sup>	4×10 <sup>-2</sup>	3×10 <sup>-1</sup>	2×10 <sup>-1</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Hanford, WA	7×10 <sup>-3</sup>	5×10 <sup>-2</sup>	4×10 <sup>-1</sup>	2×10 <sup>-1</sup>
CaF <sub>2</sub> in Bulk Bags	Clive, UT	4×10 <sup>-3</sup>	3×10 <sup>-2</sup>	3×10 <sup>-1</sup>	1×10 <sup>-1</sup>
CaF <sub>2</sub> in Bulk Bags	Hanford, WA	6×10 <sup>-3</sup>	4×10 <sup>-2</sup>	3×10 <sup>-1</sup>	2×10 <sup>-1</sup>
Solid Waste in 55-Gallon Drums	Barnwell, SC	6×10 <sup>-5</sup>	4×10 <sup>-4</sup>	5×10 <sup>-3</sup>	2×10 <sup>-3</sup>
Solid Waste in 55-Gallon Drums	Clive, UT	7×10 <sup>-5</sup>	6×10 <sup>-4</sup>	5×10 <sup>-3</sup>	2×10 <sup>-3</sup>
Solid Waste in 55-gallon drums	Hanford, WA	1×10 <sup>-4</sup>	8×10 <sup>-4</sup>	5×10 <sup>-3</sup>	3×10 <sup>-3</sup>
Solid Waste in 55-Gallon Drums	Oak Ridge, TN	6×10 <sup>-5</sup>	4×10 <sup>-4</sup>	5×10 <sup>-3</sup>	1×10 <sup>-3</sup>
<b>Range</b>					
Feed Material	Low	4×10 <sup>-3</sup>	3×10 <sup>-2</sup>	3×10 <sup>-1</sup>	1×10 <sup>-1</sup>
	High	1×10 <sup>-2</sup>	6×10 <sup>-2</sup>	1	2×10 <sup>-1</sup>
Product	Low	9×10 <sup>-4</sup>	6×10 <sup>-3</sup>	8×10 <sup>-2</sup>	2×10 <sup>-2</sup>
	High	1×10 <sup>-3</sup>	1×10 <sup>-2</sup>	8×10 <sup>-2</sup>	4×10 <sup>-2</sup>
Disposition of Depleted Uranium	Low	3×10 <sup>-3</sup>	2×10 <sup>-2</sup>	4×10 <sup>-2</sup>	8×10 <sup>-2</sup>
	High	7×10 <sup>-3</sup>	5×10 <sup>-2</sup>	4×10 <sup>-1</sup>	2×10 <sup>-1</sup>
Waste	Low	6×10 <sup>-5</sup>	4×10 <sup>-4</sup>	5×10 <sup>-3</sup>	1×10 <sup>-3</sup>
	High	1×10 <sup>-4</sup>	8×10 <sup>-4</sup>	5×10 <sup>-3</sup>	3×10 <sup>-3</sup>
Empty Cylinders	Low	2×10 <sup>-3</sup>	2×10 <sup>-2</sup>	2×10 <sup>-1</sup>	6×10 <sup>-2</sup>
	High	4×10 <sup>-3</sup>	2×10 <sup>-2</sup>	4×10 <sup>-1</sup>	9×10 <sup>-2</sup>
Total Impacts	Low	1×10 <sup>-2</sup>	7×10 <sup>-2</sup>	6×10 <sup>-1</sup>	3×10 <sup>-1</sup>
	High	2×10 <sup>-2</sup>	2×10 <sup>-1</sup>	2	6×10 <sup>-1</sup>
ON - Ontario, Canada.	IL - Illinois.	SC - South Carolina.	NC - North Carolina.		
WA - Washington.	KY - Kentucky.	OH - Ohio.	UT - Utah.		
TN - Tennessee.	NV - Nevada.	NTS - Nevada Test Site.			

**Table D-15 Radiological Latent Cancer Fatalities from Incident-Free Truck Transportation of Radioactive Materials**

Material	Route	Maximum Individual	Crew	In-Transit			Crew			
				Public Off-Link	Public On-Link	Public Stop	Loading	State Inspection	Total Public	Total Worker
Feed Material in Type 48X Cylinder	Port Hope, ON	$7 \times 10^{-9}$	$1 \times 10^{-3}$	$3 \times 10^{-4}$	$2 \times 10^{-3}$	$2 \times 10^{-3}$	$9 \times 10^{-4}$	$7 \times 10^{-3}$	$3 \times 10^{-3}$	$9 \times 10^{-3}$
Feed Material in Type 48Y Cylinder	Port Hope, ON	$5 \times 10^{-9}$	$9 \times 10^{-4}$	$2 \times 10^{-4}$	$1 \times 10^{-3}$	$1 \times 10^{-3}$	$5 \times 10^{-4}$	$5 \times 10^{-3}$	$2 \times 10^{-3}$	$6 \times 10^{-3}$
Feed Material in Type 48X Cylinder	Metropolis, IL	$7 \times 10^{-9}$	$6 \times 10^{-4}$	$1 \times 10^{-4}$	$6 \times 10^{-4}$	$7 \times 10^{-4}$	$9 \times 10^{-4}$	$2 \times 10^{-3}$	$1 \times 10^{-3}$	$3 \times 10^{-3}$
Feed Material in Type 48Y Cylinder	Metropolis, IL	$5 \times 10^{-9}$	$4 \times 10^{-4}$	$9 \times 10^{-5}$	$5 \times 10^{-4}$	$5 \times 10^{-4}$	$5 \times 10^{-4}$	$1 \times 10^{-3}$	$1 \times 10^{-3}$	$2 \times 10^{-3}$
Product in Type 30B Cylinder	Columbia, SC	$4 \times 10^{-10}$	$3 \times 10^{-5}$	$1 \times 10^{-5}$	$6 \times 10^{-5}$	$6 \times 10^{-5}$	$2 \times 10^{-4}$	$6 \times 10^{-4}$	$1 \times 10^{-4}$	$8 \times 10^{-4}$
Product in Type 30B Cylinder	Wilmington, NC	$4 \times 10^{-10}$	$4 \times 10^{-5}$	$1 \times 10^{-5}$	$6 \times 10^{-5}$	$7 \times 10^{-5}$	$2 \times 10^{-4}$	$7 \times 10^{-4}$	$1 \times 10^{-4}$	$9 \times 10^{-4}$
Product in Type 30B Cylinder	Richland, WA	$4 \times 10^{-10}$	$4 \times 10^{-5}$	$9 \times 10^{-6}$	$6 \times 10^{-5}$	$9 \times 10^{-5}$	$2 \times 10^{-4}$	$9 \times 10^{-4}$	$2 \times 10^{-4}$	$1 \times 10^{-3}$
DUF <sub>6</sub> in Type 48Y Cylinder	Paducah, KY	$5 \times 10^{-9}$	$4 \times 10^{-4}$	$8 \times 10^{-5}$	$4 \times 10^{-4}$	$6 \times 10^{-4}$	$6 \times 10^{-4}$	$2 \times 10^{-3}$	$1 \times 10^{-3}$	$3 \times 10^{-3}$
DUF <sub>6</sub> in Type 48Y Cylinder	Portsmouth, OH	$5 \times 10^{-9}$	$6 \times 10^{-4}$	$1 \times 10^{-4}$	$7 \times 10^{-4}$	$7 \times 10^{-4}$	$6 \times 10^{-4}$	$2 \times 10^{-3}$	$2 \times 10^{-3}$	$3 \times 10^{-3}$
DUF <sub>6</sub> in Type 48Y Cylinder	Metropolis, IL	$5 \times 10^{-9}$	$4 \times 10^{-4}$	$8 \times 10^{-5}$	$4 \times 10^{-4}$	$5 \times 10^{-4}$	$6 \times 10^{-4}$	$1 \times 10^{-3}$	$1 \times 10^{-3}$	$2 \times 10^{-3}$
Empty Type 48Y Cylinder	Metropolis, IL	$9 \times 10^{-9}$	$5 \times 10^{-4}$	$1 \times 10^{-4}$	$7 \times 10^{-4}$	$8 \times 10^{-4}$	$1 \times 10^{-3}$	$3 \times 10^{-3}$	$2 \times 10^{-3}$	$5 \times 10^{-3}$
Empty Type 48Y Cylinder	Port Hope, ON	$9 \times 10^{-9}$	$1 \times 10^{-3}$	$4 \times 10^{-4}$	$2 \times 10^{-3}$	$2 \times 10^{-3}$	$1 \times 10^{-3}$	$1 \times 10^{-2}$	$4 \times 10^{-3}$	$1 \times 10^{-2}$

Material	Route	Maximum Individual	Crew	In-Transit			Crew			
				Public Off-Link	Public On-Link	Public Stop	Loading	State Inspection	Total Public	Total Worker
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to NTS, NV	4×10 <sup>-9</sup>	6×10 <sup>-4</sup>	9×10 <sup>-5</sup>	6×10 <sup>-4</sup>	8×10 <sup>-4</sup>	1×10 <sup>-4</sup>	8×10 <sup>-4</sup>	2×10 <sup>-3</sup>	2×10 <sup>-3</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to Clive, UT	4×10 <sup>-9</sup>	5×10 <sup>-4</sup>	8×10 <sup>-5</sup>	5×10 <sup>-4</sup>	8×10 <sup>-4</sup>	1×10 <sup>-4</sup>	8×10 <sup>-4</sup>	1×10 <sup>-3</sup>	1×10 <sup>-3</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to NTS	4×10 <sup>-9</sup>	7×10 <sup>-4</sup>	1×10 <sup>-4</sup>	7×10 <sup>-4</sup>	9×10 <sup>-4</sup>	1×10 <sup>-4</sup>	1×10 <sup>-3</sup>	2×10 <sup>-3</sup>	2×10 <sup>-3</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to Clive, UT	4×10 <sup>-9</sup>	6×10 <sup>-4</sup>	1×10 <sup>-4</sup>	6×10 <sup>-4</sup>	9×10 <sup>-4</sup>	1×10 <sup>-4</sup>	1×10 <sup>-3</sup>	2×10 <sup>-3</sup>	2×10 <sup>-3</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Metropolis, IL, to Clive, UT	2×10 <sup>-9</sup>	3×10 <sup>-4</sup>	4×10 <sup>-5</sup>	2×10 <sup>-4</sup>	3×10 <sup>-4</sup>	7×10 <sup>-5</sup>	3×10 <sup>-4</sup>	6×10 <sup>-4</sup>	6×10 <sup>-4</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Clive, UT	4×10 <sup>-9</sup>	5×10 <sup>-4</sup>	7×10 <sup>-5</sup>	5×10 <sup>-4</sup>	6×10 <sup>-4</sup>	1×10 <sup>-4</sup>	4×10 <sup>-4</sup>	1×10 <sup>-3</sup>	1×10 <sup>-3</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Hanford, WA	4×10 <sup>-9</sup>	6×10 <sup>-4</sup>	9×10 <sup>-5</sup>	6×10 <sup>-4</sup>	9×10 <sup>-4</sup>	1×10 <sup>-4</sup>	7×10 <sup>-4</sup>	2×10 <sup>-3</sup>	1×10 <sup>-3</sup>
CaF <sub>2</sub> in Bulk Bags	Clive, UT	4×10 <sup>-9</sup>	4×10 <sup>-4</sup>	6×10 <sup>-5</sup>	4×10 <sup>-4</sup>	5×10 <sup>-4</sup>	2×10 <sup>-6</sup>	6×10 <sup>-6</sup>	1×10 <sup>-3</sup>	4×10 <sup>-4</sup>
CaF <sub>2</sub> in Bulk Bags	Hanford, WA	4×10 <sup>-9</sup>	5×10 <sup>-4</sup>	8×10 <sup>-5</sup>	5×10 <sup>-4</sup>	8×10 <sup>-4</sup>	2×10 <sup>-6</sup>	1×10 <sup>-5</sup>	1×10 <sup>-3</sup>	5×10 <sup>-4</sup>
Solid Waste in 55-Gallon Drums	Barnwell, SC	1×10 <sup>-12</sup>	3×10 <sup>-7</sup>	3×10 <sup>-8</sup>	2×10 <sup>-7</sup>	2×10 <sup>-7</sup>	4×10 <sup>-6</sup>	1×10 <sup>-5</sup>	3×10 <sup>-7</sup>	2×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Clive, UT	1×10 <sup>-12</sup>	3×10 <sup>-7</sup>	2×10 <sup>-8</sup>	1×10 <sup>-7</sup>	2×10 <sup>-7</sup>	4×10 <sup>-6</sup>	1×10 <sup>-5</sup>	3×10 <sup>-7</sup>	1×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Hanford, WA	1×10 <sup>-12</sup>	4×10 <sup>-7</sup>	2×10 <sup>-8</sup>	2×10 <sup>-7</sup>	2×10 <sup>-7</sup>	4×10 <sup>-6</sup>	2×10 <sup>-5</sup>	4×10 <sup>-7</sup>	2×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Oak Ridge, TN	1×10 <sup>-12</sup>	2×10 <sup>-7</sup>	2×10 <sup>-8</sup>	1×10 <sup>-7</sup>	2×10 <sup>-7</sup>	4×10 <sup>-6</sup>	1×10 <sup>-5</sup>	3×10 <sup>-7</sup>	1×10 <sup>-5</sup>

Material	Route	Maximum Individual	Crew	In-Transit			Crew			
				Public Off-Link	Public On-Link	Public Stop	Loading	State Inspection	Total Public	Total Worker
<i>Range</i>										
Feed Material	Low	$5 \times 10^{-9}$	$4 \times 10^{-4}$	$9 \times 10^{-5}$	$5 \times 10^{-4}$	$5 \times 10^{-4}$	$5 \times 10^{-4}$	$1 \times 10^{-3}$	$1 \times 10^{-3}$	$2 \times 10^{-3}$
	High	$7 \times 10^{-9}$	$1 \times 10^{-3}$	$3 \times 10^{-4}$	$2 \times 10^{-3}$	$2 \times 10^{-3}$	$9 \times 10^{-4}$	$7 \times 10^{-3}$	$3 \times 10^{-3}$	$9 \times 10^{-3}$
Product	Low	$4 \times 10^{-10}$	$3 \times 10^{-5}$	$9 \times 10^{-6}$	$6 \times 10^{-5}$	$6 \times 10^{-5}$	$2 \times 10^{-4}$	$6 \times 10^{-4}$	$1 \times 10^{-4}$	$8 \times 10^{-4}$
	High	$4 \times 10^{-10}$	$4 \times 10^{-5}$	$1 \times 10^{-5}$	$6 \times 10^{-5}$	$9 \times 10^{-5}$	$2 \times 10^{-4}$	$9 \times 10^{-4}$	$2 \times 10^{-4}$	$1 \times 10^{-3}$
Disposition of Depleted Uranium	Low	$2 \times 10^{-9}$	$3 \times 10^{-4}$	$4 \times 10^{-5}$	$2 \times 10^{-4}$	$3 \times 10^{-4}$	$2 \times 10^{-6}$	$6 \times 10^{-6}$	$6 \times 10^{-4}$	$4 \times 10^{-4}$
	High	$5 \times 10^{-9}$	$7 \times 10^{-4}$	$1 \times 10^{-4}$	$7 \times 10^{-4}$	$9 \times 10^{-4}$	$6 \times 10^{-4}$	$2 \times 10^{-3}$	$2 \times 10^{-3}$	$3 \times 10^{-3}$
Waste	Low	$1 \times 10^{-12}$	$2 \times 10^{-7}$	$2 \times 10^{-8}$	$1 \times 10^{-7}$	$2 \times 10^{-7}$	$4 \times 10^{-6}$	$1 \times 10^{-5}$	$3 \times 10^{-7}$	$1 \times 10^{-5}$
	High	$1 \times 10^{-12}$	$4 \times 10^{-7}$	$3 \times 10^{-8}$	$2 \times 10^{-7}$	$2 \times 10^{-7}$	$4 \times 10^{-6}$	$2 \times 10^{-5}$	$4 \times 10^{-7}$	$2 \times 10^{-5}$
Empty Cylinders	Low	$9 \times 10^{-9}$	$5 \times 10^{-4}$	$1 \times 10^{-4}$	$7 \times 10^{-4}$	$8 \times 10^{-4}$	$1 \times 10^{-3}$	$3 \times 10^{-3}$	$2 \times 10^{-3}$	$5 \times 10^{-3}$
	High	$9 \times 10^{-9}$	$1 \times 10^{-3}$	$4 \times 10^{-4}$	$2 \times 10^{-3}$	$2 \times 10^{-3}$	$1 \times 10^{-3}$	$1 \times 10^{-2}$	$4 \times 10^{-3}$	$1 \times 10^{-2}$
Total Impacts	Low	$2 \times 10^{-8}$	$1 \times 10^{-3}$	$3 \times 10^{-4}$	$1 \times 10^{-3}$	$2 \times 10^{-3}$	$2 \times 10^{-3}$	$5 \times 10^{-3}$	$3 \times 10^{-3}$	$8 \times 10^{-3}$
	High	$2 \times 10^{-8}$	$3 \times 10^{-3}$	$8 \times 10^{-4}$	$4 \times 10^{-3}$	$4 \times 10^{-3}$	$3 \times 10^{-3}$	$2 \times 10^{-2}$	$9 \times 10^{-3}$	$3 \times 10^{-2}$

ON - Ontario, Canada.    IL - Illinois.    SC - South Carolina.    NC - North Carolina.  
 WA - Washington.    KY - Kentucky.    OH - Ohio.    UT - Utah.  
 TN - Tennessee.    NV - Nevada.    NTS - Nevada Test Site.

**Table D-16 Risk of Latent Cancer Fatalities from Accidents During Truck Transportation of Radioactive Materials**

<b>Material</b>	<b>Route</b>	<b>Ground</b>	<b>Inhaled</b>	<b>Resuspended Soil</b>	<b>Cloud Shine</b>	<b>Total Risk of LCF</b>
Feed Material in Type 48X Cylinder	Port Hope, ON	$2 \times 10^{-7}$	$2 \times 10^{-1}$	$7 \times 10^{-2}$	$2 \times 10^{-11}$	$2 \times 10^{-1}$
Feed Material in Type 48Y Cylinder	Port Hope, ON	$2 \times 10^{-7}$	$2 \times 10^{-1}$	$7 \times 10^{-2}$	$2 \times 10^{-11}$	$2 \times 10^{-1}$
Feed Material in Type 48X Cylinder	Metropolis, IL	$9 \times 10^{-8}$	$6 \times 10^{-2}$	$3 \times 10^{-2}$	$8 \times 10^{-12}$	$8 \times 10^{-2}$
Feed Material in Type 48Y Cylinder	Metropolis, IL	$9 \times 10^{-8}$	$6 \times 10^{-2}$	$2 \times 10^{-2}$	$8 \times 10^{-12}$	$8 \times 10^{-2}$
Product in Type 30B Cylinder	Columbia, SC	$9 \times 10^{-8}$	$7 \times 10^{-2}$	$1 \times 10^{-2}$	$3 \times 10^{-12}$	$8 \times 10^{-2}$
Product in Type 30B Cylinder	Wilmington, NC	$1 \times 10^{-7}$	$7 \times 10^{-2}$	$1 \times 10^{-2}$	$3 \times 10^{-12}$	$8 \times 10^{-2}$
Product in Type 30B Cylinder	Richland, WA	$8 \times 10^{-8}$	$6 \times 10^{-2}$	$1 \times 10^{-2}$	$3 \times 10^{-12}$	$7 \times 10^{-2}$
DUF <sub>6</sub> in Type 48Y Cylinder	Paducah, KY	$4 \times 10^{-8}$	$3 \times 10^{-2}$	$1 \times 10^{-2}$	$7 \times 10^{-12}$	$4 \times 10^{-2}$
DUF <sub>6</sub> in Type 48Y Cylinder	Portsmouth, OH	$7 \times 10^{-8}$	$4 \times 10^{-2}$	$2 \times 10^{-2}$	$1 \times 10^{-11}$	$6 \times 10^{-2}$
DUF <sub>6</sub> in Type 48Y Cylinder	Metropolis, IL	$4 \times 10^{-8}$	$3 \times 10^{-2}$	$1 \times 10^{-2}$	$7 \times 10^{-12}$	$4 \times 10^{-2}$
Empty Type 48Y Cylinder	Metropolis, IL	$1 \times 10^{-13}$	$6 \times 10^{-3}$	$3 \times 10^{-2}$	$3 \times 10^{-17}$	$3 \times 10^{-2}$
Empty Type 48Y Cylinder	Port Hope, ON	$3 \times 10^{-13}$	$2 \times 10^{-2}$	$7 \times 10^{-2}$	$7 \times 10^{-17}$	$9 \times 10^{-2}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to NTS, NV	$7 \times 10^{-8}$	$1 \times 10^{-4}$	$9 \times 10^{-5}$	$1 \times 10^{-12}$	$2 \times 10^{-4}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to Clive, UT	$5 \times 10^{-8}$	$9 \times 10^{-5}$	$6 \times 10^{-5}$	$9 \times 10^{-13}$	$1 \times 10^{-4}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to NTS, NV	$8 \times 10^{-8}$	$1 \times 10^{-4}$	$1 \times 10^{-4}$	$2 \times 10^{-12}$	$2 \times 10^{-4}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to Clive, UT	$6 \times 10^{-8}$	$1 \times 10^{-4}$	$7 \times 10^{-5}$	$1 \times 10^{-12}$	$2 \times 10^{-4}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Metropolis, IL, to Clive, UT	$3 \times 10^{-8}$	$4 \times 10^{-5}$	$3 \times 10^{-5}$	$5 \times 10^{-13}$	$7 \times 10^{-5}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Clive, UT	$6 \times 10^{-8}$	$1 \times 10^{-4}$	$8 \times 10^{-5}$	$1 \times 10^{-12}$	$2 \times 10^{-4}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Hanford, WA	$7 \times 10^{-8}$	$1 \times 10^{-4}$	$8 \times 10^{-5}$	$1 \times 10^{-12}$	$2 \times 10^{-4}$

Material	Route	Ground	Inhaled	Resuspended Soil	Cloud Shine	Total Risk of LCF
CaF <sub>2</sub> in Bulk Bags	Clive, UT	5×10 <sup>-13</sup>	2×10 <sup>-9</sup>	7×10 <sup>-9</sup>	1×10 <sup>-18</sup>	9×10 <sup>-9</sup>
CaF <sub>2</sub> in Bulk Bags	Hanford, WA	5×10 <sup>-13</sup>	2×10 <sup>-9</sup>	8×10 <sup>-9</sup>	2×10 <sup>-18</sup>	1×10 <sup>-8</sup>
Solid Waste in 55-Gallon Drums	Barnwell, SC	2×10 <sup>-11</sup>	1×10 <sup>-5</sup>	4×10 <sup>-5</sup>	1×10 <sup>-15</sup>	5×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Clive, UT	2×10 <sup>-11</sup>	9×10 <sup>-6</sup>	3×10 <sup>-5</sup>	1×10 <sup>-15</sup>	4×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Hanford, WA	2×10 <sup>-11</sup>	1×10 <sup>-5</sup>	3×10 <sup>-5</sup>	1×10 <sup>-15</sup>	4×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Oak Ridge, TN	2×10 <sup>-11</sup>	9×10 <sup>-6</sup>	3×10 <sup>-5</sup>	1×10 <sup>-15</sup>	4×10 <sup>-5</sup>
<b>Range</b>						
Feed Material	Low	9×10 <sup>-8</sup>	6×10 <sup>-2</sup>	2×10 <sup>-2</sup>	8×10 <sup>-12</sup>	8×10 <sup>-2</sup>
	High	2×10 <sup>-7</sup>	2×10 <sup>-1</sup>	7×10 <sup>-2</sup>	2×10 <sup>-11</sup>	2×10 <sup>-1</sup>
Product	Low	8×10 <sup>-8</sup>	6×10 <sup>-2</sup>	1×10 <sup>-2</sup>	3×10 <sup>-12</sup>	7×10 <sup>-2</sup>
	High	1×10 <sup>-7</sup>	7×10 <sup>-2</sup>	1×10 <sup>-2</sup>	3×10 <sup>-12</sup>	8×10 <sup>-2</sup>
Disposition of Depleted uranium	Low	5×10 <sup>-13</sup>	2×10 <sup>-9</sup>	7×10 <sup>-9</sup>	1×10 <sup>-18</sup>	9×10 <sup>-9</sup>
	High	8×10 <sup>-8</sup>	4×10 <sup>-2</sup>	2×10 <sup>-2</sup>	1×10 <sup>-11</sup>	6×10 <sup>-2</sup>
Waste	Low	2×10 <sup>-11</sup>	9×10 <sup>-6</sup>	3×10 <sup>-5</sup>	1×10 <sup>-15</sup>	4×10 <sup>-5</sup>
	High	2×10 <sup>-11</sup>	1×10 <sup>-5</sup>	4×10 <sup>-5</sup>	1×10 <sup>-15</sup>	5×10 <sup>-5</sup>
Empty Cylinders	Low	1×10 <sup>-13</sup>	6×10 <sup>-3</sup>	3×10 <sup>-2</sup>	3×10 <sup>-17</sup>	3×10 <sup>-2</sup>
	High	3×10 <sup>-13</sup>	2×10 <sup>-2</sup>	7×10 <sup>-2</sup>	7×10 <sup>-17</sup>	9×10 <sup>-2</sup>
Total Impact	Low	2×10 <sup>-7</sup>	1×10 <sup>-1</sup>	6×10 <sup>-2</sup>	1×10 <sup>-11</sup>	2×10 <sup>-1</sup>
	High	4×10 <sup>-7</sup>	3×10 <sup>-1</sup>	2×10 <sup>-1</sup>	4×10 <sup>-11</sup>	5×10 <sup>-1</sup>
ON - Ontario, Canada.	IL - Illinois.	SC - South Carolina.	NC - North Carolina.			
WA - Washington.	KY - Kentucky.	OH - Ohio.	UT - Utah.			
TN - Tennessee.	NV - Nevada.	NTS - Nevada Test Site.				

**Table D-17 Nonradiological Fatalities from Rail Transportation of Radioactive Materials**

Material	Route	Occupational		Nonoccupational	
		Normal (Latent Cancer Fatalities)	Accident (Fatalities)	Normal (LCFs)	Accident (Fatalities)
Feed Material in Type 48X Cylinder	Port Hope, ON	$7 \times 10^{-4}$	$1 \times 10^{-1}$	$4 \times 10^{-2}$	$1 \times 10^{-1}$
Feed Material in Type 48Y Cylinder	Port Hope, ON	$6 \times 10^{-4}$	$9 \times 10^{-2}$	$3 \times 10^{-2}$	$9 \times 10^{-2}$
Feed Material in Type 48X Cylinder	Metropolis, IL	$5 \times 10^{-4}$	$7 \times 10^{-2}$	$2 \times 10^{-2}$	$7 \times 10^{-2}$
Feed Material in Type 48Y Cylinder	Metropolis, IL	$4 \times 10^{-4}$	$6 \times 10^{-2}$	$1 \times 10^{-2}$	$6 \times 10^{-2}$
Product in Type 30B Cylinder	Columbia, SC	$8 \times 10^{-5}$	$1 \times 10^{-2}$	$5 \times 10^{-3}$	$1 \times 10^{-2}$
Product in Type 30B Cylinder	Wilmington, NC	$9 \times 10^{-5}$	$2 \times 10^{-2}$	$5 \times 10^{-3}$	$2 \times 10^{-2}$
Product in Type 30B Cylinder	Richland, WA	$1 \times 10^{-4}$	$2 \times 10^{-2}$	$5 \times 10^{-3}$	$2 \times 10^{-2}$
DUF <sub>6</sub> in Type 48Y Cylinder	Paducah, KY	$3 \times 10^{-4}$	$5 \times 10^{-2}$	$1 \times 10^{-2}$	$5 \times 10^{-2}$
DUF <sub>6</sub> in Type 48Y Cylinder	Portsmouth, OH	$4 \times 10^{-4}$	$7 \times 10^{-2}$	$2 \times 10^{-2}$	$7 \times 10^{-2}$
DUF <sub>6</sub> in Type 48Y Cylinder	Metropolis, IL	$3 \times 10^{-4}$	$5 \times 10^{-2}$	$1 \times 10^{-2}$	$5 \times 10^{-2}$
Empty Type 48Y Cylinder	Metropolis, IL	$2 \times 10^{-4}$	$3 \times 10^{-2}$	$7 \times 10^{-3}$	$3 \times 10^{-2}$
Empty Type 48Y Cylinder	Port Hope, ON	$3 \times 10^{-4}$	$5 \times 10^{-2}$	$2 \times 10^{-2}$	$5 \times 10^{-2}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to NTS, NV	$2 \times 10^{-4}$	$4 \times 10^{-2}$	$6 \times 10^{-3}$	$4 \times 10^{-2}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to Clive, UT	$2 \times 10^{-4}$	$3 \times 10^{-2}$	$5 \times 10^{-3}$	$3 \times 10^{-2}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to NTS	$3 \times 10^{-4}$	$4 \times 10^{-2}$	$1 \times 10^{-2}$	$4 \times 10^{-2}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to Clive, UT	$2 \times 10^{-4}$	$4 \times 10^{-2}$	$9 \times 10^{-3}$	$4 \times 10^{-2}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Metropolis, IL, to Clive, UT	$2 \times 10^{-4}$	$3 \times 10^{-2}$	$5 \times 10^{-3}$	$3 \times 10^{-2}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Clive, UT	$2 \times 10^{-4}$	$3 \times 10^{-2}$	$6 \times 10^{-3}$	$3 \times 10^{-2}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Hanford, WA	$3 \times 10^{-4}$	$4 \times 10^{-2}$	$1 \times 10^{-2}$	$4 \times 10^{-2}$
CaF <sub>2</sub> in Bulk Bags	Clive, UT	$4 \times 10^{-4}$	$6 \times 10^{-2}$	$1 \times 10^{-2}$	$6 \times 10^{-2}$
CaF <sub>2</sub> in Bulk Bags	Hanford, WA	$5 \times 10^{-4}$	$8 \times 10^{-2}$	$2 \times 10^{-2}$	$8 \times 10^{-2}$
Solid Waste in 55-Gallon Drums	Barnwell, SC	$5 \times 10^{-6}$	$9 \times 10^{-4}$	$3 \times 10^{-4}$	$9 \times 10^{-4}$
Solid Waste in 55-Gallon Drums	Clive, UT	$6 \times 10^{-6}$	$9 \times 10^{-4}$	$2 \times 10^{-4}$	$9 \times 10^{-4}$

Material	Route	Occupational		Nonoccupational	
		Normal (Latent Cancer Fatalities)	Accident (Fatalities)	Normal (LCFs)	Accident (Fatalities)
Solid Waste in 55-Gallon Drums	Hanford, WA	$7 \times 10^{-6}$	$1 \times 10^{-3}$	$3 \times 10^{-4}$	$1 \times 10^{-3}$
Solid Waste in 55-Gallon Drums	Oak Ridge, TN	$5 \times 10^{-6}$	$8 \times 10^{-4}$	$2 \times 10^{-4}$	$8 \times 10^{-4}$
<i>Range</i>					
Feed Material	Low	$4 \times 10^{-4}$	$6 \times 10^{-2}$	$1 \times 10^{-2}$	$6 \times 10^{-2}$
	High	$7 \times 10^{-4}$	$1 \times 10^{-1}$	$4 \times 10^{-2}$	$1 \times 10^{-1}$
Product	Low	$8 \times 10^{-5}$	$1 \times 10^{-2}$	$5 \times 10^{-3}$	$1 \times 10^{-2}$
	High	$1 \times 10^{-4}$	$2 \times 10^{-2}$	$5 \times 10^{-3}$	$2 \times 10^{-2}$
Disposition of Depleted Uranium	Low	$2 \times 10^{-4}$	$3 \times 10^{-2}$	$5 \times 10^{-3}$	$3 \times 10^{-2}$
	High	$5 \times 10^{-4}$	$8 \times 10^{-2}$	$2 \times 10^{-2}$	$8 \times 10^{-2}$
Waste	Low	$5 \times 10^{-6}$	$8 \times 10^{-4}$	$2 \times 10^{-4}$	$8 \times 10^{-4}$
	High	$7 \times 10^{-6}$	$1 \times 10^{-3}$	$3 \times 10^{-4}$	$1 \times 10^{-3}$
Empty Cylinders	Low	$2 \times 10^{-4}$	$3 \times 10^{-2}$	$7 \times 10^{-3}$	$3 \times 10^{-2}$
	High	$3 \times 10^{-4}$	$5 \times 10^{-2}$	$2 \times 10^{-2}$	$5 \times 10^{-2}$
Total Impact	Low	$8 \times 10^{-4}$	$1 \times 10^{-1}$	$3 \times 10^{-2}$	$1 \times 10^{-1}$
	High	$2 \times 10^{-3}$	$3 \times 10^{-1}$	$8 \times 10^{-2}$	$3 \times 10^{-1}$
ON - Ontario, Canada.	IL - Illinois.	SC - South Carolina.	NC - North Carolina.		
WA - Washington.	KY - Kentucky.	OH - Ohio.	UT - Utah.		
TN - Tennessee.	NV - Nevada.	NTS - Nevada Test Site.			



**Table D-18 Radiological Latent Cancer Fatalities from Incident-Free Rail Transportation of Radioactive Materials**

Material	Route	Maximum Individual	In-Transit			Crew			
			Crew	Public Off-Link	Public On-Link	Public Stop	Loading	Total Public	Total Worker
Feed Material in Type 48X Cylinder	Port Hope, ON	$7 \times 10^{-9}$	$4 \times 10^{-4}$	$3 \times 10^{-4}$	$2 \times 10^{-5}$	$8 \times 10^{-2}$	$9 \times 10^{-4}$	$8 \times 10^{-2}$	$1 \times 10^{-3}$
Feed Material in Type 48Y Cylinder	Port Hope, ON	$5 \times 10^{-9}$	$3 \times 10^{-4}$	$2 \times 10^{-4}$	$2 \times 10^{-5}$	$6 \times 10^{-2}$	$5 \times 10^{-4}$	$6 \times 10^{-2}$	$8 \times 10^{-4}$
Feed Material in Type 48X Cylinder	Metropolis, IL	$7 \times 10^{-9}$	$3 \times 10^{-4}$	$2 \times 10^{-4}$	$1 \times 10^{-5}$	$8 \times 10^{-2}$	$9 \times 10^{-4}$	$8 \times 10^{-2}$	$1 \times 10^{-3}$
Feed Material in Type 48Y Cylinder	Metropolis, IL	$5 \times 10^{-9}$	$2 \times 10^{-4}$	$1 \times 10^{-4}$	$9 \times 10^{-6}$	$6 \times 10^{-2}$	$5 \times 10^{-4}$	$6 \times 10^{-2}$	$7 \times 10^{-4}$
Product in Type 30B Cylinder	Columbia, SC	$9 \times 10^{-10}$	$4 \times 10^{-5}$	$4 \times 10^{-5}$	$3 \times 10^{-6}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$
Product in Type 30B Cylinder	Wilmington, NC	$9 \times 10^{-10}$	$5 \times 10^{-5}$	$4 \times 10^{-5}$	$3 \times 10^{-6}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$
Product in Type 30B Cylinder	Richland, WA	$9 \times 10^{-10}$	$5 \times 10^{-5}$	$3 \times 10^{-5}$	$3 \times 10^{-6}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$
DUF <sub>6</sub> in Type 48Y Cylinder	Paducah, KY	$1 \times 10^{-9}$	$4 \times 10^{-5}$	$3 \times 10^{-5}$	$2 \times 10^{-6}$	$1 \times 10^{-2}$	$3 \times 10^{-3}$	$1 \times 10^{-2}$	$3 \times 10^{-3}$
DUF <sub>6</sub> in Type 48Y Cylinder	Portsmouth, OH	$1 \times 10^{-9}$	$5 \times 10^{-5}$	$4 \times 10^{-5}$	$3 \times 10^{-6}$	$1 \times 10^{-2}$	$3 \times 10^{-3}$	$1 \times 10^{-2}$	$3 \times 10^{-3}$
DUF <sub>6</sub> in Type 48Y Cylinder	Metropolis, IL	$1 \times 10^{-9}$	$5 \times 10^{-5}$	$3 \times 10^{-5}$	$2 \times 10^{-6}$	$1 \times 10^{-2}$	$3 \times 10^{-3}$	$1 \times 10^{-2}$	$3 \times 10^{-3}$
Empty Type 48Y Cylinder	Metropolis, IL	$3 \times 10^{-9}$	$7 \times 10^{-5}$	$5 \times 10^{-5}$	$4 \times 10^{-6}$	$3 \times 10^{-2}$	$1 \times 10^{-3}$	$3 \times 10^{-2}$	$1 \times 10^{-3}$
Empty Type 48Y Cylinder	Port Hope, ON	$3 \times 10^{-9}$	$9 \times 10^{-5}$	$9 \times 10^{-5}$	$8 \times 10^{-6}$	$3 \times 10^{-2}$	$1 \times 10^{-3}$	$3 \times 10^{-2}$	$1 \times 10^{-3}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to NTS, NV	$5 \times 10^{-10}$	$3 \times 10^{-5}$	$1 \times 10^{-5}$	$1 \times 10^{-6}$	$6 \times 10^{-3}$	$7 \times 10^{-5}$	$6 \times 10^{-3}$	$1 \times 10^{-4}$

Material	Route	Maximum Individual	In-Transit			Crew			
			Crew	Public Off-Link	Public On-Link	Public Stop	Loading	Total Public	Total Worker
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to Clive, UT	5×10 <sup>-10</sup>	3×10 <sup>-5</sup>	1×10 <sup>-5</sup>	1×10 <sup>-6</sup>	6×10 <sup>-3</sup>	7×10 <sup>-5</sup>	6×10 <sup>-3</sup>	1×10 <sup>-4</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to NTS, NV	5×10 <sup>-10</sup>	3×10 <sup>-5</sup>	1×10 <sup>-5</sup>	2×10 <sup>-6</sup>	6×10 <sup>-3</sup>	7×10 <sup>-5</sup>	6×10 <sup>-3</sup>	1×10 <sup>-4</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to Clive, UT	5×10 <sup>-10</sup>	3×10 <sup>-5</sup>	1×10 <sup>-5</sup>	1×10 <sup>-6</sup>	6×10 <sup>-3</sup>	7×10 <sup>-5</sup>	6×10 <sup>-3</sup>	1×10 <sup>-4</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Metropolis, IL, to Clive, UT	5×10 <sup>-10</sup>	3×10 <sup>-5</sup>	9×10 <sup>-6</sup>	9×10 <sup>-7</sup>	6×10 <sup>-3</sup>	7×10 <sup>-5</sup>	6×10 <sup>-3</sup>	1×10 <sup>-4</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Clive, UT	5×10 <sup>-10</sup>	3×10 <sup>-5</sup>	1×10 <sup>-5</sup>	1×10 <sup>-6</sup>	6×10 <sup>-3</sup>	7×10 <sup>-5</sup>	6×10 <sup>-3</sup>	1×10 <sup>-4</sup>
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Hanford, WA	5×10 <sup>-10</sup>	3×10 <sup>-5</sup>	2×10 <sup>-5</sup>	2×10 <sup>-6</sup>	6×10 <sup>-3</sup>	7×10 <sup>-5</sup>	6×10 <sup>-3</sup>	1×10 <sup>-4</sup>
CaF <sub>2</sub> in Bulk Bags	Clive, UT	1×10 <sup>-9</sup>	5×10 <sup>-5</sup>	2×10 <sup>-5</sup>	2×10 <sup>-6</sup>	1×10 <sup>-2</sup>	2×10 <sup>-6</sup>	1×10 <sup>-2</sup>	5×10 <sup>-5</sup>
CaF <sub>2</sub> in Bulk Bags	Hanford, WA	1×10 <sup>-9</sup>	6×10 <sup>-5</sup>	3×10 <sup>-5</sup>	3×10 <sup>-6</sup>	1×10 <sup>-2</sup>	2×10 <sup>-6</sup>	1×10 <sup>-2</sup>	6×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Barnwell, SC	2×10 <sup>-11</sup>	7×10 <sup>-7</sup>	6×10 <sup>-7</sup>	5×10 <sup>-8</sup>	2×10 <sup>-4</sup>	4×10 <sup>-6</sup>	2×10 <sup>-4</sup>	4×10 <sup>-6</sup>
Solid Waste in 55-Gallon Drums	Clive, UT	2×10 <sup>-11</sup>	7×10 <sup>-7</sup>	3×10 <sup>-7</sup>	3×10 <sup>-8</sup>	2×10 <sup>-4</sup>	4×10 <sup>-6</sup>	2×10 <sup>-4</sup>	4×10 <sup>-6</sup>
Solid Waste in 55-Gallon Drums	Hanford, WA	2×10 <sup>-11</sup>	9×10 <sup>-7</sup>	4×10 <sup>-7</sup>	5×10 <sup>-8</sup>	2×10 <sup>-4</sup>	4×10 <sup>-6</sup>	2×10 <sup>-4</sup>	4×10 <sup>-6</sup>
Solid Waste in 55-Gallon Drums	Oak Ridge, TN	2×10 <sup>-11</sup>	6×10 <sup>-7</sup>	6×10 <sup>-7</sup>	4×10 <sup>-8</sup>	2×10 <sup>-4</sup>	4×10 <sup>-6</sup>	2×10 <sup>-4</sup>	4×10 <sup>-6</sup>
<b>Range</b>									
Feed Material	Low	5×10 <sup>-9</sup>	2×10 <sup>-4</sup>	1×10 <sup>-4</sup>	9×10 <sup>-6</sup>	6×10 <sup>-2</sup>	5×10 <sup>-4</sup>	6×10 <sup>-2</sup>	7×10 <sup>-4</sup>
	High	7×10 <sup>-9</sup>	4×10 <sup>-4</sup>	3×10 <sup>-4</sup>	2×10 <sup>-5</sup>	8×10 <sup>-2</sup>	9×10 <sup>-4</sup>	8×10 <sup>-2</sup>	1×10 <sup>-3</sup>

Material	Route	Maximum Individual	In-Transit			Crew			
			Crew	Public Off-Link	Public On-Link	Public Stop	Loading	Total Public	Total Worker
Product	Low	$9 \times 10^{-10}$	$4 \times 10^{-5}$	$3 \times 10^{-5}$	$3 \times 10^{-6}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$
	High	$9 \times 10^{-10}$	$5 \times 10^{-5}$	$4 \times 10^{-5}$	$3 \times 10^{-6}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$	$1 \times 10^{-2}$	$2 \times 10^{-4}$
Disposition of Depleted Uranium	Low	$5 \times 10^{-10}$	$3 \times 10^{-5}$	$9 \times 10^{-6}$	$9 \times 10^{-7}$	$6 \times 10^{-3}$	$2 \times 10^{-6}$	$6 \times 10^{-3}$	$5 \times 10^{-5}$
	High	$1 \times 10^{-9}$	$6 \times 10^{-5}$	$4 \times 10^{-5}$	$3 \times 10^{-6}$	$1 \times 10^{-2}$	$3 \times 10^{-3}$	$1 \times 10^{-2}$	$3 \times 10^{-3}$
Waste	Low	$2 \times 10^{-11}$	$6 \times 10^{-7}$	$3 \times 10^{-7}$	$3 \times 10^{-8}$	$2 \times 10^{-4}$	$4 \times 10^{-6}$	$2 \times 10^{-4}$	$4 \times 10^{-6}$
	High	$2 \times 10^{-11}$	$9 \times 10^{-7}$	$6 \times 10^{-7}$	$5 \times 10^{-8}$	$2 \times 10^{-4}$	$4 \times 10^{-6}$	$2 \times 10^{-4}$	$4 \times 10^{-6}$
Empty Cylinders	Low	$3 \times 10^{-9}$	$7 \times 10^{-5}$	$5 \times 10^{-5}$	$4 \times 10^{-6}$	$3 \times 10^{-2}$	$1 \times 10^{-3}$	$3 \times 10^{-2}$	$1 \times 10^{-3}$
	High	$3 \times 10^{-9}$	$9 \times 10^{-5}$	$9 \times 10^{-5}$	$8 \times 10^{-6}$	$3 \times 10^{-2}$	$1 \times 10^{-3}$	$3 \times 10^{-2}$	$1 \times 10^{-3}$
Total Impact	Low	$9 \times 10^{-9}$	$3 \times 10^{-4}$	$2 \times 10^{-4}$	$2 \times 10^{-5}$	$1 \times 10^{-1}$	$2 \times 10^{-3}$	$1 \times 10^{-1}$	$2 \times 10^{-3}$
	High	$1 \times 10^{-8}$	$5 \times 10^{-4}$	$5 \times 10^{-4}$	$4 \times 10^{-5}$	$1 \times 10^{-1}$	$6 \times 10^{-3}$	$1 \times 10^{-1}$	$6 \times 10^{-3}$

ON - Ontario, Canada.    IL - Illinois.    SC - South Carolina.    NC - North Carolina.  
 WA - Washington.    KY - Kentucky.    OH - Ohio.    UT - Utah.  
 TN - Tennessee.    NV - Nevada.    NTS - Nevada Test Site.

**Table D-19 Radiological Latent Cancer Fatalities from Accidents During Rail Transportation of Radioactive Materials**

<b>Material</b>	<b>Route</b>	<b>Ground</b>	<b>Inhaled</b>	<b>Resuspended Soil</b>	<b>Cloud Shine</b>	<b>Total Risk of LCF</b>
Feed Material in Type 48X Cylinder	Port Hope, ON	$3 \times 10^{-7}$	$2 \times 10^{-1}$	$3 \times 10^{-2}$	$3 \times 10^{-11}$	$3 \times 10^{-1}$
Feed Material in Type 48Y Cylinder	Port Hope, ON	$3 \times 10^{-7}$	$2 \times 10^{-1}$	$3 \times 10^{-2}$	$3 \times 10^{-11}$	$3 \times 10^{-1}$
Feed Material in Type 48X Cylinder	Metropolis, IL	$1 \times 10^{-7}$	$1 \times 10^{-1}$	$1 \times 10^{-2}$	$1 \times 10^{-11}$	$1 \times 10^{-1}$
Feed Material in Type 48Y Cylinder	Metropolis, IL	$1 \times 10^{-7}$	$1 \times 10^{-1}$	$1 \times 10^{-2}$	$1 \times 10^{-11}$	$1 \times 10^{-1}$
Product in Type 30B Cylinder	Columbia, SC	$2 \times 10^{-7}$	$1 \times 10^{-1}$	$8 \times 10^{-3}$	$7 \times 10^{-12}$	$1 \times 10^{-1}$
Product in Type 30B Cylinder	Wilmington, NC	$2 \times 10^{-7}$	$2 \times 10^{-1}$	$9 \times 10^{-3}$	$7 \times 10^{-12}$	$2 \times 10^{-1}$
Product in Type 30B Cylinder	Richland, WA	$2 \times 10^{-7}$	$1 \times 10^{-1}$	$9 \times 10^{-3}$	$6 \times 10^{-12}$	$1 \times 10^{-1}$
DUF <sub>6</sub> in Type 48Y Cylinder	Paducah, KY	$3 \times 10^{-7}$	$2 \times 10^{-1}$	$6 \times 10^{-3}$	$6 \times 10^{-11}$	$2 \times 10^{-1}$
DUF <sub>6</sub> in Type 48Y Cylinder	Portsmouth, OH	$5 \times 10^{-7}$	$4 \times 10^{-1}$	$1 \times 10^{-2}$	$1 \times 10^{-10}$	$4 \times 10^{-1}$
DUF <sub>6</sub> in Type 48Y Cylinder	Metropolis, IL	$3 \times 10^{-7}$	$2 \times 10^{-1}$	$5 \times 10^{-3}$	$6 \times 10^{-11}$	$2 \times 10^{-1}$
Empty Type 48Y Cylinder	Metropolis, IL	$2 \times 10^{-13}$	$1 \times 10^{-2}$	$5 \times 10^{-2}$	$5 \times 10^{-17}$	$6 \times 10^{-2}$
Empty Type 48Y Cylinder	Port Hope, ON	$4 \times 10^{-13}$	$2 \times 10^{-2}$	$1 \times 10^{-1}$	$1 \times 10^{-16}$	$1 \times 10^{-1}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to NTS, NV	$4 \times 10^{-8}$	$7 \times 10^{-5}$	$1 \times 10^{-5}$	$7 \times 10^{-13}$	$9 \times 10^{-5}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Paducah, KY, to Clive, UT	$3 \times 10^{-8}$	$6 \times 10^{-5}$	$1 \times 10^{-5}$	$6 \times 10^{-13}$	$7 \times 10^{-5}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to NTS, NV	$6 \times 10^{-8}$	$1 \times 10^{-4}$	$2 \times 10^{-5}$	$1 \times 10^{-12}$	$1 \times 10^{-4}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Portsmouth, OH, to Clive, UT	$5 \times 10^{-8}$	$1 \times 10^{-4}$	$2 \times 10^{-5}$	$1 \times 10^{-12}$	$1 \times 10^{-4}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Metropolis, IL, to Clive, UT	$8 \times 10^{-8}$	$2 \times 10^{-4}$	$2 \times 10^{-5}$	$2 \times 10^{-12}$	$2 \times 10^{-4}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Clive, UT	$4 \times 10^{-8}$	$7 \times 10^{-5}$	$2 \times 10^{-5}$	$7 \times 10^{-13}$	$9 \times 10^{-5}$
Depleted U <sub>3</sub> O <sub>8</sub> in Bulk Bags	Hanford, WA	$7 \times 10^{-8}$	$1 \times 10^{-4}$	$3 \times 10^{-5}$	$1 \times 10^{-12}$	$2 \times 10^{-4}$

Material	Route	Ground	Inhaled	Resuspended Soil	Cloud Shine	Total Risk of LCF
CaF <sub>2</sub> in Bulk Bags	Clive, UT	7×10 <sup>-13</sup>	3×10 <sup>-9</sup>	1×10 <sup>-8</sup>	2×10 <sup>-18</sup>	1×10 <sup>-8</sup>
CaF <sub>2</sub> in Bulk Bags	Hanford, WA	1×10 <sup>-12</sup>	5×10 <sup>-9</sup>	2×10 <sup>-8</sup>	4×10 <sup>-18</sup>	3×10 <sup>-8</sup>
Solid Waste in 55-Gallon Drums	Barnwell, SC	5×10 <sup>-11</sup>	2×10 <sup>-5</sup>	5×10 <sup>-5</sup>	3×10 <sup>-15</sup>	8×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Clive, UT	2×10 <sup>-11</sup>	1×10 <sup>-5</sup>	3×10 <sup>-5</sup>	2×10 <sup>-15</sup>	4×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Hanford, WA	4×10 <sup>-11</sup>	2×10 <sup>-5</sup>	5×10 <sup>-5</sup>	3×10 <sup>-15</sup>	8×10 <sup>-5</sup>
Solid Waste in 55-Gallon Drums	Oak Ridge, TN	4×10 <sup>-11</sup>	2×10 <sup>-5</sup>	5×10 <sup>-5</sup>	3×10 <sup>-15</sup>	7×10 <sup>-5</sup>
<b>Range</b>						
Feed Material	Low	1×10 <sup>-7</sup>	1×10 <sup>-1</sup>	1×10 <sup>-2</sup>	1×10 <sup>-11</sup>	1×10 <sup>-1</sup>
	High	3×10 <sup>-7</sup>	2×10 <sup>-1</sup>	3×10 <sup>-2</sup>	3×10 <sup>-11</sup>	3×10 <sup>-1</sup>
Product	Low	2×10 <sup>-7</sup>	1×10 <sup>-1</sup>	8×10 <sup>-3</sup>	6×10 <sup>-12</sup>	1×10 <sup>-1</sup>
	High	2×10 <sup>-7</sup>	2×10 <sup>-1</sup>	9×10 <sup>-3</sup>	7×10 <sup>-12</sup>	2×10 <sup>-1</sup>
Disposition of Depleted Uranium	Low	7×10 <sup>-13</sup>	3×10 <sup>-9</sup>	1×10 <sup>-8</sup>	2×10 <sup>-18</sup>	1×10 <sup>-8</sup>
	High	5×10 <sup>-7</sup>	4×10 <sup>-1</sup>	1×10 <sup>-2</sup>	1×10 <sup>-10</sup>	4×10 <sup>-1</sup>
Waste	Low	2×10 <sup>-11</sup>	1×10 <sup>-5</sup>	3×10 <sup>-5</sup>	2×10 <sup>-15</sup>	4×10 <sup>-5</sup>
	High	5×10 <sup>-11</sup>	2×10 <sup>-5</sup>	5×10 <sup>-5</sup>	3×10 <sup>-15</sup>	8×10 <sup>-5</sup>
Empty Cylinders	Low	2×10 <sup>-13</sup>	1×10 <sup>-2</sup>	5×10 <sup>-2</sup>	5×10 <sup>-17</sup>	6×10 <sup>-2</sup>
	High	4×10 <sup>-13</sup>	2×10 <sup>-2</sup>	1×10 <sup>-1</sup>	1×10 <sup>-16</sup>	1×10 <sup>-1</sup>
Total Impact	Low	3×10 <sup>-7</sup>	2×10 <sup>-1</sup>	7×10 <sup>-2</sup>	2×10 <sup>-11</sup>	3×10 <sup>-1</sup>
	High	1×10 <sup>-6</sup>	8×10 <sup>-1</sup>	2×10 <sup>-1</sup>	1×10 <sup>-10</sup>	1
ON - Ontario, Canada.	IL - Illinois.	SC - South Carolina.	NC - North Carolina.			
WA - Washington.	KY - Kentucky.	OH - Ohio.	UT - Utah.			
TN - Tennessee.	NV - Nevada.	NTS - Nevada Test Site.				

## D.5 Chemical Impact Analysis Resulting from Accidents with UF<sub>6</sub> Cylinders

If UF<sub>6</sub> is released to the atmosphere, it reacts with water vapor in the air to form hydrofluoric acid and uranyl fluoride (UO<sub>2</sub>F<sub>2</sub>), independent of the enrichment of the UF<sub>6</sub> (i.e., natural, enriched, or depleted). The products are chemically toxic to humans. Hydrofluoric acid is extremely corrosive and can damage the lungs and cause death if inhaled at high enough concentrations. In addition, uranium is a heavy metal that, in addition to being radioactive, can have toxic chemical effects (primarily on the kidneys) if it enters by way of ingestion and/or inhalation (DOE, 2004a).

DOE analyzed the chemical impacts from the transportation of DUF<sub>6</sub> from the East Tennessee Technology Park to the Portsmouth and Paducah Gaseous Diffusion Plants (DOE, 2004a; DOE, 2004b). These results were used to estimate the chemical impacts associated with the proposed NEF. Their results are applicable because the chemical impacts would not vary with: (1) the shipping route, (2) the amount of enrichment, and (3) similar shipping containers. Because DOE postulated a hypothetical accident that could occur at any location, the results are not route dependent. DOE evaluated chemical impacts to rural (6 persons per square kilometer [15 persons per square mile]), suburban (719 persons per square kilometer [1,798 persons per square mile]), and urban (1,600 persons per square kilometer [4,000 persons per square mile]) areas. In addition, the proposed NEF would use the same containers (Type 48Y cylinders) that DOE evaluated. Chemical impacts are not dependent on enrichment of the uranium, only on the amount of uranium in the container.

The toxic effects, or chemical impacts, can be categorized as adverse health effects or irreversible adverse health effects. An adverse health effect includes respiratory irritation or skin rash associated with lower chemical concentrations. An irreversible adverse health effect generally occurs at higher chemical concentrations and is permanent in nature. Irreversible adverse health effects include death, impaired organ function (such as central nervous system or lung damage), and other effects that may impair daily functions. Of those individuals receiving an irreversible adverse health effect, approximately 1 percent or less would die from it (LES, 2005).

Acute effects evaluated were assumed to exhibit a threshold nonlinear relationship with exposures; that is, some low level of exposure can be tolerated without inducing a health effect. Chemical-specific threshold concentrations were developed for potential adverse effects and potential irreversible adverse effects. To address maximally exposed individuals, the locations of maximum chemical concentration were identified for shipments with the largest potential releases. Estimates of exposure duration at those locations were obtained from modeling output and were used to assess whether maximally exposed individual exposure to uranium and hydrofluoric acid would exceed the criteria for potential irreversible adverse effects. The primary exposure pathway would be inhalation as it results in the highest exposure for the chemicals. Acute effects from ingestion and absorption through the skin would be less than those from inhalation (DOE 2004a; DOE 2004b).

DOE used the FIREPLUME model to simulate the dispersion of toxic gases and particulates from transportation accidents involving UF<sub>6</sub> fires. The model can simulate three phases that UF<sub>6</sub> fires may undergo. These include (1) the instantaneous puff that is released in a hydraulic rupture, (2) the emissions from the continuous fire that occurs afterwards, and (3) the emissions from the cool-down phase in which releases decline to zero as the temperature of the fire declines. The location of the maximally exposed individual is assumed to be 30 meters (100 feet) or farther from the release point (DOE, 2004a, DOE 2004b).

DOE evaluated chemical impacts for both neutral and stable meteorological conditions. Neutral meteorological conditions are defined as Pasquill stability class D conditions (wind speed of 4 meters per

second [9 miles per hour]) while stable meteorological conditions are defined as Pasquill stability class F (wind speed of 1 meter per second [2 miles per hour]) (DOE 2004a, DOE 2004b). Results for stable meteorological conditions are presented in this appendix because the impacts are greater than for neutral conditions and are therefore bounding.

The potential transportation chemical consequences of an accident involving UF<sub>6</sub> are shown in Table D-20 for both truck and rail. This table also shows the potential chemical consequences of a severe transportation accident assumed to have occurred involving the transportation of depleted U<sub>3</sub>O<sub>8</sub> from a DUF<sub>6</sub> conversion facility to a disposal facility. The probability that this accident could occur is very remote. The results show that while adverse chemical impacts would be high, few individuals would experience irreversible adverse health effects and less than one death would be expected.

**Table D-20 Potential Chemical Consequences to the Population from Severe Transportation Accidents**

Source	Mode	Rural	Suburban	Urban
<i>Number of Persons with the Potential for Adverse Health Effects</i>				
DUF <sub>6</sub>	Truck	6	760	1,700
	Rail	110	13,000	28,000
Depleted U <sub>3</sub> O <sub>8</sub> (in bulk bags)	Truck	0	12	28
	Rail	0	47	103
<i>Number of Persons with the Potential for Irreversible Adverse Health Effects<sup>a</sup></i>				
DUF <sub>6</sub>	Truck	0	1	3
	Rail	0	2	4
Depleted U <sub>3</sub> O <sub>8</sub> (in bulk bags)	Truck	0	5	10
	Rail	0	17	38

<sup>a</sup> Exposure to hydrofluoric acid or uranium compounds is estimated to result in fatality to approximately 1 percent or less of those persons experiencing irreversible adverse effects.

Sources: DOE, 2004a; DOE, 2004b.

## D.6 Uncertainty in Transportation Risk Assessment

There are many sources of uncertainty in assessing the risks of transporting radioactive materials to and from the proposed NEF. Several factors that can be quantified are: routing of the material, the shipping container characteristics, mode of transport, and source or destination of the material. Each of these sources of uncertainty are discussed below.

### D.6.1 Routing of Radioactive Material

There are many varying routes for the shipments of the radioactive materials to and from the proposed NEF. The WebTragis computer code simplifies the routing choices by allowing the analyst to select various routing restrictions. These can range from no restrictions to Highway Route Controlled Quantity restrictions. Choices can be made between shortest route, fastest route, block various routes, etc. For this EIS, the NRC staff examined two different types of routing: the shortest with commercial, hazardous, and radioactive restrictions and Highway Route Controlled Quantity restrictions one of the most restrictive route specifications. For shipments in the eastern part of the US, the two different routes did not vary to

any significant amount. For shipments to Clive, Utah; Richland and Hanford, Washington; and the Nevada Test Site, Nevada, the two different routes could vary significantly.

A comparison of the RADTRAN 5 results for comparable shipments indicated that for all but one route, Highway Route Controlled Quantity routing yields the greater impacts. For this one route, the variation impacts were less than 1 percent. Therefore, the NRC staff used the Highway Route Controlled Quantity routing.

### **D.6.2 Shipping Container Characteristics**

The characteristics of the shipping container are important in the assessment of both the incident-free and the accident impacts. The incident-free impact is determined by the direct radiation along the side of the shipping container and the length of the container. The accident impacts are determined by the release fraction for each accident severity class. Historically, NUREG-0170 (NRC, 1977) was developed to provide background material for a review by the NRC of regulations dealing with the transportation of radioactive materials. In 2002, DOE prepared a resource handbook for transportation risk assessment (DOE, 2002). That document presented a review of the historical assessments, transportation models, and a compilation of supporting data parameters and generally accepted assumptions. DOE/EA-1290 also evaluated the shipments of  $\text{DUF}_6$  in Type 48Y containers; however, the release fractions were about one quarter of the DOE handbook values (DOE, 1999).

The NRC staff chose to use the release fractions from the DOE handbook for Type A containers as being more conservative than those presented in DOE/EA-1290.

### **D.6.3 Mode of Transport**

The use of truck or rail can affect the impact analysis in several different ways. First the number of trips can be reduced greatly by the use of railroads rather than trucks. Therefore, the impact from vehicle emissions and accidents involving trains is reduced with the use of railroads. However, since a railcar can transport more material, the impacts from the release of radioactive material during an accident would be greater. The capacity of trucks can also affect the impact analysis. In a similar way, the larger the truck, the more material can be transported, resulting in fewer trips but higher impacts from the release of radioactive material during an accident.

The NRC staff evaluated the transportation impacts from the use of both trucks and rail.

### **D.6.4 Source or Destination of Radioactive Material**

The source or destination of the radioactive material can also affect the transportation impact analysis. For example, as discussed in section D.4.2, it is not expected that all of the feed material would come exclusively from Port Hope, Ontario, Canada, or from Metropolis, Illinois. It is a reasonable assumption that some feed would come from Port Hope and some would come from Metropolis. Therefore, the impact from the transportation of feed material would be somewhere between the impacts evaluated for Port Hope and Metropolis.



## D.7 References

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- (DOE, 2002) U.S. Department of Energy. *A Resource Handbook on DOE Transportation Risk Assessment*. DOE/EM/NTP/HB-01. National Transportation Program. July 2002.
- (DOE, 2004a) U.S. Department of Energy. *Final Environmental Impact Statement for Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Paducah, Kentucky, Site*. DOE/EIS-0359. Office of Environmental Management. June 2004.
- (DOE, 2004b) U.S. Department of Energy. *Final Environmental Impact Statement for Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio, Site*. DOE/EIS-0360. Office of Environmental Management. June 2004.
- (LES, 2004) Louisiana Energy Services. "Response to NRC Request for Additional Information Regarding the National Enrichment Facility Environmental Report." NEF#04-019. NRC Docket No. 70-3103. May 20, 2004.
- (LES, 2005) Louisiana Energy Services. "National Enrichment Facility Environment Report." Revision 4. NRC Docket No. 70-3103. April 2005.
- (Neuhauser and Kanipe, 2003) Neuhauser, K.S., and F.L. Kanipe. *RADTRAN 5 User Guide*. SAND2000-2354. Sandia National Laboratories. July 7, 2003.  
<<http://ttd.sandia.gov/risk/docs/R5userguide.pdf>> (Accessed 4/19/04).
- (NRC, 1977) U.S. Nuclear Regulatory Commission. *Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes*. NUREG-0170, Vol 1. December 1977.
- (ORNL, 2003) Oak Ridge National Laboratory. *Transport Routing Analysis Geographic Information System (TRAGIS) User's Manual*. ORNL/NTRC-006. Revision 0. June 2003.
- (USEC, 1995) United States Enrichment Corporation. *Uranium Hexafluoride: A Manual of Good Handling Practices*. USEC-651. Revision 7. January 1995.

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## APPENDIX E AIR-QUALITY ANALYSIS

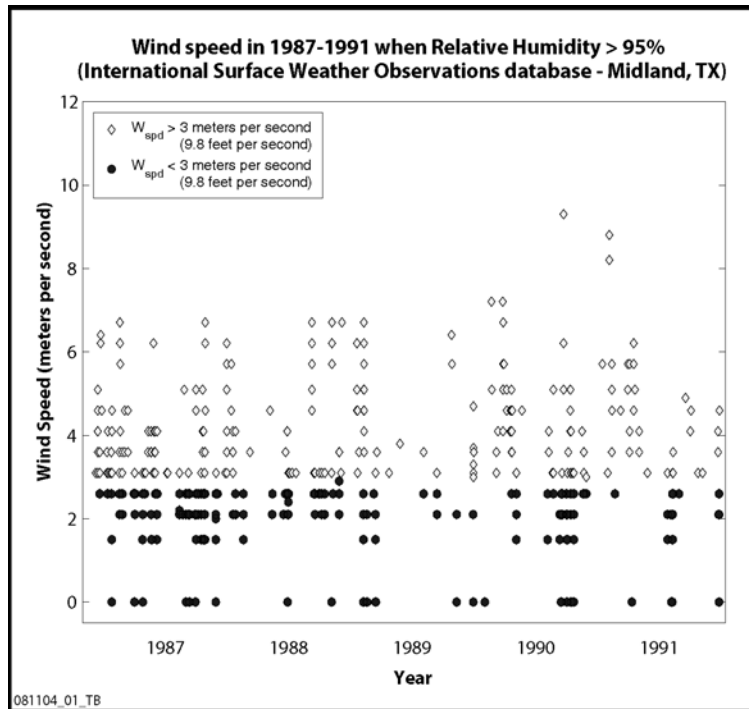
This appendix presents the analysis for determining the visibility impacts from operation of the Louisiana Energy Services (LES) proposed National Enrichment Facility (NEF) site and an assessment of the potential impacts due to high wind speed conditions.

### E.1 Analysis for the Potential for Fog from the Proposed NEF

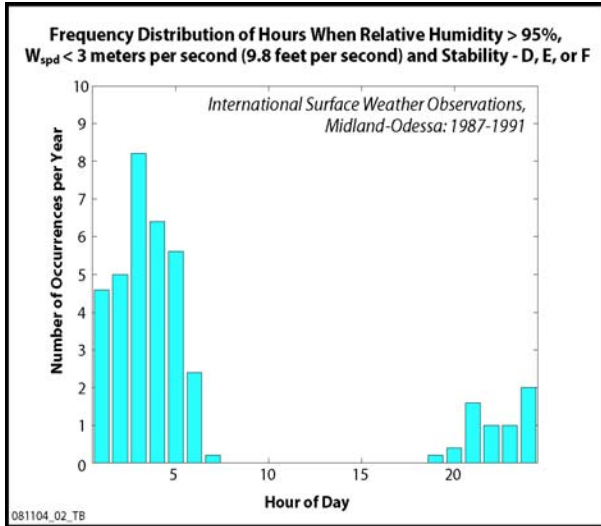
There is the potential for visual impacts in the local area from fog that could be generated by the cooling towers during operation under the proper weather conditions. Conditions are considered to be favorable for fog formation when humidity is high, wind speed is low, and atmosphere is stable. One concern is that under low wind speed conditions (less than 3 meters per second [9.8 feet per second]) and high relative humidity (greater than 95 percent), the cooling towers might significantly reduce visibility due to the generation of fog. To investigate potential visual impact from the cooling towers, meteorological data were analyzed for these conditions. Hourly surface observations at Midland-Odessa, Texas, for the five most recent years of data were used in this analysis as recommended by the U.S. Environmental Protection Agency (NCDC, 1998). These meteorological data were used as input in the air-quality modeling.

Hourly observations of wind speed and relative humidity for Midland-Odessa, Texas, from the International Surface Weather Observations database for the five-year period from 1987 through 1991 were examined. From all observations within that period, relative humidity was higher than 95 percent in 527 cases (or 1.2 percent per year). Figure E-1 shows the wind speed for such conditions. From 527 observations when relative humidity was higher than 95 percent, only 193 cases were observed when wind speed was below 3 meters per second (9.8 feet per second) and stability was neutral (D), stable (E), or very stable (F). This corresponds to less than 0.5 percent of the total number of hours per year.

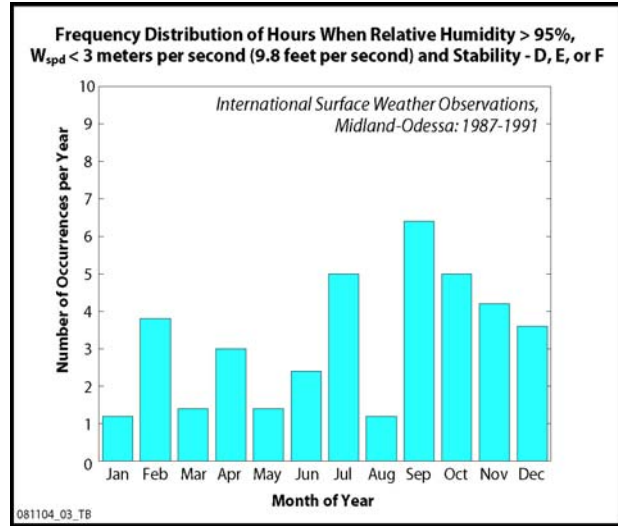
To determine time of day and seasonality for atmospheric conditions favorable for fog formation, frequency distributions were generated for all observations when relative humidity is greater than 95 percent, wind speed is less than 3 meters per second (9.8 feet per second), and stability is D, E, or F. Figure E-2 shows a histogram of hour of day and Figure E-3 shows a histogram of month of year for such conditions for all hours in the years 1987 through 1991. The figures show that such atmospheric conditions occur mostly early in the morning or late in the evening.



**Figure E-1 Wind Speed in High Relative Humidity Conditions for Midland-Odessa, Texas (NCDC, 1998)**

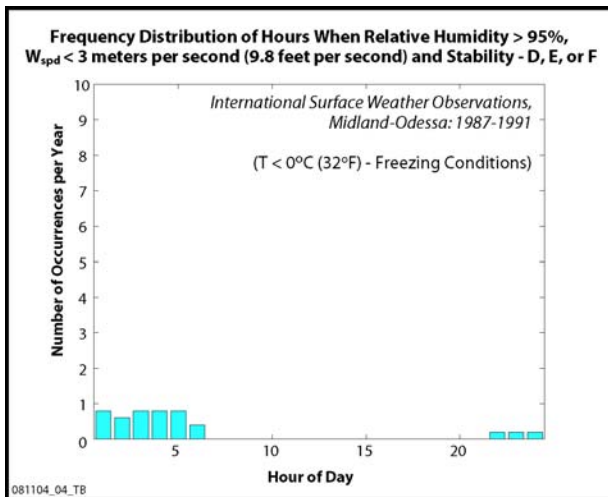


**Figure E-2 Histogram of Hour of Day (1987-1991) for Favorable Conditions for Fog (NCDC, 1998)**

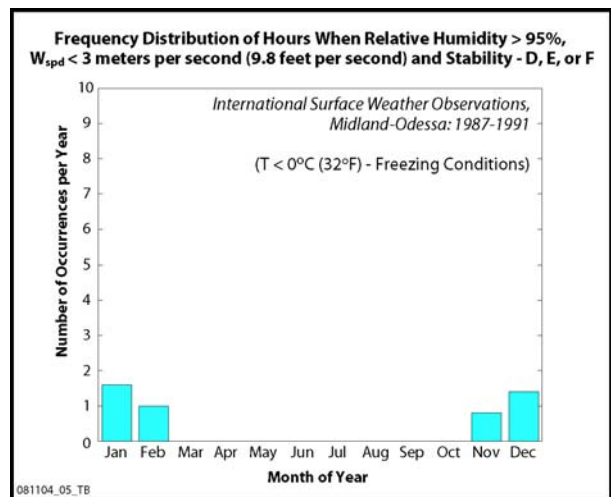


**Figure E-3 Histogram of Month of Year (1987-1991) for Favorable Conditions for Fog (NCDC, 1998)**

Another concern is that the cooling towers may increase the probability of freezing and icing on the ground. To determine time of day and seasonality for atmospheric conditions favorable to such conditions, frequency distributions were generated for all observations when relative humidity was greater than 95 percent, wind speed was less than 3 meters per second (9.8 feet per second); stability was D, E, or F; and temperature was below 0°C (32°F). Figure E-4 shows a histogram of hour of day and Figure E-5 shows a histogram of month of year for such conditions for all hours in the years 1987 through 1991. The figures show that such atmospheric conditions occur mostly early in the morning or late in the evening in late fall and winter (November through February).



**Figure E-4 Histogram of Hour of Day for Favorable Conditions for Icing on the Ground (NCDC, 1998)**



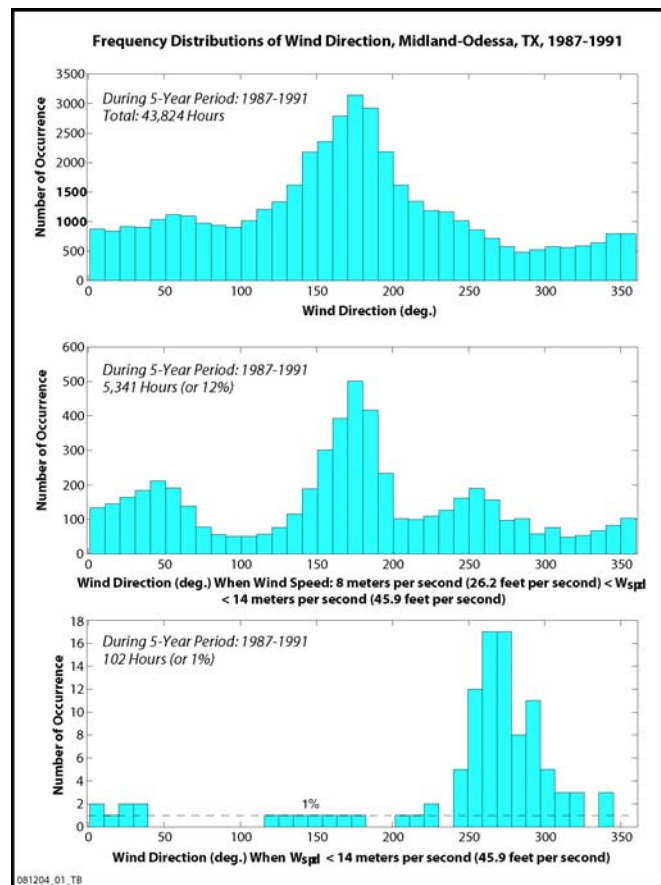
**Figure E-5 Histogram of Month of Year for Favorable Conditions for Icing on the Ground (NCDC, 1998)**

## E.2 Analysis of the Potential Effects of High Winds

The analysis of meteorological observations indicates the presence of high prevailing southerly winds in this area. There is a concern that emissions from the proposed NEF plant could be carried by these strong southerly winds over Hobbs, New Mexico, in less than 1 hour. Five years of hourly meteorological observations at the Midland-Odessa National Weather Service Station were analyzed to determine frequency of occurrence of strong southerly winds. Figure E-6 shows frequency distribution of wind direction for all hours in 1987-1991 (upper panel), winds greater than 8 meters per second (26.2 feet per second) but less than 14 meters per second (45.9 feet per second) (middle panel), and only for those hours when wind speed exceeds 14 meters per second (45.9 feet per second) (lower panel). These strong winds fall into a category “gale” (greater than 15 meters per second [49.2 feet per second]) or “storm” (greater than 25 meters per second [82.0 feet per second]) type of winds. Wind speed of 14 meters per second (45.9 feet per second) corresponds to 1 hour of travel time, so the trajectory can reach a 50-kilometer (31.1-mile) distance.

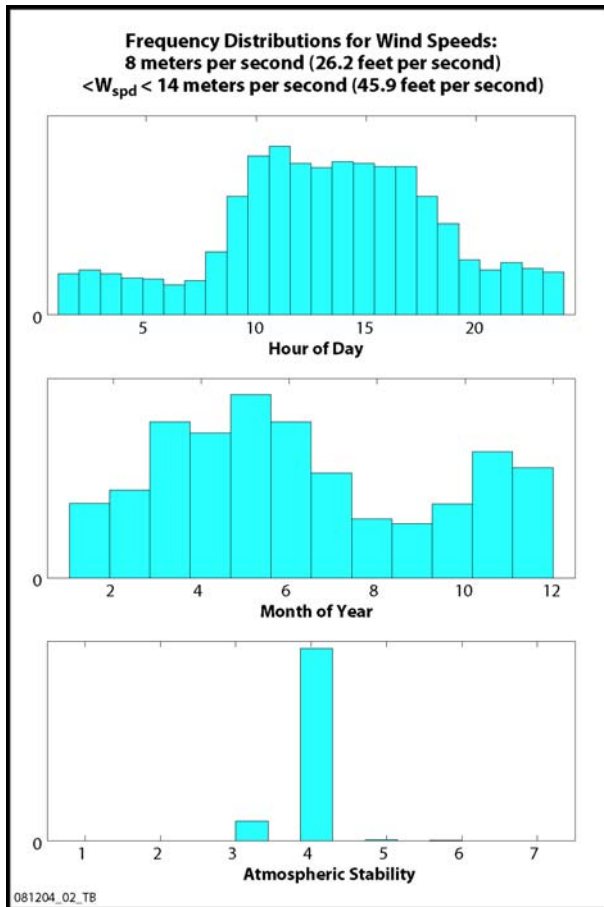
When wind speed is less than 14 meters per second (45.9 feet per second) but greater than 8 meters per second (26.2 feet per second), the trajectory can reach a 25-kilometer (15.5-mile) distance or more (and possibly reach Hobbs, New Mexico, in 1 hour). As shown in Figure E-6, the histogram of wind direction for all hours (all wind speeds) has a maximum at 180 degrees (southerly winds), whereas the histogram of wind direction for hours when wind speeds exceed 14 meters per second (45.9 feet per second) has a maximum at 270 degrees (westerly winds). This indicates that strong winds (category “gale” or “storm”) in the study area are predominately from the west.

However, these are relatively rare events—statistical analysis shows that only for 1 percent of the time in a 5-year period (102 hours total) are winds greater than 14 meters per second (45.9 feet per second) (i.e., category “gale” or “storm”). To determine atmospheric conditions associated with these strong westerly winds in the area, histograms of other related parameters were created. Figures E-7a and E-7b show histograms of hour, day, month of year, and stability class for all hours in 1987-1991 when (a) winds are greater than 8 meters per second (26.2 feet per second) but less than 14 meters per second (45.9 feet per second), and (b) winds are stronger than 14 meters per second (45.9 feet per second). As can be seen from these figures, the very strong westerly winds occur mostly in the afternoon in spring under neutral stability conditions. Strong, but not extreme wind speeds between 8 meters per second (26.2 feet per second) and 14 meters per second (45.9 feet per second) (i.e., below

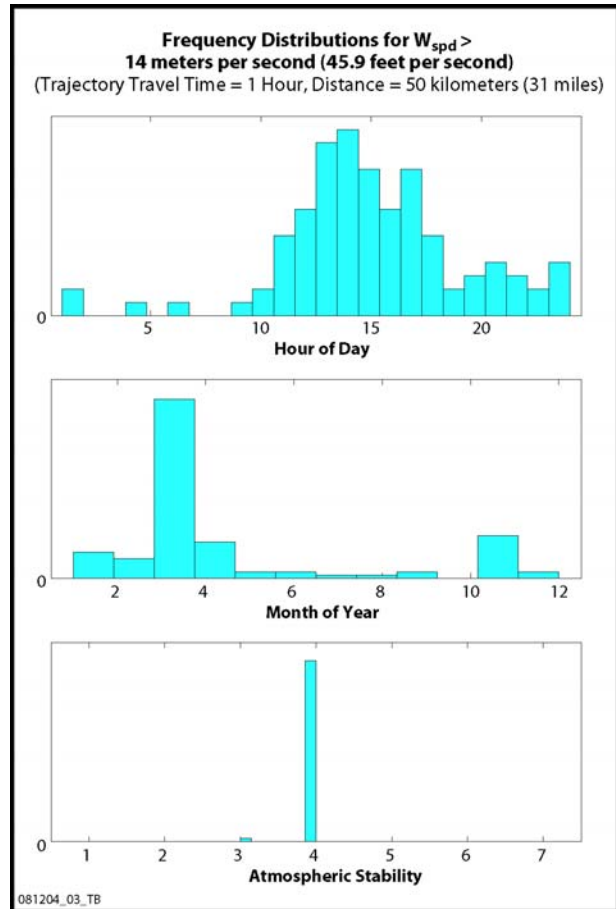


**Figure E-6 Frequency Distribution of Wind Direction for All Hours (1987-1991)**

category “gale”) are mostly from the south. Total number of hours when winds are strong, but still below the “gale” category, is approximately 12 percent of all hours in 1987-1991.



**Figure E-7a Histogram of Occurrences of Strong Winds**



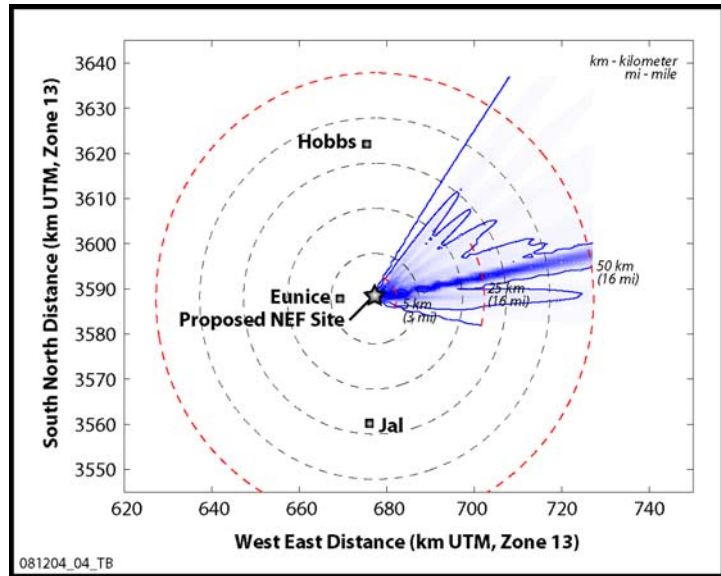
**Figure E-7b Histogram of Occurrences of Extreme Winds**

To estimate spatial gradient in potential pollutant concentration from the proposed NEF, a sensitivity test was conducted. This sensitivity test helps to visualize possible transport of material from the proposed NEF during the strong wind episodes. A surface release was simulated using the Industrial Source Complex Short-Term dispersion model (EPA, 1995) using data from March 1, 1991. This was a typical “high wind case” when winds were above 14 meters per second (45.9 feet per second) from 11 a.m. until 6 p.m., mostly from the west-southwest, and stability was neutral. The results from this simulation are shown in Figure E-8. Average 24-hour concentrations are shown as a shaded image overlaid on a schematic map of the study area. This figure shows that a narrow plume would extend to the east from the proposed NEF source.

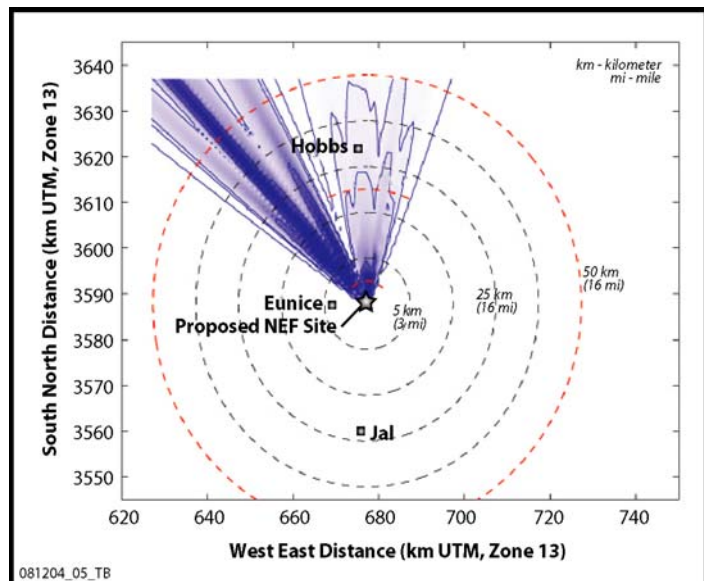
Another sensitivity test was conducted to investigate possible effects of strong southerly but not extreme winds (again between 8 meters per second [26.2 feet per second] and 14 meters per second [45.9 feet per second]) on pollutant concentrations, when pollutants may possibly reach Hobbs, New Mexico. March 10, 1991, was selected for this simulation and 24-hour average concentrations were estimated. The wind speed was approximately 10 meters per second (32.8 feet per second) from 9 a.m. until 10 p.m., mostly

from the south, and stability was neutral. Figure E-9 shows the results from this simulation. Average 24-hour concentrations are shown as a shaded image overlaid on a schematic map of the study area. The figure shows a narrow plume extending to the north from the source.

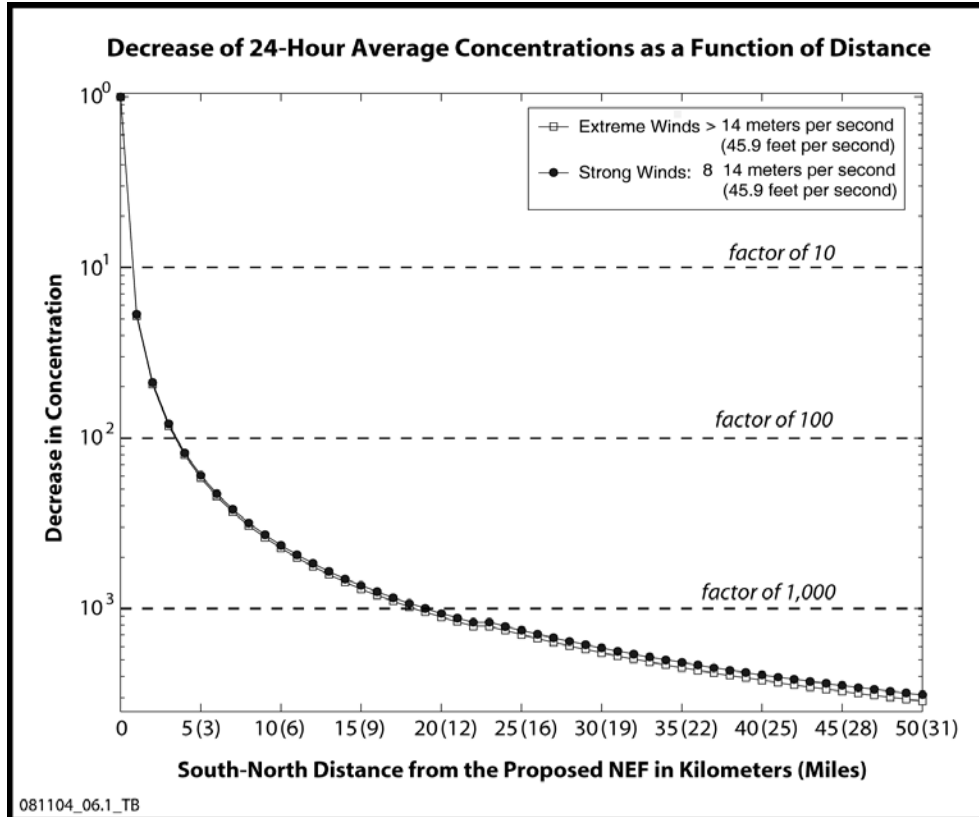
These sensitivity tests indicate that pollutants may possibly reach Hobbs, New Mexico, during strong wind episodes. However, atmospheric conditions when winds can be characterized as “gale” or “storm” are rare, and levels of concentrations are expected to be significantly lower at distances greater than 25 kilometers (15.5 miles). Spatial gradients in modeled pollutant concentrations were also estimated. A sensitivity test was conducted for the same day (March 10, 1991), with winds from the south, so the plume extends to the north from the proposed NEF source. The results from this simulation are shown in Figure E-10. The figure shows the decrease in concentrations at the plume centerline due to dispersion processes as a function of distance from the source. As can be seen from the figure, the concentration decreases by a factor of 1,000 when the possible plume from the proposed NEF reaches Hobbs, New Mexico.



**Figure E-8 Average 24-Hour Concentrations of Pollutants in Extreme Winds from the West-Southwest**



**Figure E-9 Average 24-Hour Concentrations of Pollutants in Strong Southerly Winds**



**Figure E-10 Pollutant Concentrations at the Plume Centerline as a Function of Distance from the Proposed NEF**

### E.3 References

(EPA, 1995) U.S. Environmental Protection Agency. *User's Guide for the Industrial Source Complex (ISC3) Dispersion Models*. Volume I. EPA-454/B-95-003a. Research Triangle Park, North Carolina. September 1995.

(NCDC, 1998) National Climate Data Center. "International Surface Weather Observations 1982-1997." CDROM. September 1998.

<<http://ols.nndc.noaa.gov/plolstore/plsql/olstore.prodspecif?prodnum=C0042-CDR-A0001>> (Accessed 9/3/04).



**APPENDIX F  
SOCIOECONOMICS**

**F.1 Impacts**

This appendix presents the potential socioeconomic impacts of the Louisiana Energy Services (LES) proposed National Enrichment Facility (NEF) using cost data for local construction and operations (LES, 2005). These data and Regional Input-Output Modeling System (RIMS II) final demand multipliers, specifically developed for the 120-kilometer (75-mile) region of influence, were used to estimate impacts on output, earnings, and jobs (BEA, 1997). These final demand multipliers and results (in 2004 dollars) are shown in Table F-1 for construction and Table F-2 for operations. For the output and earnings multipliers, each multiplier indicates the change in output or earnings for each \$1 change in final demand. The jobs multiplier indicates the additional jobs created for each \$1 million dollars in local spending.

**Table F-1 Total Estimated Average Annual Impact of the Proposed NEF Construction**

Good/Service	Local Purchases	Final Demand Multipliers			Total Impact		
		Output	Earnings	Jobs	Output (\$1,000)	Earnings (\$1,000)	Jobs
Concrete	\$647	1.7112	0.5087	16.4	\$1,070	\$329	10
Reinforcing Steel	\$65	1	0	0	\$65	\$0	0
Structural Steel	\$259	1	0	0	\$259	\$0	0
Lumber	\$32	1	0	0	\$32	\$0	0
Site Preparation	\$2,588	1.6002	0.4459	13.7	\$4,141	\$1,154	34
Transportation	\$259	1.7782	0.5066	17.7	\$460	\$131	4
<i>Subcontracts</i>							
Precast Concrete	\$2,588	1.6002	0.4459	13.7	\$4,141	\$1,154	34
Architectural - Building	\$5,175	1.6002	0.4459	13.7	\$8,282	\$2,308	69
Equipment	\$3,235	1.6002	0.4459	13.7	\$5,176	\$1,442	43
Mechanical/Piping/ Heating Ventilation and Air Conditioning	\$9,704	1.6002	0.4459	13.7	\$15,528	\$4,327	129
Electrical Controls	\$9,704	1.6002	0.4459	13.7	\$15,528	\$4,327	129
Payroll	\$16,066	0.8182	0.2216	8.4	\$13,145	\$3,560	130
<b>Total</b>	<b>\$50,320</b>				<b>\$67,863</b>	<b>\$18,732</b>	<b>582</b>

Sources: LES, 2005; BEA, 2004.

**Table F-2 Total Estimated Average Annual Impact of the Proposed NEF Operations**

Good/Service	Local Purchases (\$1,000)	Final Demand Multipliers			Total Impact		
		Output	Earnings	Jobs	Output (\$1,000)	Earnings (\$1,000)	Jobs
Landscaping	\$78	1.6154	0.7509	38.2	\$125	\$58	3
Protective Clothing	\$31	1.4698	0.3211	13.4	\$46	\$10	0
Lab Chemicals	\$52	1.7137	0.3411	6.5	\$89	\$18	0
Plant Spare Equipment	\$176	1.4774	0.3783	10.7	\$260	\$67	2
Office Equipment	\$166	1	0	0	\$166	\$0	0
Engineered Parts	\$155	1.6005	0.5761	16.6	\$248	\$89	2
Electrical Parts	\$228	1.5052	0.4576	14.9	\$343	\$104	3
Natural Gas	\$58	2.8977	0.3734	7.3	\$168	\$22	0
Waste Water	\$96	1.7537	0.4507	12.0	\$169	\$43	1
Solid Waste Disposal	\$3	1.7537	0.4507	12.0	\$5	\$1	0
Insurance	\$0	1.5546	0.5486	17.7	\$0	\$0	0
Catering	\$52	1.5453	0.4801	30.2	\$80	\$25	2
Building Maintenance	\$383	1.5772	0.4727	14.8	\$604	\$181	5
Custodial Services	\$259	1.7909	0.7261	41.7	\$463	\$188	10
Professional Services	\$186	1.6377	0.6922	18.8	\$305	\$129	3
Security Services	\$518	1.4976	0.6315	28.9	\$775	\$327	14
Mail & Document Services	\$104	1.6370	0.7074	19.5	\$169	\$73	2
Office Supplies	\$145	1	0	0	\$145	\$0	0
Electric Services	\$7,246	1.5129	0.2892	5.5	\$10,962	\$2,095	38
Payroll	\$10,890	0.8182	0.2216	8.4	\$8,910	\$2,413	88
<b>Total</b>	<b>\$20,824</b>				<b>\$24,033</b>	<b>\$5,844</b>	<b>173</b>

Sources: LES, 2005; BEA, 2004.

## F.2 References

(BEA, 1997) Bureau of Economic Analysis. *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II)*. U.S. Department of Commerce. Washington, D.C. March 1997.

(BEA, 2004) Bureau of Economic Analysis. *RIMS II Multipliers for the Hobbs, New Mexico, and Odessa-Midland, Texas, Region*. U.S. Department of Commerce. Washington, D.C. March 2004.

(LES, 2005) Louisiana Energy Services. "National Enrichment Facility Environmental Report." Revision 4. NRC Docket No. 70-3103. April 2005.

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## **APPENDIX G ENVIRONMENTAL JUSTICE**

### **G.1 Introduction**

This appendix provides additional material for the assessment of the potential for disproportionately high and adverse human health or environmental effects on minority and low-income populations resulting from the proposed construction, operation, and decommissioning of the Louisiana Energy Services (LES) proposed National Enrichment Facility (NEF).

Table G-1 presents the detailed census data for the environmental justice review and provides the minority and low-income population data for each census block group within 80 kilometers (50 miles) of the proposed NEF site (USCB, 2002a; USCB, 2002b). Minority and low-income block groups that are shown in bold meet the U.S. Nuclear Regulatory Commission criteria in NUREG-1748 (NRC, 2003); therefore, environmental justice should be considered in greater detail. These criteria are defined as (1) the minority and/or low-income populations exceed 50 percent in a block group or (2) the minority and/or low-income population in the block group is significantly greater than the State or relevant county percentage. This information was used in the environmental justice analysis described in Chapter 3 of this Environmental Impact Statement (EIS).

**Table G-1 Census Block Groups Within 80 Kilometers (50 Miles) of the Proposed NEF Site<sup>a</sup>**

County/ Tract	Block Group	Persons	Below Poverty Level (%)	White (%)	African American/ Black (%)	American Indian and Alaskan Native (%)	Asian or Other Pacific Islander (%)	Other Race (%)	Two or More Races (%)	Hispanic or Latino (All Races) (%)	Minorities (Racial Minorities Plus White Hispanics) (%)
<i>State of New Mexico</i>		1,819,046	18.4	66.8	2.1	10.2	1.4	19.0	0.6	42.1	55.3
<i>Threshold for Environmental Justice Concerns</i>			38.4	—	22.1	30.2	21.4	39.0	20.6	50.0/42.1	50.0
<i>Eddy County</i>											
000700	1	759	15.1	75.8	0.8	1.3	0.1	21.5	0.5	39.3	41.7
000800	1	654	20.5	65.2	0.3	1.8	0.2	32.3	0.2	<b>66.8</b>	<b>68.6</b>
000900	1	136	13.9	77.4	0.8	2.7	0.1	18.5	0.6	34.1	37.0
<i>Lea County</i>											
000100	1	935	21.9	52.5	5.2	1.4	1.2	<b>39.5</b>	0.2	<b>65.0</b>	<b>72.6</b>
000100	2	829	28.1	57.2	5.3	2.4	0.5	34.0	0.6	<b>52.4</b>	<b>60.9</b>
000100	3	682	<b>54.8</b>	42.1	3.1	1.0	0.2	<b>53.1</b>	0.6	<b>73.9</b>	<b>77.4</b>
000200	1	677	30.7	64.0	0.7	2.1	0.2	32.3	0.7	<b>58.5</b>	<b>60.7</b>
000200	2	592	32.9	47.8	6.4	1.9	0.0	<b>43.1</b>	0.8	<b>62.8</b>	<b>69.6</b>
000200	3	585	24.9	67.4	0.5	1.2	0.7	30.3	0.0	47.7	<b>50.4</b>
000200	4	563	32.9	61.6	2.5	2.0	0.7	32.5	0.7	<b>55.2</b>	<b>59.7</b>
000200	5	565	<b>52.1</b>	42.7	4.3	1.6	0.0	<b>51.3</b>	0.2	<b>71.2</b>	<b>75.9</b>
000300	1	686	30.3	24.8	<b>39.8</b>	1.9	0.0	32.8	0.7	<b>52.9</b>	<b>92.3</b>
000300	2	810	<b>46.7</b>	42.2	7.8	2.1	0.0	<b>47.0</b>	0.9	<b>69.0</b>	<b>78.8</b>
000300	3	820	<b>41.6</b>	43.7	11.0	1.2	0.4	<b>43.3</b>	0.5	<b>70.1</b>	<b>81.8</b>
000300	4	985	<b>56.9</b>	52.8	4.9	0.2	0.4	<b>41.4</b>	0.3	<b>63.4</b>	<b>68.9</b>
000400	1	775	<b>57.0</b>	27.5	21.3	1.3	0.3	<b>48.6</b>	1.0	<b>68.0</b>	<b>91.0</b>

County/ Tract	Block Group	Persons	Below Poverty Level (%)	White (%)	African American/ Black (%)	American Indian and Alaskan Native (%)	Asian or Other Pacific Islander (%)	Other Race (%)	Two or More Races (%)	Hispanic or Latino (All Races) (%)	Minorities (Racial Minorities Plus White Hispanics) (%)
000400	2	1,053	25.9	56.1	10.0	1.8	0.8	30.7	0.7	<b>50.5</b>	<b>62.9</b>
000400	3	661	<b>42.8</b>	31.0	21.0	1.1	0.8	<b>44.8</b>	1.4	<b>68.8</b>	<b>90.8</b>
000501	1	781	2.9	86.6	2.1	0.5	1.3	9.1	0.5	12.7	16.9
000501	2	848	7.2	84.3	1.7	3.1	0.1	10.7	0.1	22.8	27.5
000501	3	533	<b>39.6</b>	75.1	5.6	2.6	0.8	15.8	0.2	26.1	34.0
000501	4	1,063	16.7	80.1	3.5	1.8	0.9	13.0	0.9	20.9	26.6
000501	5	775	9.8	89.9	1.6	0.9	0.9	6.6	0.1	9.7	13.8
000501	6	718	7.2	83.6	3.5	1.5	0.1	11.0	0.3	18.2	24.0
000501	7	1,381	5.2	87.8	2.6	0.8	1.1	7.2	0.4	12.2	16.6
000502	1	920	25.4	69.0	4.6	1.2	0.0	24.6	0.7	35.9	42.4
000502	2	968	28.2	65.4	4.8	0.8	0.7	28.0	0.3	41.4	47.1
000502	3	1,002	16.9	71.6	6.4	1.4	0.0	20.4	0.3	31.1	38.5
000502	4	810	3.7	86.2	2.6	1.7	2.4	6.4	0.7	11.4	17.9
000502	5	1,052	15.3	77.3	2.5	1.1	0.9	18.1	0.3	25.2	29.6
000502	6	786	31.4	59.3	14.6	0.8	0.1	24.0	1.2	34.5	<b>50.5</b>
000600	1	805	4.8	89.7	2.4	1.2	1.4	5.3	0.0	10.8	15.9
000600	2	734	4.3	90.7	1.1	0.8	0.4	6.7	0.3	10.6	12.9
000600	3	901	4.7	76.1	2.1	1.6	0.0	20.0	0.2	30.7	34.2
000600	4	756	22.2	74.2	3.0	0.8	0.7	21.2	0.1	31.0	35.7
000600	5	811	23.0	38.7	14.2	1.0	0.0	<b>45.4</b>	0.7	<b>66.1</b>	<b>81.3</b>
000600	6	957	17.5	48.5	13.4	2.1	0.1	35.3	0.6	<b>63.3</b>	<b>76.9</b>
000600	7	906	11.4	59.3	7.5	2.8	1.4	28.5	0.6	41.8	<b>52.8</b>
000700	1	1,052	7.7	83.2	0.8	1.1	0.7	14.2	0.1	21.5	24.1

County/ Tract	Block Group	Persons	Below Poverty Level (%)	White (%)	African American/ Black (%)	American Indian and Alaskan Native (%)	Asian or Other Pacific Islander (%)	Other Race (%)	Two or More Races (%)	Hispanic or Latino (All Races) (%)	Minorities (Racial Minorities Plus White Hispanics) (%)
000700	2	1,899	1.7	68.6	9.1	3.7	0.7	17.8	0.1	40.7	<b>54.2</b>
000700	3	882	13.2	83.8	0.6	1.1	0.6	13.8	0.1	22.3	24.5
000700	4	812	13.8	83.1	0.9	1.6	0.1	14.2	0.1	18.2	20.7
000700	5	1,331	19.0	84.8	1.0	2.0	0.3	11.9	0.0	23.4	26.7
000700	6	1,930	13.7	85.6	1.0	1.3	1.2	10.5	0.4	16.4	19.9
000800	1	850	10.2	75.7	0.5	0.7	0.0	23.2	0.0	32.1	33.6
000800	2	618	3.6	82.0	0.5	1.5	0.2	15.5	0.3	24.8	26.9
000800	3	773	24.1	67.9	2.6	1.7	0.5	27.2	0.1	48.6	<b>52.8</b>
000800	4	655	25.6	66.3	0.9	0.8	0.5	31.6	0.0	41.2	44.3
000900	1	562	17.8	79.5	0.2	1.1	0.2	18.9	0.2	28.6	30.1
000900	2	726	24.1	57.3	1.4	2.6	0.0	38.3	0.4	<b>51.1</b>	<b>53.9</b>
000900	3	830	12.5	68.0	0.1	2.3	0.0	28.9	0.7	39.2	41.2
001002	1	819	24.4	53.7	2.0	2.0	0.5	<b>41.8</b>	0.1	<b>55.3</b>	<b>58.6</b>
001002	2	1,357	19.3	64.2	2.5	1.4	0.2	31.6	0.2	45.8	49.8
001002	3	975	22.6	60.3	2.1	0.8	1.4	35.4	0.0	<b>51.7</b>	<b>54.6</b>
001002	4	713	25.3	51.5	3.1	1.7	0.3	<b>43.3</b>	0.1	<b>65.1</b>	<b>69.0</b>
001002	5	945	28.4	53.3	10.5	1.3	0.1	34.8	0.0	<b>56.9</b>	<b>68.9</b>
001002	6	592	20.2	51.9	3.2	0.5	0.2	<b>43.9</b>	0.3	<b>62.0</b>	<b>66.6</b>
001002	7	853	31.3	68.8	0.1	2.0	0.6	28.3	0.2	47.4	49.4
001003	1	870	25.7	53.2	4.3	0.2	1.3	<b>41.0</b>	0.0	<b>59.0</b>	<b>64.0</b>
001003	2	1,080	20.4	53.2	1.9	1.4	0.1	<b>42.9</b>	0.6	<b>64.5</b>	<b>67.8</b>
001003	3	873	17.7	79.0	0.0	1.0	0.7	19.1	0.1	29.2	30.2
001003	4	813	8.4	77.5	3.9	1.1	0.4	16.6	0.5	27.1	32.7



County/ Tract	Block Group	Persons	Below Poverty Level (%)	White (%)	African American/ Black (%)	American Indian and Alaskan Native (%)	Asian or Other Pacific Islander (%)	Other Race (%)	Two or More Races (%)	Hispanic or Latino (All Races) (%)	Minorities (Racial Minorities Plus White Hispanics) (%)
001100	1	6	26.8	71.1	0.3	1.4	0.2	27.1	0.0	30.6	32.3
001100	3	980	21.6	71.4	1.1	0.2	1.1	26.1	0.0	35.0	37.2
001100	4	822	14.1	75.5	1.1	1.8	0.1	20.7	0.8	30.9	32.7
001100	5	612	11.3	82.0	1.4	2.0	0.3	14.0	0.5	21.9	25.0
Total New Mexico Block Groups			66								
<i>State of Texas</i>		20,851,820	15.4	71.0	11.7	0.9	3.0	13.0	0.4	32.0	47.6
<i>Threshold for Environmental Justice Concerns</i>			35.4	—	31.7	20.9	23.0	33.0	20.4	50.0/32.0	50.0
<i>Andrews County</i>											
950100	3	896	9.6	85.4	1.1	1.3	1.3	10.9	0.0	24.7	28.2
950100	4	591	9.9	84.3	0.5	1.9	2.9	10.5	0.0	19.8	25.9
950200	1	1,289	17.2	73.9	6.0	1.9	0.3	17.6	0.3	37.5	46.2
950200	2	923	19.8	68.8	2.7	0.9	1.1	26.4	0.1	49.8	<b>54.9</b>
950200	3	1,176	22.7	76.0	2.1	1.3	0.8	19.3	0.5	37.6	41.4
950200	6	692	7.2	75.4	2.2	1.0	0.3	21.1	0.0	41.2	43.5
950200	7	775	14.7	88.4	1.2	1.0	0.0	8.8	0.7	21.8	23.7
950200	8	752	0.0	94.7	0.4	0.7	2.0	2.1	0.1	5.1	8.8
950300	1	642	19.2	60.1	1.1	0.3	1.4	<b>37.1</b>	0.0	<b>70.6</b>	<b>72.7</b>
950300	2	593	22.4	72.2	3.7	1.0	0.0	22.9	0.2	<b>55.3</b>	<b>59.5</b>
950300	3	514	27.6	69.8	0.4	3.1	1.2	25.5	0.0	48.6	<b>53.1</b>
950300	4	914	15.7	69.4	2.0	2.2	0.3	25.7	0.4	<b>54.2</b>	<b>57.3</b>
950300	5	856	25.7	74.2	0.2	1.2	1.2	23.0	0.2	<b>61.1</b>	<b>63.7</b>
950400	6	420	9.8	86.9	0.5	0.2	1.7	10.7	0.0	35.0	37.9
950400	7	1,523	18.6	78.6	0.5	1.2	0.1	17.1	0.1	40.4	41.6

County/ Tract	Block Group	Persons	Below Poverty Level (%)	White (%)	African American/ Black (%)	American Indian and Alaskan Native (%)	Asian or Other Pacific Islander (%)	Other Race (%)	Two or More Races (%)	Hispanic or Latino (All Races) (%)	Minorities (Racial Minorities Plus White Hispanics) (%)
<b><i>Ector County</i></b>											
002200	1	622	10.0	82.3	0.2	1.2	0.0	16.1	0.3	37.8	39.3
002700	2	0	15.7	76.5	0.8	0.8	0.3	21.5	0.2	40.1	41.7
002700	4	690	17.1	64.4	1.8	1.3	0.2	31.7	0.6	<b>59.1</b>	<b>61.9</b>
003000	1	586	3.8	92.7	0.7	0.9	0.4	5.4	0.0	9.7	11.4
003000	2	38	2.8	88.8	0.3	1.7	0.3	8.9	0.0	14.8	16.7
<b><i>Gaines County</i></b>											
950100	1	246	25.2	80.6	0.5	1.4	0.0	16.8	0.7	35.2	36.5
950100	2	770	20.1	76.9	1.2	1.8	0.0	20.1	0.0	42.5	45.1
950100	3	778	21.3	68.1	7.5	0.1	0.1	23.5	0.6	<b>56.9</b>	<b>65.6</b>
950100	4	836	33.9	54.8	8.4	2.3	0.0	<b>34.3</b>	0.2	<b>69.6</b>	<b>79.4</b>
950100	5	584	20.6	78.3	2.4	0.0	0.0	18.7	0.7	37.5	41.4
950200	1	1,455	20.6	84.7	0.9	1.2	0.3	12.8	0.1	32.1	33.9
950200	2	2,470	17.7	83.4	1.2	1.1	0.0	14.0	0.3	23.4	24.9
950200	3	1,759	29.7	90.0	1.6	0.7	0.3	7.4	0.1	14.6	17.2
950300	1	818	24.5	70.8	5.5	1.7	0.7	21.1	0.1	<b>57.2</b>	<b>62.6</b>
950300	2	797	14.6	77.2	0.8	0.5	0.5	21.1	0.0	45.7	47.7
950300	3	1,243	16.2	91.1	1.5	0.5	0.6	6.4	0.1	18.7	21.8
950300	4	921	19.5	81.8	0.9	0.1	0.5	16.5	0.2	40.8	42.7
950300	5	1,281	21.1	78.0	3.1	2.7	1.1	15.1	0.0	49.3	<b>53.9</b>
<b><i>Loving County</i></b>											
950100	1	28	0.0	89.6	0.0	0.0	0.0	10.4	0.0	10.4	10.4
<b><i>Terry County</i></b>											
950100	3	41	15.8	82.1	0.0	2.2	0.0	15.8	0.0	36.0	36.2

County/ Tract	Block Group	Persons	Below Poverty Level (%)	White (%)	African American/ Black (%)	American Indian and Alaskan Native (%)	Asian or Other Pacific Islander (%)	Other Race (%)	Two or More Races (%)	Hispanic or Latino (All Races) (%)	Minorities (Racial Minorities Plus White Hispanics) (%)
<i>Winkler County</i>											
950200	1	720	17.0	80.4	1.3	0.3	0.0	17.2	0.8	36.5	38.1
950200	2	644	<b>37.4</b>	74.2	0.2	0.8	0.0	24.7	0.2	<i>41.1</i>	42.4
950200	3	846	11.8	69.4	5.1	1.1	0.0	24.3	0.1	<i>45.6</i>	<b>51.3</b>
950300	1	372	31.1	61.6	1.9	0.0	0.0	<b>34.9</b>	1.6	<b>75.8</b>	<b>79.0</b>
950300	2	673	14.0	76.2	2.8	0.5	0.9	19.2	0.5	<i>44.6</i>	48.7
950300	3	674	13.5	80.1	1.5	0.3	0.0	26.3	0.2	<i>41.8</i>	43.3
950300	4	994	15.5	71.9	3.0	1.3	0.1	23.6	0.0	<i>44.8</i>	49.2
950300	5	785	27.7	66.0	0.8	0.6	1.0	31.6	0.0	<b>62.7</b>	<b>64.3</b>
950400	1	589	9.5	78.5	1.1	0.6	0.0	19.1	0.7	36.6	38.0
950400	2	749	16.9	86.1	0.8	0.4	0.0	12.7	0.0	23.9	25.0
<i>Yoakum County</i>											
950100	1	128	14.4	84.2	1.7	0.0	0.0	14.1	0.0	<i>34.4</i>	36.1
950200	1	1,019	22.3	69.8	2.9	0.5	0.1	26.3	0.4	<i>41.7</i>	44.9
950200	2	1,138	20.6	67.0	1.1	1.3	0.4	30.0	0.2	<b>52.9</b>	<b>55.2</b>
950200	3	767	22.2	76.3	0.9	0.5	0.0	22.2	0.1	<i>40.7</i>	42.2
950200	4	1,220	19.1	59.3	1.1	1.3	0.2	<b>38.1</b>	0.1	<b>54.8</b>	<b>56.2</b>
950200	5	967	16.1	77.4	2.7	1.1	0.0	18.9	0.0	<i>34.2</i>	38.1
Total Texas Block Groups			51								
Grand Total			117								

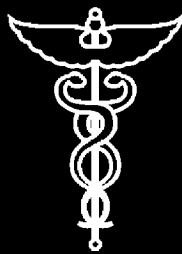
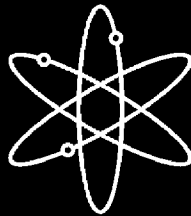
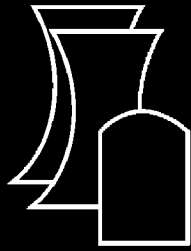
<sup>a</sup> Minority block groups meeting standard Office of Nuclear Material Safety and Safeguards criteria are shown in bold. Additional block groups meeting special Hispanic/Latino criteria are shown in italics. Threshold criteria are shown in the table. Special Hispanic/Latino criteria are 42.1 percent for New Mexico, 32.0 percent for Texas. Source: USCB, 2002a; USCB, 2002b.

## G.2 References

(NRC, 2003) U.S. Nuclear Regulatory Commission. "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." NUREG-1748. Office of Nuclear Material Safety and Safeguards. Washington, D.C. August 2003.

(USCB, 2002a) U.S. Census Bureau. "DP-3. Race." May 7, 2002.  
<<http://censtats.census.gov/data/NM/05035025.pdf>> (Accessed 2/26/04).

(USCB, 2002b) U.S. Census Bureau. "Table DP-4. Profile of Selected Housing Characteristics: 2000." May 3, 2002. <<http://censtats.census.gov/data/TX/05048003.pdf>> (Accessed 2/26/04).



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

**Appendices H through J**

**Final Report**

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



## **APPENDIX H PUBLIC COMMENTS**

### **H.1 Overview**

The U.S. Nuclear Regulatory Commission (NRC) staff published a notice in the *Federal Register* requesting public review and comment of the Draft Environmental Impact Statement (Draft EIS) on September 17, 2004 (69 FR 56104-56105) in accordance with Title 10, Parts 51.73, 51.74, and 51.117 of the *U.S. Code of Federal Regulations* (10 CFR § 51.73, 51.74, and 51.117). The NRC staff initially established November 6, 2004, as the deadline for submitting public comments on the Draft EIS. The NRC staff subsequently extended this deadline twice, first to December 18, 2004 (69 FR 64983), and then to a final deadline of January 7, 2005 (69 FR 76485). More than 390 comment documents (i.e., letters, facsimiles, and e-mails) were submitted to the NRC. In addition, oral comments were received from approximately 60 individuals at a public meeting conducted by the NRC staff in October 2004.

The NRC staff considered and evaluated comment documents received after the January 7, 2005, deadline for public comment and concluded that none raised issues not already captured in timely comments and already considered in the EIS analysis.

### **H.2 Public Participation**

Public participation is an essential part of the environmental review process. This section discusses the process for public participation during the NRC staff's development of the EIS for the proposed NEF.

The NRC conducted an open, public EIS development process consistent with the requirements of the *National Environmental Policy Act of 1969* (NEPA) and the NRC's regulations (detailed discussions follow). The NRC held a public scoping meeting early in the environmental review process (March 4, 2004) and a public meeting on the Draft EIS during the public comment period (October 14, 2004). With extensions in the comment period, the NRC provided a 113-day public comment period for agencies and the public to review the Draft EIS and provide comments. This EIS considers and addresses the nearly 4,200 individual comments the NRC staff identified from letters, facsimile transmittals, and e-mails received from more than 390 individuals and from oral comments given by approximately 60 individuals.

#### **H.2.1 Initial Notification and Notice of Formal Proceeding**

Upon receipt of the Louisiana Energy Services' (LES's) application for the proposed National Enrichment Facility (NEF) and completion of an initial acceptance review, the NRC published a notice in the *Federal Register* (69 FR 5873) of receipt of the application and notice of hearing on February 6, 2004.

#### **H.2.2 Public Scoping**

The NRC's public scoping process for the EIS began on February 4, 2004, with the publication in the *Federal Register* (69 FR 5374-5375) of a Notice of Intent (NOI) to prepare an EIS. As part of this process, the NRC conducted a public scoping meeting in Eunice, New Mexico, on March 4, 2004. At this meeting, the NRC staff provided a description of NRC's role, responsibilities, and mission; gave a brief overview of its environmental and safety review processes; discussed how the public could effectively participate in the environmental review process; and solicited input from the general public on environmental concerns related to the proposed NEF. The NRC staff published notice of the scoping meeting in the same *Federal Register* notice as the NOI to prepare the EIS. The NRC staff advertised the meeting in the *Lovington Leader* (Lovington, New Mexico); *Albuquerque Journal* and *Albuquerque*

*Tribune* (Albuquerque, New Mexico); *Hobbs News-Sun* (Hobbs, New Mexico); *Carlsbad Current-Argus*, (Carlsbad, New Mexico); *Chamber Pot* (Eunice, New Mexico); *Eunice News* (Eunice, New Mexico); and *Jal Record* (Jal, New Mexico).

### **H.2.3 Issuance and Availability of the Draft EIS**

On September 17, 2004, in accordance with NRC regulations, the NRC staff published a Notice of Availability for the Draft EIS in the *Federal Register* (69 FR 56104-56105). In the notice, the NRC staff provided information on how to obtain a free copy of the Draft EIS. Additionally, copies of the Draft EIS were mailed to approximately 300 individuals including Federal, Tribal, State, and local government officials as well as members of the general public. An electronic version of the document and supporting information was made accessible through the NRC's project-specific web site (<http://www.nrc.gov/materials/fuel-cycle-fac/lesfacility.html>) and through the NRC's Agencywide Documents Access and Management System (ADAMS) database on the NRC's web site.

### **H.2.4 Public Comment Period**

In the publication of the Notice of Availability of the Draft EIS on September 17, 2004 (69 FR 56104-56105), the NRC staff stated that public comments on the Draft EIS should be submitted by November 6, 2004. On November 9, 2004, the NRC staff extended the public comment period to December 18, 2004, (69 FR 64983) in response to the closing of public access to the ADAMS database. A redacted version of the Draft EIS was made available to the public on the NRC's web site on December 20, 2004. The NRC staff extended the public comment period a second time to January 7, 2005, due to the continued suspension of public access to ADAMS (69 FR 76485; December 21, 2004). The 113-day period for public comment (i.e., from September 17, 2004, to January 7, 2005) exceeds the 45-day comment period required under the NRC regulations. By letter, facsimile, and e-mail, more than 390 individuals submitted more than 4,200 comments on the Draft EIS.

### **H.2.5 Public Comment Meeting**

On October 14, 2004, in Eunice, New Mexico, the NRC staff conducted a public meeting to receive oral comments on the Draft EIS from members of the public. The NRC staff selected the city of Eunice as the location for the meeting because it is approximately 8 kilometers (5 miles) from the proposed NEF site. The NRC staff advertised this meeting in the local and regional newspapers noted in section H.2.2 and issued a nationwide press release. The meeting received coverage in the Eunice-Hobbs, New Mexico, area media.

Approximately 60 people provided oral comments during the meeting. A certified court reporter recorded the oral comments and prepared a written transcript. The transcript is provided in Appendix J of this EIS. The transcript is part of the public record for the proposed project and was used in the development of the comment summaries contained in Appendix I.

## **H.3 Comments Received on the Draft EIS**

As discussed above, the NRC staff received both oral and written comments on the Draft EIS during the comment period. The NRC staff identified nearly 4,200 comments in the more than 390 letters, facsimiles, and e-mails received and from the oral comments.

### **H.3.1 Comment Review**

The NRC staff reviewed each comment letter and the transcript of the public meeting. Comments relating to similar issues and topics were grouped, as permitted by NRC regulations in 10 CFR § 51.91 and the Council on Environmental Quality's *National Environmental Policy Act* (NEPA) regulations at 40 CFR § 1503.4(b).

Appendix I presents the comments, or summaries of comments, along with the NRC staff's corresponding responses. When comments have resulted in a modification to the Draft EIS, those changes are noted in the staff's response. In cases for which the comments do not warrant a detailed response, the NRC staff provides an explanation as to why no further response is necessary. In all cases, the NRC staff sought to respond to all comments received during the public comment period.

Due to the volume of comments received, Appendix I provides summaries of all substantive comments received on the Draft EIS. The NRC staff prepared responses for each of the comments or for summaries of comments.

## **H.4 Major Issues and Topics of Concern**

The majority of the comments received specifically addressed the scope of the environmental reviews, analysis, and issues contained in the Draft EIS, including existing conditions, potential impacts, proposed mitigation, and the NRC's environmental review process. However, other comments addressed topics and issues that were not part of the review process for the proposed action. Those comments included questions about the NRC's safety evaluation of the proposed uranium enrichment facility, security concerns, general statements of support or opposition to nuclear power, observations regarding past NRC or LES activities, comments on the NRC regulatory process in general, and comments on policies of the NRC and other Government agencies.

### **H.4.1 Comments on Out-of-Scope Topics**

Some commenters raised issues that were not related to the NRC staff's environmental review of LES's application to construct, operate, and decommission the proposed NEF. These issues are identified below. Because these issues did not directly relate to the environmental effects of the proposed action and were outside the scope of the NEPA review of the proposed action, the NRC staff did not prepare detailed responses to these comments.

#### **H.4.1.1 Public Hearing**

By law, a license to construct and operate the proposed NEF cannot be issued until completion of a hearing before the NRC's Atomic Safety and Licensing Board. Notice of the hearing, including guidance on certain aspects, was provided by the Commission in a notice published in the Federal Register on February 6, 2004. Thereafter, a Licensing Board comprised of three administrative judges was established to conduct the hearing. Three parties have been permitted to intervene in the proceeding: Nuclear Information and Resource Services and Public Citizen, the New Mexico Attorney General, and the New Mexico Environment Department. These parties have advanced contentions which are under consideration by the Licensing Board. From February 7 to 10, 2005, the Licensing Board conducted an evidentiary hearing on contentions relating to the Draft EIS. Based on the evidence presented, the Licensing Board issued a Partial Initial Decision on June 8, 2005, resolving the contentions in favor of the Staff and/or LES and upholding the adequacy of the Draft EIS. Additional evidentiary hearings are expected to be conducted in order to consider other admitted contentions. In addition, the Licensing Board will conduct a mandatory hearing. Following completion of these hearings, the Licensing Board will issue a final decision as to whether the requested license should be issued. The evidence submitted



during the hearing and the decisions of the Licensing Board are publically available except to the extent that they contain proprietary information.

#### **H.4.1.2 Public Participation in the NRC Environmental Review Process**

The NRC's environmental review begins with the receipt and docketing of an application, which is described above. Pursuant to 10 CFR § 51.60, an applicant for an NRC license to construct and operate a uranium enrichment facility must submit an environmental report to the NRC with the application. In support of its licensing decision for a uranium enrichment facility, the NRC is required under 10 CFR § 51.20(b)(10) to prepare an EIS, and pursuant to 10 CFR § 51.26, to issue an NOI to prepare the EIS, which is published in the *Federal Register*. [For this licensing action, the NRC staff published the NOI in the *Federal Register* (69 FR 5374) on February 4, 2004.] In the NOI, the NRC staff describes, among other things, the scoping process proposed for the requested action. While a public meeting on the scoping process is not required under 10 CFR § 51.27, should the NRC staff decide that such a meeting is appropriate, the NOI identifies its time and place or when the time and place will be announced. Pursuant to 10 CFR § 51.28, the NRC staff invites designated persons to participate in the scoping process, including any person who has requested to participate.

Once the NRC staff has completed the scoping process, defined the proposed action, and determined the scope of the EIS, the staff prepares a Draft EIS. Pursuant to 10 CFR § 51.74, the NRC staff then makes the Draft EIS publicly available, publishes notice of the Draft EIS's availability in the *Federal Register*, and requests public comment on it. As specified in 10 CFR § 51.73, the minimum public comment period is 45 days. The NRC staff also distributes copies of the Draft EIS to the persons or organizations identified in 10 CFR § 51.74 including the EPA, certain State and local agencies, Indian Tribes, and, upon written request and to the extent copies are available, to any other person. After receipt and consideration of public comments on the Draft EIS, the NRC staff prepares a Final EIS pursuant to 10 CFR § 51.90 and 51.91.

#### **H.4.1.3 NRC Safety Review Process**

The NRC staff evaluates a license application to determine whether an applicant has demonstrated compliance with the regulatory requirements which pertain to the type of license being sought. In the case of the present license application from LES to construct, operate, and decommission a uranium enrichment facility, the NRC staff evaluated the application against the Commission's regulations found at 10 CFR Part 70. The NRC staff's evaluation of an applicant's demonstration of compliance with the regulations is documented in an Safety Evaluation Report (SER). The NRC staff evaluates an applicant's attempt to demonstrate compliance with the regulations by reviewing the license application against the regulations. Requests by the NRC staff for additional information from the applicant are made publicly available. However, there is no requirement for a formal public comment resolution process for SERs.

#### **H.4.1.4 Redaction of Material in the NEPA Process**

The NRC has a duty to balance the need for public disclosure of relevant information with the need to protect sensitive information that could, in the wrong hands, pose a danger to the public. To address security concerns about information that could be used to undermine the safety of operations at the proposed NEF, the NRC redacted certain information from the Draft EIS. The NRC made a redacted version of the Draft EIS available to the public in December 2004, replacing the original Draft EIS on its project-specific web site and in ADAMS. Thereafter, in the interest of providing full public disclosure, the unredacted version was placed on the web site and in ADAMS.

#### **H.4.1.5 Terrorism**

As stated in the Commission's Memorandum and Order CLI-02-24<sup>1</sup>, although the NRC has determined that issues of terrorism in the context of NEPA should not be addressed, the NRC is devoting substantial time and attention to terrorism-related matters. For example, as part of fulfilling its mission to protect public health and safety and common defense and security pursuant to the *Atomic Energy Act*, the NRC staff is conducting security assessments of commercial uses of radioactive material.

#### **H.4.1.6 Nonproliferation**

Nonproliferation issues, such as the downblending of Russian highly enriched uranium under the Megatons to Megawatts program, are issues of national U.S. policy. The proposed action in this EIS is limited to the construction, operation, and decommissioning of the proposed NEF. Thus, based on the no-action alternative provided in section 2.2.1 of this EIS, the impacts associated with the no-action alternative discussed in section 4.8 address the range of impacts associated with not constructing, operating, or decommissioning the proposed NEF.

### **H.5 Comment Summaries and Responses for Public Review**

Detailed responses to comments are given in Appendix I. The structure of Appendix I provides commenter identification, the comment summaries, and the NRC staff's responses. The comments were grouped into the following subject areas:

- I.1 General Opposition
- I.2 General Support
- I.3 NEPA Process
- I.4 Purpose and Need
- I.5 Scope of the Analysis
- I.6 Cooperating Agencies and Consultations
- I.7 Alternatives Considered but Eliminated
- I.8 Land Use
- I.9 Historic and Cultural Resources
- I.10 Climatology, Meteorology, and Air Quality
- I.11 Geology, Minerals, Soils, and Seismic Issues
- I.12 Water Resources
- I.13 Ecological Resources
- I.14 Socioeconomics
- I.15 Environmental Justice
- I.16 Noise
- I.17 Transportation
- I.18 Public and Occupational Health - Normal Operations
- I.19 Public and Occupational Health - Accidents
- I.20 Waste Management
- I.21 Decontamination and Decommissioning
- I.22 Cumulative Impacts
- I.23 Environmental Measurements and Monitoring Program

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<sup>1</sup> Commission Memorandum and Order CLI-02-24. "In the Matter of Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation)." December 18, 2002. ADAMS Accession Number ML023520349.

- I.24 Cost Benefit Analysis
- I.25 Terrorism, Security, and Nonproliferation
- I.26 Conflict of Interest
- I.27 Editorial Comments

## **H.6 Commenter and Comment Identification**

The NRC staff received several hundred comment documents from which the staff identified 396 individual commenters and over 4,200 comments. As discussed in the next section, the NRC staff assigned an identification number to each commenter which will aid the reader in locating comments submitted by individual commenters and the NRC staff's corresponding responses.

### **H.6.1 Commenter Identification**

Each commenter has been identified using either a commenter identification number, a Commenter Group letter, or both. This was carried out as follows:

- A three-digit commenter identification number was assigned to commenters who submitted unique comment documents.
- A group letter(s) was assigned to commenters who submitted comment documents that were duplicates of comment documents previously submitted. Each Commenter Group letter signifies a single comment document that was received by the NRC staff multiple times from different commenters. Commenter Group letters also were assigned to comment documents that contained multiple signatures.

Table H-1 provides an alphabetical listing of individuals who provided comments on the Draft EIS during the comment period. Please note that the NRC staff used "Illegible" for those whose signatures could not be deciphered. Also listed for each identified commenter is their affiliation (if provided), as well as their assigned three-digit commenter number and/or their assigned Commenter Group letter(s)<sup>2</sup>.

Table H-2 identifies the Commenter Groups and the commenters who belong to each group.

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<sup>2</sup>Twenty-seven sets of duplicate comment documents were identified.

**Table H-1 Commenter Identification**

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Abousleman, Ron	City of Eunice, New Mexico	084; Group J
Adelberg, Kurt	Member of the Public	Group L
Adkins, Ami	Member of the Public	Group L
Allison, Donna and George	Members of the Public	Group L
Ambrose, Christian	Member of the Public	Group L
Amundsen, Olav	New Mexico Junior College	063
Anderson, Clifford	Member of the Public	Group L
Andrews, Sharon	Member of the Public	Group L
Armstrong II, W.E.	Member of the Public	Group H
Ash, Coila	Creative Commotion: Voices for Social Change	Group M
Aviles, Lauren Louise	Member of the Public	Group L
Aviles, Olivia Shannon	Member of the Public	Group L
Aviles, Thomas Sullivan	Member of the Public	Group L
Aviles, William Timothy	Member of the Public	Group L
Ayling, Allene	Member of the Public	Group L
Barnes, Brent	Member of the Public	Group L
Barnes, Melanie	Member of the Public	041
Barr, Phillip	Member of the Public	033
Battaglini, Ray	Hobbs Chamber of Commerce	006
Baumwald, Keith	Member of the Public	Group L
Bavel, Lana	City of Andrews, Texas	087
Baxter, Dean	Member of the Public	Group L
Bearden, Kathi	Lea County Economic Development Corporation Hobbs News-Sun	074; 051
Beatty, Diane	Member of the Public	Group L
Berggren, Nancy	Member of the Public	Group L
Berghofer, Richard	Member of the Public	Group L
Bernard, Elaine	Member of the Public	Group L
Bettis, Vera	Member of the Public	Group A
Betzen, Ray	City of Hobbs, New Mexico	081; Group B
Bingaman, Jeff	United States Senator for the State of New Mexico	067

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Birnie, Patricia	Tucson Branch of the Women's International League for Peace and Freedom	343
Blumberg, Rena	Member of the Public	Group L
Bogle, Paula	Member of the Public	Group L
Borje, Christine	Member of the Public	Group L
Branch, Shawn	Member of the Public	Group L
Bratton, Donald E.	State of New Mexico House of Representatives	058
Braun, Marisa	Member of the Public	Group L
Breiding, Joan	Member of the Public	Group L
Brickle, Vickey	Member of the Public	Group L
Brock, Michael	Member of the Public	Group I
Brown, James	City of Eunice, New Mexico	066; Group H
Brown, Sharon	Member of the Public	Group L
Bulger, Paul	Member of the Public	Group L
Bundick, Mike	City of Eunice, New Mexico Chamber of Commerce	089; Group H
Buono, Alfred	Member of the Public	Group L
Burke, Bonnie Margay	Member of the Public	Group L
Burns, Deborah	Member of the Public	Group L
Butler, Kirk	Member of the Public	Group L
Caballero, Albert	Member of the Public	009
Calderon, Irene	Member of the Public	Group J
Calderon, Joe	City of Hobbs, New Mexico School Board Member	027
Callahan, Sharon	Member of the Public	Group L
Carmack, Linda C.	Member of the Public	Group I
Carmack, Reyce L.	Member of the Public	Group I
Carter, Bob	Lea County Community Improvement Corporation	069
Cheek, Charlene	Member of the Public	Group L
Cheney, Lee	Citizens Nuclear Information Center	031; Group M
Choi, Sabrina	Member of the Public	Group L
Claiborne, Claydean	City of Jal, New Mexico	018; Group E
Clark, Sharon	Economic Development Corporation of Lea County	Group J

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Clarke, Margot	Sierra Club, Lone Star Chapter	356
CNIC	Citizens' Nuclear Information Center	036
Coake, Jennifer	Member of the Public	Group L
Coghlan, Jay	Nuclear Watch of New Mexico	Group M
Cohagn, Emmett	Member of the Public	Group I
Cole, David	Member of the Public	016
Connery, Brendan	Member of the Public	Group L
Connor, Thomas	Member of the Public	Group L
Cope, Johnny	State of New Mexico Transportation Commission	082
Craig, Clavin	Member of the Public	Group G
Cramer, Don	Member of the Public	Group L
Cutter, Sandra	Member of the Public	Group L
D., John	Member of the Public	Group I
Daley, Richard	Member of the Public	Group L
Davis, J.D.	Member of the Public	Group F
Davis, Jared	Member of the Public	Group L
DeClue, Anne	Member of the Public	Group L
DeLeon, Alice	Member of the Public	Group E
Demar, Ben	Member of the Public	Group L
Dempster, Brian	Member of the Public	Group L
Dill, Garu	College of the Southwest	091
Dill, Marilyn	Southwest Symphony in Hobbs, New Mexico	090
Dobryn, Renata	Member of the Public	Group L
Dolgener, Richard	Andrews County, Texas	086
Dorch, David A.	Member of the Public	Group L
Douglas, Ben	Member of the Public	Group L
Dressler, Pat	Member of the Public	Group L
Duesler Jr., John G.	Member of the Public	Group L
Dunham, Russ	Member of the Public	Group L
Eaves, Carol	Member of the Public	Group L
Edmonson, Scott	Member of the Public	Group L
Ehrhardt, Erin	Member of the Public	Group L
Enszer, Julie	Member of the Public	Group L

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Ervin, John	Member of the Public	Group L
Espinos, Mick	Member of the Public	Group G
Evilsizer, Susan	Member of the Public	Group L
Fareed, Nashid	Member of the Public	Group L
Feldman, Mark	Member of the Public	Group L
Ferguson, Rick	Jal Public Schools	076
Ferland, James	Louisiana Energy Services	073
Fisher, Amber	Member of the Public	Group B
Fisher, Karen	State of New Mexico Attorney General's Office	034
Ford, Corisa	Member of the Public	Group L
Foster, Ariele	Member of the Public	Group L
Fourmyle, Lisa	Member of the Public	Group L
Fox, Tannis	New Mexico Environment Department	042
Fredericks, Misha	Member of the Public	Group L
Frontz, Jeff	Member of the Public	Group L
Fulfer, Kim	Member of the Public	100
Fuller, Mary J.	Eunice, New Mexico City Council	020; Group H
Galbraith Jr., John F.	An Alternative Way	245
Gardner, Rose	Member of the Public	032
Gebhard, Sister Mary	Member of the Public	Group L
Gliva, Davis	Member of the Public	Group L
Gliva, Stephen	Member of the Public	Group L
Goff, Buster	Lea County Water Users Association	083
Goldstein, Sidney	Member of the Public	Group L
Good, John	Member of the Public	061; Group K
Gordon, Joal A.	Member of the Public	Group L
Gosule, Leonard	Member of the Public	Group L
Graves, Glen A.	Los Alamos Education Group	045
Greenwald, Janet	Citizens for Alternatives to Radioactive Dumping	295; Group M
Grove, John	Member of the Public	151
Grover, Ravi	Member of the Public	Group L
Habibi, Anoushka	Member of the Public	Group L

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Hackler, Glen E. and Robert Zap	City of Andrews, Texas	002
Haislen, Tom	Member of the Public	Group G
Halsey, Chad	Member of the Public	Group L
Hancock, Don	Southwest Research and Information Center	358
Hande, G.	Member of the Public	Group L
Harlan, Harry	Member of the Public	Group I
Harper, Jerry	Eunice Fire Department	088
Harper, Jerry	Member of the Public	Group C
Harrison, Emily	Member of the Public	Group L
Hawkins, Karen R.	Member of the Public	Group K
Hawkins, J. Brad	Member of the Public	Group F
Hayes, Paula B.	Members of the Public	149
Henderson, Barbara	Member of the Public	Group L
Henry, Christopher	Member of the Public	Group L
Hernandez, Junior	Member of the Public	Group I
Herron, Rixey	Member of the Public	Group L
Hersh, Charles	Member of the Public	185
Hetrick, Nathan	Member of the Public	Group L
Hicks, Debra P.	Pettigrew and Associates, P.A.	025
Hobbs, A.I.	Member of the Public	Group I
Holladay, Kelly	New Mexico Junior College	029
Holler, Suzanne	Member of the Public	010
Holmberg, Dennis	Lea County	075
Hopper, Pam	Member of the Public	Group L
Howald, William	Member of the Public	Group L
Howard, Patricia	Member of the Public	Group L
Howard, William	Member of the Public	Group L
Hudson, Murray	Member of the Public	Group L
Hughes, Maurice	Member of the Public	Group I
Hunt, Jim	Member of the Public	Group L
Hutto, Janet	Member of the Public	Group L
Illegible - 1	Member of the Public	Group C
Illegible - 2	Member of the Public	Group C



<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Illegible - 3	Member of the Public	Group F
Illegible - 4	Member of the Public	Group H
Illegible - 5	Member of the Public	Group H
Illegible - 6	Member of the Public	Group H
Illegible - 7	Member of the Public	Group H
Illegible - 8	Member of the Public	Group H
Illegible - 9	Member of the Public	Group I
Illegible - 10	Member of the Public	Group K
Illegible - 11	Member of the Public	Group K
Illegible - 12	Member of the Public	Group N; O; P; R; T; U; V; W; X; Y
Illegible - 13	Member of the Public	Group N; O; P; R; T; U; V; W; X; Y
Illegible - 14	Member of the Public	Group N; O; P; R; T; U; V; W; X; Y
Illegible - 15	Member of the Public	Group N; O; P; R; T; U; V; W; X; Y
Illegible - 16	Member of the Public	Group N; O; P; R; T; U; V; W; X; Y
Illegible - 17	Member of the Public	Group N; O; Q; R; S; T; U; V; X; Y; Z
Illegible - 18	Member of the Public	Group N; O; P; Q; R; S; T; U; V; W; X; Y; Z; AA
Illegible - 19	Member of the Public	Group N; O; P; Q; R; S; T; U; V; W; X; Y; Z; AA
Illegible - 20	Member of the Public	Group N; O; P; Q; R; S; T; U; V; W; X; Y; Z; AA
Illegible - 21	Member of the Public	Group N; O; P; Q; R; S; T; U; V; W; X; Y; Z; AA
Illegible - 22	Member of the Public	001
Inmann, Pam O.	Western Governors' Association	103
Irizarry, Miguel A.	Member of the Public	Group L
Isaacson, Joel	Member of the Public	Group L
J., John	Member of the Public	Group H

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
James, Erin	Member of the Public	Group L
Jansky, Michael P.	United States Environmental Protection Agency	044
Jennings, Lewayne	Member of the Public	Group H
Johnson, Carol	Member of the Public	Group L
Johnson, Karen	Member of the Public	Group L
Johnson, Linda	Member of the Public	Group J
Johnson, Richard M.	Member of the Public	Group L
Johnston, Timothy	Member of the Public	Group L
Jordon, Jennifer L.	New Mexico Junior College	053
Kauffman, Patricia	Member of the Public	Group L
Kellum, Lucille	Member of the Public	Group I
Kendall, Mark	Member of the Public	Group L
Kendrick, Ben A.	Economic Development Corporation of Lea County	054
Kernan, Gay G.	New Mexico State Senate	062
Kesner, Guy	Zia Natural Gas Company	Group J
Khalsa, Mha Atma S	Member of the Public	Group L
Kimball, Toni	Member of the Public	Group L
Kirkpatrick, Lisa	State of New Mexico, Department of Game and Fish	038
Kirkpatrick, Mary	Member of the Public	Group L
Klosterman, Jim	Member of the Public	Group L
Knijnenburg, Michelle	Member of the Public	Group L
Koelle, Helena	Member of the Public	Group L
Kosuda, Constance	Member of the Public	Group L
Kovacs, Michael	Member of the Public	Group L
Kowatch, William E.	Member of the Public	Group L
Krich, R.M.	Louisiana Energy Services	048
Kuhlik, Barry	Member of the Public	Group L
L., Nelda	Member of the Public	Group E
Lacki, Isabella	Member of the Public	Group L
Laeng-Gilliatt, Sarah	Institute for Nonviolent Economics	Group M
Lara, Joe	United States Department of Interior, Bureau of Land Management	039

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Leavell, Carroll H.	New Mexico State Senate	022
Lee, Minerva	Member of the Public	Group D
Levendos, Mary	Member of the Public	Group L
Levitt, Ellen	Member of the Public	Group L
Linn, Eva	Member of the Public	Group L
Linscott, Chuck	Member of the Public	Group L
Liu, C.	Member of the Public	Group L
Locke, Rhonda	Member of the Public	Group H
Long, Freddie	Member of the Public	Group L
Longacre, David	Member of the Public	Group L
Lorentzen, Robin	Member of the Public	Group L
Lowery, Alana	Member of the Public	Group L
Luster, Willie Lee	Member of the Public	Group I
Lyle, Janet	Member of the Public	Group I
Lynch, Marybeth	Member of the Public	Group L
Lynch, Robert S.	Member of the Public	Group L
Lyons, Jacob	Member of the Public	Group L
Lyons, Pat	State Land Office	085
Mackie, William B.	Western Governors' Association	035
Magee, Dan	Member of the Public	Group L
Malherek, Joseph and Michael Mariotte	Public Citizen/Nuclear Information and Resource Service	316
Manetas, Michael	Member of the Public	Group L
Mariotte, Michael and Wenonah Hauter	Public Citizen/Nuclear Information and Resource Service	037
Markham, Thomas	Member of the Public	Group L
Marshall, Laurel	Member of the Public	Group L
Mastro, Nick	Member of the Public	Group L
Mathews, Kristi	Member of the Public	Group I
Matlock, KL	Member of the Public	Group L
McCasland, Pat	Member of the Public	093; Group H
McCleery, Steve	New Mexico Junior College	026
McCormick, Randall D.	McCormick & Sons Tire & Service Center	109

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
McGrath, Justin	City of Carlsbad, New Mexico Chamber of Commerce	092
McMonagle, Patricia	Member of the Public	Group L
McMullen, Penelope	Loretto Community	Group M
Meiklejohn, Douglas	New Mexico Environmental Law Center	Group M
Mendoza, Susan	Member of the Public	Group H
Merenda, Michael	Member of the Public	Group L
Metreger, Tabitha	Member of the Public	Group L
Meyers, Natalie	Member of the Public	Group I
Miller, Danielle	Member of the Public	Group L
Milliner, Susan Emge	Member of the Public	Group L
Milstein, Noah	Member of the Public	Group L
Minault, Kent	Member of the Public	Group L
Misale, Judi	Member of the Public	Group L
Montanez, Alicia N.	Member of the Public	024
Moreno, Dorinda	Member of the Public	Group L
Morgenstern, Jack and Helga Freund	Members of the Public	Group L
Moyer, Jessica	Member of the Public	Group G
Mozer, Elizabeth	Member of the Public	Group L
Mullarkey, Mike	Member of the Public	Group L
Munn, Mary	Member of the Public	Group L
Murphy, Juliann	Member of the Public	Group L
Nidess, Rael	Member of the Public	Group L
Norsworthy, William	Member of the Public	Group L
Norwood Brian	City of Jal, New Mexico Chamber of Commerce	094
Ojeda, Hermilo	KLMA Radio 96.5 FM	059; Group J
O'Nan, Elizabeth M.S.	Member of the Public	Group L
Overby, James	Member of the Public	Group L
Owens, Robert	Member of the Public	Group G
P., Larry	Member of the Public	Group G
Paddock, Kathryn	Member of the Public	Group L
Palmer, Will	Member of the Public	095
Parker, G.	Member of the Public	Group H

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Parker, Twilla	Member of the Public	Group I
Patience, J.	Member of the Public	Group L
Patnode, Martha	Member of the Public	Group L
Patrick, A.A.	Member of the Public	Group L
Patsis, John	Member of the Public	Group L
Patterson, Michael	Member of the Public	Group I
Pawlowski, Georgia	Member of the Public	Group L
Pearce, Stevan	United States Representative for the State of New Mexico	068
Pearlman, Tamara R.	Member of the Public	Group L
Perner, Mary	Member of the Public	Group L
Petersen, Donald F.	Los Alamos Education Group	046
Peterson, Ellen	Member of the Public	Group L
Peterson, Ron	Member of the Public	Group L
Picleul, Norman	Member of the Public	Group G
Pihl, Julie	Member of the Public	Group L
Pinkerton, Brian	Member of the Public	Group L
Pipes, Glenn	Member of the Public	065; Group H
Preston, Twilla	Member of the Public	096
R., Amelia	Member of the Public	Group I
R., Connie	Member of the Public	Group I
Ramirez, Hector	City of Hobbs, New Mexico	079
Ramos, Pedro	Member of the Public	Group I
Rattner, Ron	Member of the Public	Group L
Raunio, Diane	Member of the Public	Group L
Raunio, Larry	Member of the Public	Group L
Redd, Sherry	Member of the Public	Group L
Reed, Cyrus	Texas Center for Policy Studies	355
Reed, Mary S.	Member of the Public	Group L
Reese, Mary Celeste	Member of the Public	Group L
Representative	Carlsbad Chamber of Commerce, Convention & Visitors Bureau	060
Representative	Member of the Public	Group F
Richardson, Roberta	Member of the Public	Group L

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Ritz, Theodore	Member of the Public	Group L
Rivera, Mario George	Member of the Public	Group L
Roane, Christine	Member of the Public	Group L
Robbins, Daniel	Member of the Public	Group L
Robertson, Justin	Member of the Public	Group G
Rodriguez, Robby	SouthWest Organizing Project	Group M
Rogers, Sandy	Member of the Public	104
Rolfes, Kevin	Member of the Public	Group L
Rosmarino, Nicole J.	Forest Guardians	043
Ross, Jeanne	Member of the Public	Group L
Rounds, Stan	City of Hobbs, New Mexico Municipal Schools	021
Runnels, Jack	Member of the Public	Group L
Rutkowski, Robert	Member of the Public	Group L
Saecker, Jan	Member of the Public	365
Salazar, Joe	Member of the Public	Group L
Salb, Karen	Member of the Public	Group D
Sands, Kris	Member of the Public	Group L
Santerre, Roger	Member of the Public	Group L
Schneider, Jeremy	Member of the Public	Group L
Schtick, Nici	Member of the Public	Group L
Schubert, Gary	Lea County Commission	078
Scurrah, James	Member of the Public	Group L
Serrano, Russell	Member of the Public	Group L
Silberman, Phil	Member of the Public	105
Simpson, Craig	Member of the Public	Group L
Simpson, Richard	Member of the Public	284
Smay, Betty	Member of the Public	Group L
Smith, Don	Member of the Public	Group L
Smith, Ken J.	Member of the Public	Group H
Smith, Mark E.	Member of the Public	Group L
Smith, Scott	City of Hobbs, New Mexico Chamber of Commerce	097
Spence, Janice	Member of the Public	071

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Spencer, Stephen R.	U.S. Department of the Interior, Office of Environmental Policy and Compliance	040
SS	Member of the Public	Group L
St.Onge, Kathleen	Member of the Public	Group L
Stanley, Phyllis	Member of the Public	Group L
Starr, Paul J.	Noalmark Broadcasting Corporation	Group I
Stein, Paul	Member of the Public	Group L
Stephenson, Darrold	Lea County Commission	011; Group H
Stevens, Karen	City of Jal, New Mexico Chamber of Commerce	052; Group F
Stoner, Kyle	Member of the Public	Group L
Stratton, W.R.	Los Alamos Education Group	047
Strickland, Gene	Eunice High School	077
Strubhart, Kristi L.	Member of the Public	Group K
Stuckman, Scott	Member of the Public	Group L
Sumrall, Daniel	Member of the Public	Group L
Teague, Harry	Lea County Commission	005; Group D
Tenio, Gary	Member of the Public	Group L
Thompson, Delores	Member of the Public	Group I
Thompson, Fay	Member of the Public	Group H
Timmerman, Don and Roberta Thurstin	Members of the Public	Group L
Tjessem, Sandra	Member of the Public	Group L
Tromm, Curtis	Member of the Public	Group L
Trujillo, Toni Nolan	City of Eunice, New Mexico Public Schools	007
Tucker, Joan	Member of the Public	070
Turner, Kathleen Keading	Member of the Public	Group L
Turnoy, David	Member of the Public	Group L
Valdez, Chris	Member of the Public	Group H
Valey, Erika	Economic Development Corporation of Lea County	Group E
Wagner, Jim and Virginia	Member of the Public	Group L
Wahosi, Mare	Member of the Public	Group L
Walker, Betha	Member of the Public	Group G
Walker, Todd	Member of the Public	Group L

<b>Commenter Name</b>	<b>Affiliation</b>	<b>Commenter No.</b>
Wallace, DeeDee	Andrews Industrial Foundation, Inc.	028
Wallach, Robert	City of Hobbs, New Mexico	080
Warner, Darryl	Member of the Public	Group L
Weaver, Bill and Sue	Members of the Public	Group H
Weishaar, Jennifer M.	Member of the Public	Group L
White, Lee	Eunice Municipal Schools	099
White, Lynn	Member of the Public	098; Group I
White, Tanya	Eunice News	030; Group I
Williams, Paul	Member of the Public	Group L
Williams, Amy	Concerned Citizens for Nuclear Safety	Group M
Williams, Fletch	Member of the Public	102; Group N; O; P; Q; R; S; T; U; V; W; X; Y; Z; AA
Wilson, Pamela	Member of the Public	Group L
Winter, Warren	Member of the Public	Group L
Woodell, E.O.	Member of the Public	Group G
Worrell, Jennifer	Member of the Public	Group L
x x	Member of the Public	Group L
Y., Sarah	Member of the Public	Group A
Yribar, Rita	Member of the Public	Group L
Zap, Robert	City of Andrews, Texas	072
Zee-Six, M.	Member of the Public	Group L
Zinn, Roger	Member of the Public	Group L
Zoda, Al	Member of the Public	Group L



**Table H-2 Duplicate Comment Document Groups**

<b>Group</b>	<b>Commenters</b>			
Group A	Bettis, Vera	Y., Sarah		
Group B	Betzen, Ray	Fisher, Amber		
Group C	Harper, Jerry	Illegible - 1	Illegible - 2	
Group D	Lee, Minerva	Salb, Karen	Teague, Harry	
Group E	Claiborne, Claydean	DeLeon, Alice	L., Nelda	Valey, Erika
Group F	Davis, J.D. Hawkins, J. Brad	Illegible - 3 Representative	Stevens, Karen	
Group G	Craig, Clavin Espinosa, Mick Haislen, Tom	Moyer, Jessica Owens, Robert P., Larry	Picleul, Norman Robertson, Justin Walker, Betha	Woodell, E.O.
Group H	Armstrong II, W.E. Brown, James Bundick, Mike Fuller, Mary J. Illegible - 4 Illegible - 5	Illegible - 6 Illegible - 7 Illegible - 8 J., John Jennings, Lewayne Locke, Rhonda	McCasland, Pat Mendoza, Susan Parker, G. Pipes, Glenn Smith, Ken J. Stephenson, Darrold	Thompson, Fay Valdez, Chris Weaver, Bill and Sue
Group I	Brock, Michael Carmack, Linda C. Carmack, Reyce L. Cohagn, Emmett D., John Harlan, Harry	Hernandez, Junior Hobbs, A.I. Hughes, Maurice Illegible - 9 Kellum, Lucille Luster, Willie Lee	Lyle, Janet Mathews, Kristi Meyers, Natalie Parker, Twilla Patterson, Michael R., Amelia	R., Connie Ramos, Pedro Starr, Paul J. Thompson, Delores White, Lynn White, Tanya
Group J	Abousleman, Ron Calderon, Irene	Clark, Sharon Johnson, Linda	Kesner, Guy Ojeda, Hermilo	
Group K	Good, John Hawkins, Karen R.	Illegible - 10 Illegible - 11	Strubhart, Kristi L.	
Group L	Adelberg, Kurt Adkins, Ami Allison, Donna and George Ambrose, Christian Anderson, Clifford Andrews, Sharon Aviles, Lauren Louise Aviles, Olivia Shannon Aviles, Thomas Sullivan Aviles, William Timothy Ayling, Allene Barnes, Brent Baumwald, Keith	Edmonson, Scott Ehrhardt, Erin Enszer, Julie Ervin, John Evilsizer, Susan Fareed, Nashid Feldman, Mark Ford, Corisa Foster, Ariele Fourmyle, Lisa Fredericks, Misha Frontz, Jeff Gebhard, Sister Mary Gliva, Davis Gliva, Stephen Goldstein, Sidney	Lacki, Isabella Levendosa, Mary Levitt, Ellen Linn, Eva Linscott, Chuck Liu, C. Long, Freddie Longacre, David Lorentzen, Robin Lowery, Alana Lynch, Marybeth Lynch, Robert S. Lyons, Jacob Magee, Dan Manetas, Michael Markham, Thomas	Reed, Mary S. Reese, Mary Celeste Richardson, Roberta Ritz, Theodore Rivera, Mario George Roane, Christine Robbins, Daniel Rolfes, Kevin Ross, Jeanne Runnels, Jack Rutkowski, Robert Salazar, Joe Sands, Kris Santerre, Roger Schneider, Jeremy Schtick, Nici

Group	Commenters			
	Baxter, Dean	Gordon, Joel A.	Marshall, Laurel	Scurrah, James
	Beatty, Diane	Gosule, Leonard	Mastro, Nick	Serrano, Russell
	Berggren, Nancy	Grover, Ravi	Matlock, KL	Simpson, Craig
	Berghofer, Richard	Habibi, Anoushka	McMonagle, Patricia	Smay, Betty
	Bernard, Elaine	Halsey, Chad	Merenda, Michael	Smith, Don
	Blumberg, Rena	Hande, G.	Metreger, Tabitha	Smith, Mark E.
	Bogle, Paula	Harrison, Emily	Miller, Danielle	SS
	Borje, Christine	Henderson, Barbara	Milliner, Susan Emge	St.Onge, Kathleen
	Branch, Shawn	Henry, Christopher	Milstein, Noah	Stanley, Phyllis
	Braun, Marisa	Herron, Rixey	Minault, Kent	Stein, Paul
	Breiding, Joan	Hetrick, Nathan	Misale, Judi	Stoner, Kyle
	Brickle, Vickey	Hopper, Pam	Moreno, Dorinda	Stuckman, Scott
	Brown, Sharon	Howald, William	Morgenstern, Jack	Sumrall, Daniel
	Bulger, Paul	Howard, Patricia	and Helga Freund	Tenio, Gary
	Buono, Alfred	Howard, William	Mozer, Elizabeth	Timmerman, Don and
	Burke, Bonnie Margay	Hudson, Murray	Mullarkey, Mike	Roberta Thurstin
	Burns, Deborah	Hunt, Jim	Munn, Mary	Tjessem, Sandra
	Butler, Kirk	Hutto, Janet	Murphy, Juliann	Tromm, Curtis
	Callahan, Sharon	Irizarry, Miguel A.	Nidess, Rael	Turner, Kathleen
	Cheek, Charlene	Isaacson, Joel	Norsworthy, William	Keading
	Choi, Sabrina	James, Erin	O'Nan, Elizabeth	Turnoy, David
	Coake, Jennifer	Johnson, Carol	Overby, James	Wagner, Jim and
	Connery, Brendan	Johnson, Karen	Paddock, Kathryn	Virginia
	Connor, Thomas	Johnson, Richard M.	Patience, J.	Wahosi, Mare
	Cramer, Don	Johnston, Timothy	Patnode, Martha	Walker, Todd
	Cutter, Sandra	Kauffman, Patricia	Patrick, A.A.	Warner, Darryl
	Daley, Richard	Kendall, Mark	Patsis, John	Weishaar, Jennifer M.
	Davis, Jared	Khalsa, Mha Atma S	Pawlowski, Georgia	Williams, Paul
	DeClue, Anne	Kimball, Toni	Pearlman, Tamara R.	Wilson, Pamela
	Demar, Ben	Kirkpatrick, Mary	Perner, Mary	Winter, Warren
	Dempster, Brian	Klosterman, Jim	Peterson, Ellen	Worrell, Jennifer
	Dobryn, Renata	Knijnenburg,	Peterson, Ron	x x
	Dorch, David A.	Michelle	Pihl, Julie	Yribar, Rita
	Douglas, Ben	Koelle, Helena	Pinkerton, Brian	Zee-Six, M.
	Dressler, Pat	Kosuda, Constance	Rattner, Ron	Zinn, Roger
	Duesler Jr., John G.	Kovacs, Michael	Raunio, Diane	Zoda, Al
	Dunham, Russ	Kowatch, William E.	Raunio, Larry	
	Eaves, Carol	Kuhlik, Barry	Redd, Sherry	
Group M	Ash, Coila	Greenwald, Janet	Meiklejohn, Douglas	
	Cheney, Lee	Laeng-Gilliatt, Sarah	Rodriguez, Robby	
	Coghlan, Jay	McMullen, Penelope	Williams, Amy	
Group N	Illegible - 12	Illegible - 15	Illegible - 18	Illegible - 21
	Illegible - 13	Illegible - 16	Illegible - 19	Williams, Fletch
	Illegible - 14	Illegible - 17	Illegible - 20	
Group O	Illegible - 12	Illegible - 15	Illegible - 18	Illegible - 21
	Illegible - 13	Illegible - 16	Illegible - 19	Williams, Fletch
	Illegible - 14	Illegible - 17	Illegible - 20	

<b>Group</b>	<b>Commenters</b>			
Group P	Illegible - 12	Illegible - 15	Illegible - 19	Williams, Fletch
	Illegible - 13	Illegible - 17	Illegible - 20	
	Illegible - 14	Illegible - 18	Illegible - 21	
Group Q	Illegible - 16	Illegible - 18	Illegible - 20	Williams, Fletch
	Illegible - 17	Illegible - 19	Illegible - 21	
Group R	Illegible - 12	Illegible - 15	Illegible - 18	Illegible - 21 Williams, Fletch
	Illegible - 13	Illegible - 16	Illegible - 19	
	Illegible - 14	Illegible - 17	Illegible - 20	
Group S	Illegible - 17	Illegible - 19	Illegible - 21	Williams, Fletch
	Illegible - 18	Illegible - 20		
Group T	Illegible - 12	Illegible - 15	Illegible - 18	Illegible - 21 Williams, Fletch
	Illegible - 13	Illegible - 16	Illegible - 19	
	Illegible - 14	Illegible - 17	Illegible - 20	
Group U	Illegible - 12	Illegible - 15	Illegible - 18	Illegible - 21 Williams, Fletch
	Illegible - 13	Illegible - 16	Illegible - 19	
	Illegible - 14	Illegible - 17	Illegible - 20	
Group V	Illegible - 12	Illegible - 15	Illegible - 18	Illegible - 21 Williams, Fletch
	Illegible - 13	Illegible - 16	Illegible - 19	
	Illegible - 14	Illegible - 17	Illegible - 20	
Group W	Illegible - 12	Illegible - 15	Illegible - 19	Williams, Fletch
	Illegible - 13	Illegible - 17	Illegible - 20	
	Illegible - 14	Illegible - 18	Illegible - 21	
Group X	Illegible - 12	Illegible - 15	Illegible - 18	Illegible - 21 Williams, Fletch
	Illegible - 13	Illegible - 16	Illegible - 19	
	Illegible - 14	Illegible - 17	Illegible - 20	
Group Y	Illegible - 12	Illegible - 15	Illegible - 18	Illegible - 21 Williams, Fletch
	Illegible - 13	Illegible - 16	Illegible - 19	
	Illegible - 14	Illegible - 17	Illegible - 20	
Group Z	Illegible - 17	Illegible - 19	Illegible - 21	Williams, Fletch
	Illegible - 18	Illegible - 20		
Group AA	Illegible - 17	Illegible - 19	Illegible - 21	Williams, Fletch
	Illegible - 18	Illegible - 20		

## H.6.2 Comment Identification

Comment documents received contained at least one comment on the Draft EIS. The NRC staff assigned each identified comment a two-part comment number (e.g., 000-1 or A-1). The first part of the comment number specifies the individual commenter or Commenter Group while the second part of the number is the number assigned to a specific comment made by the individual commenter or the Commenter Group. These specific comment numbers increase sequentially with each subsequent identified comment. The two-part comment numbers assigned by the NRC staff are provided in Table H-3.

Table H-3 is arranged in order, first alphabetically by Group and then numerically by commenter. This table also lists the appropriate section in Appendix I where the summary of each comment appears with the corresponding NRC staff's response.

Appendix J contains the copies of the actual comment documentation received by the NRC staff. The documents are arranged in the following order: (1) Public Meeting transcript<sup>3</sup>; (2) Group letters; and (3) commenter identification numbers. Within each comment document, boxes are placed around individual comments with the corresponding comment numbers appearing in the margins.

As an actual example, Ms. Sandy Rogers submitted a comment letter on the Draft EIS. If one wanted to read the NRC staff's response to Ms. Rogers' comments, one would first find her name in Table H-1 to get her comment identification number (she is assigned commenter No. 104). Then, one would move to Table H-3 to find her comment numbers. There, one would find that the NRC staff identified three comments from Ms. Rogers' submittal (these are comments 104-1, 104-2, and 104-3). Also identified are the sections in Appendix I where these comments are summarized and responded to by the NRC staff. If one wanted to read Ms. Rogers' comments in the context of her original letter, one would find comment document 104 in Appendix J. Comment document 104 in Appendix J is a scanned image of Ms. Rogers' letter with brackets around each identified comment.

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<sup>3</sup>A notation (a) is provided in Table H-3 if the comment was a verbal comment received at the public meeting.

**Table H-3 Index by Comment Number**

<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>	<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
A-1	I.2	Group A	L-12	I.20.7	Group L
A-2	I.2		L-13	I.10.2	
B-1	I.2	Group B	L-14	I.19.1	
C-1	I.2	Group C	L-15	I.9	
C-2	I.2		L-16	I.3.4	
D-1	I.2	Group D	M-1	I.1; I.7.3	Group M
D-2	I.2		M-2	I.26	
E-1	I.2	Group E	M-3	I.26	
E-2	I.2		M-4	I.4	
F-1	I.2	Group F	M-5	I.7.3	
F-2	I.2		M-6	I.18.2	
G-1	I.2	Group G	M-7	I.27	
H-1	I.2	Group H	M-8	I.4	
H-2	I.2		M-9	I.4	
I-1	I.2	Group I	M-10	I.3.4	
I-2	I.2		M-11	I.5.2	
J-1	I.2	Group J	M-12	I.18.2	
J-2	I.2		M-13	I.11.1	
K-1	I.2	Group K	M-14	I.8.1	
K-2	I.2		M-15	I.12.5	
L-1	I.3.4	Group L	M-16	I.8.1	
L-2	I.7.2		M-17	I.12.3	
L-3	I.7.3		M-18	I.20.5	
L-4	I.7.3		M-19	I.20.2	
L-5	I.4		M-20	I.20.4	
L-6	I.14.4		M-21	I.7.2	
L-7	I.14.1		M-22	I.7.3	
L-8	I.15		M-23	I.7.3	
L-9	I.12.5		M-24	I.7.3	
L-10	I.12.2		M-25	I.20.2	
L-11	I.20.7		M-26	I.19.1	

<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
M-27	I.10.1	Group M
M-28	I.10.1	
M-29	I.7.3	
M-30	I.7.3	
M-31	I.13.2	
M-32	I.13.2	
M-33	I.14.3	
M-34	I.14.1	
M-35	I.15	
M-36	I.9	
M-37	I.10.2	
M-38	I.10.2	
M-39	I.11.1	
M-40	I.12.2	
M-41	I.12.3	
M-42	I.12.3	
M-43	I.14.1	
M-44	I.14.2	
M-45	I.12.5; I.27	
M-46	I.17.2	
M-47	I.20.2	
M-48	I.20.3	
M-49	I.18.1	
M-50	I.22	
M-51	I.23.1	
M-52	I.23.1	
M-53	I.23.2	
M-54	I.23.1	
M-55	I.23.1	
M-56	I.23.1	
M-57	I.21	
M-58	I.24.2	

<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
M-59	I.24.1	Group M
M-60	I.6	
M-61	I.6	
M-62	I.5.2	
M-63	I.5.2	
M-64	I.5.2	
M-65	I.8.2	
M-66	I.18.1	
M-67	I.18.2	
M-68	I.19.1	
M-69	I.19.2	
M-70	I.19.1	
M-71	I.19.3	
M-72	I.19.2	
N-1	I.7.3	Group N
O-1	I.20.5	Group O
P-1	I.20.2	Group P
Q-1	I.20.3	Group Q
Q-2	I.12.5	
R-1	I.20.2	Group R
S-1	I.4	Group S
T-1	I.10.3	Group T
T-2	I.10.3; I.21	
U-1	I.14.1	Group U
U-2	I.14.2	
V-1	I.23.2	Group V
W-1	I.6	Group W
X-1	I.7.3	Group X
Y-1	I.15	Group Y
Z-1	I.4	Group Z
AA-1	I.25	Group AA
001-4	I.2	Illegible - 22

<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
001-19	I.2	Illegible - 22
002-1	I.2	Glen E. Hackler and Robert Zap
002-2	I.2	
005-2 <sup>a</sup>	I.2	Harry Teague
005-3 <sup>a</sup>	I.2	
006-1	I.2	Ray Battaglini
007-1	I.2	Toni Nolan Trujillo
007-2 <sup>a</sup>	I.2	
007-3 <sup>a</sup>	I.2	
007-4 <sup>a</sup>	I.2	
007-5	I.2	
007-6	I.2	
007-7	I.2	
009-1	I.2	Albert Caballero
010-1	I.2	Suzanne Holler
010-2 <sup>a</sup>	I.2	
010-3	I.2	
011-2 <sup>a</sup>	I.2	Darrold Stephenson
011-3 <sup>a</sup>	I.2	
016-1	I.2	David Cole
016-2	I.2	
018-2 <sup>a</sup>	I.2	Claydean Claiborne
018-3 <sup>a</sup>	I.2	
020-2 <sup>a</sup>	I.2	Mary J. Fuller
021-1	I.2	Stan Rounds
021-2 <sup>a</sup>	I.2	
022-1	I.2	Carroll H. Leavell
022-2 <sup>a</sup>	I.2	
022-3 <sup>a</sup>	I.2	
022-4	I.2	
024-1	I.2	Alicia N. Montanez
025-1	I.2	Debra P. Hicks

<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
025-2 <sup>a</sup>	I.2	Debra P. Hicks
025-3 <sup>a</sup>	I.3.6	
025-4 <sup>a</sup>	I.2	
026-1	I.2	Steve McCleery
026-2 <sup>a</sup>	I.2	
026-3 <sup>a</sup>	I.14.2	
026-4	I.2	
026-5 <sup>a</sup>	I.2	
027-1	I.2	Joe Calderon
027-2 <sup>a</sup>	I.2	
027-3 <sup>a</sup>	I.2	
027-4	I.2	
028-1	I.2	DeeDee Wallace
028-2 <sup>a</sup>	I.2	
028-3 <sup>a</sup>	I.2	
028-4 <sup>a</sup>	I.2	
029-1	I.2	Kelly Holladay
029-2 <sup>a</sup>	I.2	
029-3 <sup>a</sup>	I.20.3	
029-4	I.2	
029-5 <sup>a</sup>	I.12.2	
029-6	I.20.3	
030-2	I.2	Tanya White
031-1	I.5.3	Lee Cheney
031-2	I.12.3	
031-3	I.20.4	
031-4 <sup>a</sup>	I.3.4	
031-5 <sup>a</sup>	I.3.4	
031-6	I.1	
031-7	I.24.1	
031-8	I.24.1	
031-9	I.24.1	

<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>	<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
031-10	I.5.1	Lee Cheney	032-31	I.7.1; I.20.2; I.20.4	Rose Gardner
032-1	I.19.2	Rose Gardner	032-32	I.5.3	
032-2	I.25		032-33	I.20.2	
032-3	I.20.4		032-34	I.12.5	
032-4	I.12.5		032-35	I.14.3	
032-5	I.22		032-36	I.14.3	
032-6 <sup>a</sup>	I.25		032-37	I.15	
032-7 <sup>a</sup>	I.20.4		032-38	I.10.2	
032-8 <sup>a</sup>	I.3.4		032-39	I.12.5	
032-9 <sup>a</sup>	I.20.4		032-40	I.19.2	
032-10 <sup>a</sup>	I.12.5		032-41	I.19.2	
032-11 <sup>a</sup>	I.22		032-42	I.17.4	
032-12 <sup>a</sup>	I.18.2		032-43	I.18.2	
032-13 <sup>a</sup>	I.1		032-44	I.19.3	
032-14	I.10.2		032-45	I.19.2	
032-15	I.12.5		032-46	I.10.2; I.20.2	
032-16	I.20.4		032-47	I.18.2	
032-17	I.10.2		032-48	I.20.1	
032-18	I.1		032-49 <sup>a</sup>	I.5.1	
032-19	I.25		032-50	I.1	
032-20	I.7.1		033-1	I.18.1	Phillip Barr
032-21	I.19.2		033-2	I.10.2	
032-22	I.5.3		033-3	I.12.3	
032-23	I.20.1		033-4	I.5.3	
032-24	I.26		033-5	I.1	
032-25	I.5.1		033-6	I.10.2	
032-26	I.14.1		033-7	I.18.2	
032-27	I.12.1		034-1	I.3.1	Karen Fisher
032-28	I.20.2		034-2	I.7.3	
032-29	I.20.2		034-3	I.12.2	
032-30	I.20.2		034-4	I.12.2	



<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>	<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
034-5	I.12.3	Karen Fisher	034-37	I.17.1	Karen Fisher
034-6	I.20.1		034-38	I.17.1	
034-7	I.6		034-39	I.17.1	
034-8	I.20.7		034-40	I.17.4	
034-9	I.27		034-41	I.17.2	
034-10	I.27		034-42	I.17.4	
034-11	I.27		034-43	I.17.1	
034-12	I.27		034-44	I.17.4	
034-13	I.20.4		034-45	I.17.1	
034-14	I.27		034-46	I.18.1	
034-15	I.10.2		034-47	I.19.1	
034-16	I.10.2		034-48	I.27	
034-17	I.27		034-49	I.20.9	
034-18	I.11.1		034-50	I.10.2	
034-19	I.11.1		034-51	I.14.1	
034-20	I.11.1		034-52	I.15	
034-21	I.12.5		034-53	I.16	
034-22	I.12.3		034-54	I.22	
034-23	I.12.3		034-55	I.12.5	
034-24	I.12.3		034-56	I.27	
034-25	I.12.3		034-57	I.15	
034-26	I.13.1		034-58	I.8.2	
034-27	I.13.1		034-59	I.13.4	
034-28	I.13.4		034-60	I.27	
034-29	I.17.1		034-61	I.27	
034-30	I.18.2		034-62	I.23.1	
034-31	I.15		034-63	I.23.1	
034-32	I.15		034-64	I.27	
034-33	I.16		034-65	I.23.1	
034-34	I.16		034-66	I.27	
034-35	I.16		034-67	I.23.2	
034-36	I.17.1		034-68	I.23.2	

<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
034-69	I.6	Karen Fisher
035-1	I.6	William B. Mackie
036-1	I.7.3	Citizens' Nuclear Information Center
036-2	I.7.3	
036-3	I.15	
036-4	I.14.1	
036-5	I.14.2	
036-6	I.20.4	
036-7	I.20.2	
036-8	I.6	
036-9	I.23.1	
036-10	I.21	
036-11	I.23.2	
036-12	I.23.1	
037-1	I.3.1; I.3.2	Michael Mariotte and Wenonah Hauter
037-2	I.3.2	
038-1	I.13.4	Lisa Kirkpatrick
038-2	I.13.4	
038-3	I.13.2	
038-4	I.27	
038-5	I.27	
038-6	I.27	
038-7	I.13.3	
038-8	I.13.4	
038-9	I.4	
038-10	I.13.2	
039-1	I.11.2	Joe Lara
040-1	I.13.4	Stephen R. Spencer
040-2	I.13.4	
040-3	I.13.4	
040-4	I.10.2	

040-5	I.10.2	Stephen R. Spencer
040-6	I.13.3	
041-1	I.12.2	Melanie Barnes
041-2	I.23.1	
041-3	I.23.2	
041-4	I.14.2	
041-5	I.3.2; I.3.3	
042-1	I.20.1	Tannis Fox
042-2	I.12.4	
042-3	I.12.3	
042-4	I.12.2	
042-5	I.12.2	
042-6	I.12.5	
042-7	I.11.1	
042-8	I.11.1; I.12.2	
042-9	I.11.1	
042-10	I.12.2	
042-11	I.12.3	
042-12	I.12.2	
042-13	I.12.2	
042-14	I.12.2	
042-15	I.12.2	
042-16	I.12.2	
042-17	I.12.2	
042-18	I.12.3	
042-19	I.12.2	
042-20	I.12.4	
042-21	I.12.2; I.12.4	
042-22	I.12.2	
042-23	I.21	
042-24	I.12.3	
042-25	I.23.1	

<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
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<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
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042-26	I.12.4	Tannis Fox	046-3 <sup>a</sup>	I.2	Donald F. Petersen
042-27	I.12.4		046-4 <sup>a</sup>	I.25	
042-28	I.12.3		046-5	I.2	
042-29	I.12.1		046-6	I.2	
042-30	I.12.1		046-7	I.25	
042-31	I.12.1		047-1	I.2	W.R. Stratton
042-32	I.10.2		047-2	I.20.3	
042-33	I.10.2		047-3	I.2	
042-34	I.10.2		047-4	I.2	
042-35	I.10.3		047-5	I.2	
042-36	I.10.3		047-6	I.2	
042-37	I.19.1		047-7	I.5.1	
042-38	I.19.2		047-8	I.20.8	
042-39	I.27		048-1	I.4	R.M. Krich
042-40	I.27		048-2	I.27	
042-41	I.12.3		048-3	I.10.3	
042-42	I.11.2		048-4	I.20.3	
042-43	I.20.3		048-5	I.12.3	
042-44	I.23.1		048-6	I.27	
042-45	I.6		048-7	I.8.1	
042-46	I.19.1		048-8	I.27	
043-1	I.13.3	Nicole J. Rosmarino	048-9	I.5.6	
043-2	I.22		048-10	I.5.6	
043-3	I.13.3		048-11	I.27	
043-4	I.6		048-12	I.27	
043-5	I.13.1		048-13	I.13.4	
043-6	I.1		048-14	I.12.3	
043-7	I.13.1; I.13.3		048-15	I.27	
044-1	I.6	Michael P. Jansky	048-16	I.5.5	
045-1	I.2	Glen A. Graves	048-17	I.10.2	
046-1	I.2	Donald F. Petersen	048-18	I.10.3	
046-2 <sup>a</sup>	I.2		048-19	I.20.3	

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Comment No.	Appendix H Section	Commenter
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Comment No.	Appendix H Section	Commenter
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048-20	I.27	R.M. Krich
048-21	I.27	
048-22	I.27	
048-23	I.27	
048-24	I.27	
048-25	I.27	
048-26	I.27	
048-27	I.27	
048-28	I.27	
048-29	I.27	
048-30	I.27	
048-31	I.27	
048-32	I.13.1	
048-33	I.27	
048-34	I.27	
048-35	I.15	
048-36	I.18.1	
048-37	I.27	
048-38	I.27	
048-39	I.27	
048-40	I.8.1	
048-41	I.27	
048-42	I.12.3	
048-43	I.12.3	
048-44	I.12.2	
048-45	I.27	
048-46	I.12.3	
048-47	I.12.2	
048-48	I.12.3	
048-49	I.13.4	
048-50	I.13.4	
048-51	I.27	

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<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
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048-52	I.27	R.M. Krich
048-53	I.27	
048-54	I.27	
048-55	I.27	
048-56	I.27	
048-57	I.27	
048-58	I.20.3	
048-59	I.21	
048-60	I.27	
048-61	I.27	
048-62	I.27	
048-63	I.27	
048-64	I.27	
048-65	I.12.3	
048-66	I.27	
048-67	I.27	
048-68	I.27	
048-69	I.27	
048-70	I.27	
048-71	I.27	
048-72	I.27	
048-73	I.27	
048-74	I.27	
048-75	I.27	
048-76	I.27	
048-77	I.27	
048-78	I.27	
048-79	I.23.2	
048-80	I.27	
048-81	I.27	
048-82	I.23.2	
048-83	I.23.1	

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<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
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048-84	I.27	R.M. Krich
048-85	I.18.1	
048-86	I.12.3	
048-87	I.23.1	
048-88	I.27	
048-89	I.19.1	
048-90	I.17.3	
048-91	I.27	
048-92	I.27	
048-93	I.27	
048-94	I.27	
048-95	I.27	
048-96	I.27	
048-97	I.27	
048-98	I.27	
048-99	I.15	
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051-1	I.2	Kathi Bearden
051-2	I.2	
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052-2 <sup>a</sup>	I.2	Karen Stevens
<hr/>		
053-1	I.2	Jennifer L. Jordon
053-2 <sup>a</sup>	I.2	
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054-1	I.2	Ben A. Kendrick
054-2 <sup>a</sup>	I.2	
054-3 <sup>a</sup>	I.2	
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058-1	I.2	Donald E. Bratton
058-2	I.2	
<hr/>		
059-2 <sup>a</sup>	I.2	Hermilo Ojeda
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060-1	I.2	Representative
<hr/>		
061-2 <sup>a</sup>	I.2	John Good
061-3 <sup>a</sup>	I.2	
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062-1	I.2	Gay G. Kernan
062-2 <sup>a</sup>	I.2	

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062-3 <sup>a</sup>	I.2	Gay G. Kernan
062-4 <sup>a</sup>	I.2	
062-5 <sup>a</sup>	I.2	
062-6	I.2	
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063-1	I.2	Olav Amundsen
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065-2 <sup>a</sup>	I.2	Glenn Pipes
065-3 <sup>a</sup>	I.2	
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066-1 <sup>a</sup>	I.2	James Brown
066-2 <sup>a</sup>	I.2	
066-3 <sup>a</sup>	I.2	
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067-1 <sup>a</sup>	I.2	Jeff Bingaman
067-2 <sup>a</sup>	I.20.4	
067-3 <sup>a</sup>	I.20.5	
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068-1 <sup>a</sup>	I.2	Stevan Pearce
068-2 <sup>a</sup>	I.2	
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069-1 <sup>a</sup>	I.2	Bob Carter
069-2 <sup>a</sup>	I.2	
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070-1 <sup>a</sup>	I.2	Joan Tucker
070-2 <sup>a</sup>	I.2	
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071-1 <sup>a</sup>	I.2	Janice Spence
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072-1 <sup>a</sup>	I.2	Robert Zap
072-2 <sup>a</sup>	I.2	
072-3 <sup>a</sup>	I.12.2	
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073-1 <sup>a</sup>	I.2	James Ferland
073-2 <sup>a</sup>	I.2	
073-3 <sup>a</sup>	I.2	
<hr/>		
074-1 <sup>a</sup>	I.2	Kathi Bearden
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075-1 <sup>a</sup>	I.12.5	Dennis Holmberg
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076-1 <sup>a</sup>	I.2	Rick Ferguson
<hr/>		
077-1 <sup>a</sup>	I.2	Gene Strickland
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078-1 <sup>a</sup>	I.2	Gary Schubert
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079-1 <sup>a</sup>	I.2	Hector Ramirez

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079-2	I.2	Hector Ramirez
079-3	I.2	
080-1 <sup>a</sup>	I.2	Robert Wallach
080-2 <sup>a</sup>	I.2	
080-3 <sup>a</sup>	I.2	
081-1 <sup>a</sup>	I.2	Ray Betzen
082-1 <sup>a</sup>	I.2	Johnny Cope
082-2 <sup>a</sup>	I.2	
082-3 <sup>a</sup>	I.17.1	
082-4 <sup>a</sup>	I.2	
083-1 <sup>a</sup>	I.12.5	Buster Goff
084-1 <sup>a</sup>	I.2	Ron Abousleman
084-2 <sup>a</sup>	I.2	
084-3 <sup>a</sup>	I.2	
085-1 <sup>a</sup>	I.2	Pat Lyons
085-2 <sup>a</sup>	I.2	
085-3 <sup>a</sup>	I.2	
086-1 <sup>a</sup>	I.2	Richard Dolgener
086-2 <sup>a</sup>	I.2	
087-1 <sup>a</sup>	I.2	Lana Bavel
088-1 <sup>a</sup>	I.2	Jerry Harper
088-2 <sup>a</sup>	I.2	
089-1 <sup>a</sup>	I.2	Mike Bundick
089-2 <sup>a</sup>	I.2	
090-1 <sup>a</sup>	I.2	Marilyn Dill
090-2 <sup>a</sup>	I.2	
090-3 <sup>a</sup>	I.2	
091-1 <sup>a</sup>	I.2	Gary Dill
091-2 <sup>a</sup>	I.2	
092-1 <sup>a</sup>	I.2	Justin McGrath
093-1 <sup>a</sup>	I.2	Pat McCasland
093-2 <sup>a</sup>	I.12.1	

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093-3 <sup>a</sup>	I.20.3	Pat McCasland
093-4 <sup>a</sup>	I.3.1	
093-5 <sup>a</sup>	I.19.1	
094-1 <sup>a</sup>	I.2	Brian Norwood
095-1 <sup>a</sup>	I.2	Will Palmer
095-2 <sup>a</sup>	I.2	
096-1 <sup>a</sup>	I.2	Twillla Preston
096-2 <sup>a</sup>	I.2	
097-1 <sup>a</sup>	I.2	Scott Smith
097-2 <sup>a</sup>	I.2	
097-3 <sup>a</sup>	I.2	
098-1 <sup>a</sup>	I.2	Lynn White
098-2 <sup>a</sup>	I.2	
099-1 <sup>a</sup>	I.2	Lee White
100-1 <sup>a</sup>	I.2	Kim Fulfer
100-2 <sup>a</sup>	I.2	
102-1	I.19.2	Fletch Williams
102-2	I.18.2	
102-3	I.17.3	
103-1	I.5.3	Pam O. Inmann
103-2	I.5.3	
103-3	I.4	
103-4	I.4	
103-5	I.4	
103-6	I.20.5	
103-7	I.5.3; I.21; I.24.1	
103-8	I.20.2	
103-9	I.24.2	
103-10	I.4	
103-11	I.4	
103-12	I.10.2	

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103-13	I.20.4	Pam O. Inmann
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103-14	I.20.4	
103-15	I.20.2; I.20.4	
103-16	I.27	
103-17	I.27	
103-18	I.17.1	
103-19	I.10.2	
103-20	I.17.1	
103-21	I.24.1	
103-22	I.18.2	
103-23	I.17.4	
103-24	I.19.1	
103-25	I.5.3	
103-26	I.24.1	
104-1	I.20.2; I.20.4	Sandy Rogers
104-2	I.17.3; I.20.1	
104-3	I.25	
105-1	I.17.3	Phil Silberman
105-2	I.17.3	
105-3	I.25	
105-4	I.17.4	
105-5	I.25	
105-6	I.5.1	
105-7	I.20.4	
105-8	I.1	
109-1	I.2	Randall D. McCormick
149-1	I.2	Paula B. Hayes & Family
149-2	I.2	
151-1	I.17.2	John Grove
151-2	I.3.2	
151-3	I.3.2	
151-4	I.4	
<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
151-5	I.25	John Grove

151-6	I.3.4	
151-7	I.8.1; I.12.5	
151-8	I.6	
151-9	I.3.5	
151-10	I.3.2	
185-1	I.5.4	Charles Hersh
245-1	I.1	John F. Galbraith Jr.
245-2	I.1	
284-1	I.26	Richard Simpson
284-2	I.26	
284-3	I.7.1	
284-4	I.15	
284-5	I.5.1	
284-6	I.3.5	
284-7	I.20.7	
284-8	I.20.4	
284-9	I.22	
284-10	I.10.1	
284-11	I.12.2	
284-12	I.18.2	
284-13	I.12.2	
284-14	I.1	
295-1	I.3.5	Janet Greenwald
316-1	I.3.5	Joseph Malherek and Michael Mariotte
316-2	I.22	
316-3	I.3.4	
316-4	I.7.1	
316-5	I.5.1	
316-6	I.7.2; I.7.3	
316-7	I.7.2	
<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
316-8	I.22	Joseph Malherek and Michael Mariotte
316-9	I.22	

316-10	I.24.3		316-42	I.8.2	
316-11	I.25		316-43	I.11.1	
316-12	I.7.1; I.25		316-44	I.10.2	
316-13	I.4		316-45	I.22	
316-14	I.14.4		316-46	I.10.2	
316-15	I.14.1		316-47	I.5.5	
316-16	I.15		316-48	I.5.1	
316-17	I.15		316-49	I.21	
316-18	I.22		316-50	I.13.2;I.13.3	
316-19	I.12.5		316-51	I.13.3	
316-20	I.12.5		316-52	I.13.3	
316-21	I.12.2		316-53	I.19.1	
316-22	I.12.2; I.12.3		316-54	I.19.1	
316-23	I.12.2		316-55	I.20.3	
316-24	I.11.1		316-56	I.27	
316-25	I.12.2		316-57	I.1	
316-26	I.20.7		343-1	I.1	Patricia Birnie
316-27	I.20.4		343-2	I.4	
316-28	I.20.4		343-3	I.7.3	
316-29	I.20.7		343-4	I.12.5	
316-30	I.20.3		343-5	I.10.2; I.12.3; I.20.7; I.20.8;	
316-31	I.20.7		343-6	I.19.1	
316-32	I.20.5		343-7	I.14.4	
316-33	I.20.6		343-8	I.9	
316-34	I.24.1		343-9	I.3.6	
316-35	I.20.4; I.20.8		355-1	I.10.1	Cyrus Reed
316-36	I.20.4		355-2	I.12.2	
316-37	I.20.4		355-3	I.12.3	
316-38	I.20.8		355-4	I.12.2	
316-39	I.20.9				
<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>	<b>Comment No.</b>	<b>Appendix H Section</b>	<b>Commenter</b>
316-40	I.9	Joseph Malherek and Michael Mariotte	355-5	I.20.1; I.20.4; I.20.7	Cyrus Reed
316-41	I.9		355-6	I.22	



356-1	I.1	Margot Clarke	358-25	I.24.1	
356-2	I.4		358-26	I.24.1	
356-3	I.3.5		358-27	I.24.1	
356-4	I.20.4; I.20.7		358-28	I.3.1; I.3.5	
356-5	I.12.2; I.12.3		358-29	I.3.5	
356-6	I.7.3		358-30	I.17.4	
356-7	I.12.2		358-31	I.19.2	
356-8	I.12.5		358-32	I.19.1	
356-9	I.3.4		358-33	I.22	
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358-1	I.3.5	Donald Hancock	358-34	I.1; I.4; I.14.4	
358-2	I.3.1; I.3.5		358-35	I.3.2	
358-3	I.3.1		358-36	I.3.1; I.3.2	
358-4	I.3.5		358-37	I.3.5	
358-5	I.3.5		358-38	I.3.1	
358-6	I.20.3		358-39	I.3.1	
358-7	I.4		<hr/>		
358-8	I.5.3; I.7.1		365-1	I.9	Jan Saecker
358-9	I.20.3		365-2	I.11.2	
358-10	I.14.4		365-3	I.7.1	
358-11	I.20.3		365-4	I.12.5	
358-12	I.20.3		365-5	I.14.4	
358-13	I.20.7		365-6	I.10.2	
358-14	I.20.6		365-7	I.19.2	
358-15	I.20.2		365-8	I.3.5	
358-16	I.20.3; I.20.5; I.20.6		365-9	I.1	
358-17	I.20.2		<hr/>		
358-18	I.20.4		<sup>a</sup> Verbal comment received during the Louisiana Energy Services Public Meeting held on October 14, 2004.		
358-19	I.20.4				
358-20	I.12.5; I.27				

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358-21	I.12.5	Donald Hancock
358-22	I.12.5	
358-23	I.12.1	
358-24	I.12.5	



**APPENDIX I**  
**PUBLIC COMMENTS ON THE DRAFT ENVIRONMENTAL**  
**IMPACT STATEMENT AND NRC RESPONSES**

**I.1 General Opposition**

**Comment: M-1; 031-6**

Several commenters referred to environmental impacts associated with other U.S. enrichment facilities, and one commenter specifically referred to the Paducah Gaseous Diffusion Plant. The commenter indicated that several cancer-causing and other contaminants were found in the environment and wildlife around the Paducah plant (such as polychlorinated biphenyls, dioxin, plutonium, neptunium, trichloroethylene, technetium, lead, and other heavy metals). Several commenters stated that many potential effects of the proposed National Enrichment Facility (NEF) cannot be estimated in an Environmental Impact Statement (EIS) and recommended that the U.S. Nuclear Regulatory Commission (NRC) pursue the no-action alternative.

*Response: As discussed in sections 2.1.2 and 2.2.2.3 of the draft EIS, the proposed NEF would use different technologies for enriching uranium from the Portsmouth and Paducah Gaseous Diffusion Plants. The proposed NEF would use centrifuges, while the Paducah and Portsmouth plants use a gaseous diffusion process. The Paducah plant produced enriched uranium for several decades and supported both the commercial nuclear power industry and nuclear weapons production. The proposed NEF operations would not require the types or quantities of chemicals needed at Paducah. Polychlorinated biphenyls, dioxin and trichloroethylene, and a number of heavy metals (cesium, beryllium, cadmium, copper, lead, nickel, silver, zinc, and vanadium) are not proposed for use at the proposed NEF. The proposed NEF would comply with NRC, State, and U.S. Environmental Protection Agency (EPA) standards for the protection of health and safety and the environment.*

*The NRC staff believes the Draft EIS presents a complete analysis of the impacts of the proposed action. As discussed in section 2.2.1 of the Draft EIS, the no-action alternative would occur if the NRC concludes based on its safety review that a license for the proposed NEF should not be issued. The impacts of the no-action alternative are discussed in section 4.8 of the EIS.*

**Comment: 032-13; 032-18; 043-6; 245-1; 245-2**

Several commenters expressed opposition to the proposed NEF and requested that the NRC deny the license application. Commenters also expressed opposition to the nuclear power industry.

*Response: The NRC staff recognizes that some commenters are opposed to the proposed NEF and to nuclear power. These comments are beyond the scope of the EIS.*

**Comment: 032-50**

A commenter expressed frustration with the residents and other individuals who support the proposed NEF.

*Response: The credentials or credibility of other commenters is outside the scope of the EIS.*

**Comment: 033-5**

A commenter stated that Louisiana Energy Services (LES) and local government officials have failed to provide full disclosure on the effects of the proposed NEF.

*Response: LES has provided the following documents for NRC staff review: a Safety Analysis Report, an Environmental Report, an Emergency Plan, and an Integrated Safety Analysis Summary. The NRC recognizes that while all of these documents are not publicly available, the staff is evaluating them as part of the safety and environmental reviews and made publicly available all information that does not represent a security or business proprietary concern. LES and local government officials participated in public meetings held as part of the EIS development process. The Draft EIS analyzes impacts and actions considered to be within the scope of the proposed action as described in section 1.2. The NRC staff revised the EIS to incorporate information provided in public comments on the Draft EIS, as well as information provided during the hearings, and updated information about the proposed NEF.*

**Comment: 105-8; 358-34; 365-9**

Commenters stated that the proposed NEF is too dangerous to be constructed and that the EIS should conclude the same.

*Response: The proposed NEF would only be licensed if the NRC finds that public health and safety and the environment would be adequately protected. The conclusions regarding environmental impacts provided in section 2.4 of the Draft EIS have not changed. Safety issues that are not within the scope of the EIS are addressed in the NRC's Safety Evaluation Report (SER).*

**Comment: 284-14; 316-57; 343-1; 356-1**

Commenters provided general statements that the Draft EIS is inadequate and requested that the inadequacies be addressed before continuing the licensing process.

*Response: Consistent with the requirements of the National Environmental Policy Act of 1969 (NEPA), the NRC staff evaluated and compared the environmental impacts of the proposed action and its alternatives. The Draft EIS described the proposed action (Chapters 1 and 2), the purpose and need for the action (Chapter 1), alternatives to the proposed action (Chapter 2), potentially affected environment (Chapter 3), the direct and indirect environmental impacts of the proposed action (including depleted uranium hexafluoride [DUF<sub>6</sub>] waste disposition) and proposed mitigation (Chapters 4 and 5), and the cumulative impacts of the proposed action (Chapter 4). The analysis contained in the Draft EIS fully considered the environmental impacts of the proposed action and was consistent with the types of analyses performed in other NEPA documents prepared by the NRC. The NRC staff reviewed the Draft EIS and concluded that the environmental analysis adequately met NEPA requirements in the NRC regulations. The Commission will not make a final decision on whether to grant a license for the proposed NEF until after the NRC conducts a public hearing.*

## **I.2 General Support**

**Comment: A-1; A-2; B-1; C-1; C-2; D-1; D-2; E-1; E-2; F-1; F-2; G-1; H-1; H-2; I-1; I-2; J-1; J-2; K-1; K-2; 001-4; 001-19; 002-1; 002-2; 005-2; 005-3; 006-1; 007-1; 007-2; 007-3; 007-4; 007-5; 007-6; 007-7; 009-1; 010-1; 010-2; 010-3; 011-2; 011-3; 016-1; 016-2; 018-2; 018-3; 020-2; 021-1; 021-2; 022-1; 022-2; 022-3; 022-4; 024-1; 025-1; 025-2; 025-4; 026-1; 026-2; 026-4; 026-5; 027-1; 027-2; 027-3; 027-4; 028-1; 028-2; 028-3; 028-4; 029-1; 029-2; 029-4; 030-2; 045-1; 046-1; 046-2; 046-3; 046-5; 046-6; 047-1; 047-3; 047-4; 047-5; 047-6; 051-1; 051-2; 052-2; 053-1; 053-2; 054-1; 054-2; 054-3; 058-1; 058-2; 059-2; 060-1; 061-2; 061-3; 062-1; 062-2; 062-3; 062-4; 062-5; 062-6; 063-1; 065-2; 065-3; 066-1; 066-2; 066-3; 067-1; 068-1; 068-2; 069-1; 069-2; 070-1; 070-2; 071-1; 072-1; 072-2; 073-1; 073-2; 073-3; 074-1; 076-1; 077-1; 078-1; 079-1; 079-2; 079-3; 080-1; 080-2; 080-3; 081-1; 082-1; 082-2; 082-4; 084-1; 084-2; 084-3; 085-1; 085-2; 085-3; 086-1; 086-2; 087-1; 088-1; 088-2; 089-1; 089-2; 090-1; 090-2; 090-3; 091-1; 091-2; 092-1; 093-1; 094-1; 095-1; 095-2; 096-1; 096-2; 097-1; 097-2; 097-3; 098-1; 098-2; 099-1; 100-1; 100-2; 109-1; 149-1; 149-2**

Commenters made general statements of support for the proposed NEF. Some reasons provided for the support include: diversification and improvement of the local economy, introduction of high-technology in southeastern New Mexico, the level of safety and low environmental impacts, quality of life improvements, proposed LES partnerships with local community initiatives (such as education), and improvement in the reliability of domestic energy supply and security. Many commenters encouraged the NRC staff to approve the license application.

*Response: The NRC developed this EIS in accordance with its NEPA-implementing regulations in 10 Code of Federal Regulations (CFR) Part 51. The NRC would only approve the license application after the EIS and SER are complete and it has concluded that the construction, operation, and decommissioning of the proposed NEF would meet its environmental and safety requirements.*

### **I.3 NEPA Process**

#### **I.3.1 Document Availability**

##### **Comment: 034-1**

A commenter asked if the Draft EIS is available in Spanish.

*Response: Only the Executive Summary is available in Spanish. It can be obtained through the NRC's Agencywide Documents Access and Management System (ADAMS), available via the NRC's web site.*

##### **Comment: 037-1; 358-28**

A commenter noted that an important document on waste disposal costs was unavailable, and many other documents cited as sources were not available to the commenter. The commenter noted that there is no public document room in New Mexico and the electronic public document room was unavailable for much of the comment period. Another commenter expressed a concern that EIS supporting documentation was not conveniently available for review.

*Response: The information provided in the reference (i.e., cost of disposal) was reflected in section 7.2.3 of the Draft EIS. To access supporting documents, anyone may contact the NRC's Public Document Room by telephone, email, or fax and submit a request. The Public Document Room staff is available to supply documents (electronic or hard copy) to anyone who asks for them.*

##### **Comment: 093-4**

A commenter asked when the safety evaluation would be conducted and when it would be available.

*Response: The safety evaluation has been completed and the SER should be published by June 2005.*

##### **Comment: 358-2**

The commenter stated that the NRC should publish a supplemental Draft EIS for public comment that would address the redaction process.

*Response: If significant new information or considerations are identified concerning the proposed NEF and related operations, it is possible that a supplement to the EIS would need to be prepared in accordance with 10 CFR § 51.72. A supplement to the Draft EIS for the redaction process will not be prepared because the redaction did not hinder the NRC's evaluation of impacts associated with the proposed NEF. Furthermore, the NRC staff has determined that the supplementation criteria in 10 CFR § 51.72 were not met.*

**Comment: 358-2; 358-36; 358-38; 358-39**

A commenter asked whether the NRC would make publicly available all comments on redacted portions of the Draft EIS and, if not, what the NRC's legal authority is to withhold such comments. The commenter asked how the NRC will respond to comments on redacted portions of the Draft EIS. The commenter requested that the NRC's criteria for removing sensitive information also be made public.

*Response: The NRC staff responses to comments on redacted portions of the EIS are presented in this appendix. The NRC did not withhold any comments; comments are provided in Appendix J of the EIS. The NRC staff's review criteria to identify sensitive information in fuel cycle documents are publicly available on the NRC's web site (<http://www.nrc.gov/materials/fuel-cycle-fac/review-criteria-fuel-cycle.html>).*

**Comment: 358-3**

The commenter asked about the NRC's legal authority to redact the information. The commenter indicated that 10 CFR § 2.390 does not mention NEPA; hence, it is an inadequate basis for redacting information under NEPA. The commenter also stated that the specific paragraph in that regulation (paragraph [d]) does not apply to much of the information redacted.

*Response: In issuing a redacted version of the Draft EIS, the NRC was acting within its authority under NEPA. As discussed in section H.4.1.4 of Appendix H, agencies have a duty to balance the need for public disclosure of relevant information with the need to protect sensitive information that could, in the wrong hands, pose a danger to the public. To this end, 42 U.S.C. Section 4321 et. seq. of NEPA contemplates that, in a given situation, a Federal agency may withhold portions of the relevant NEPA document from public disclosure. Section 102(2)(c) of NEPA provides that public disclosure of documents prepared pursuant to NEPA is governed by the provisions of the Freedom of Information Act, 5 U.S.C. Section 552. Congress intended the Freedom of Information Act to balance the public's need for access to official information with the need to protect certain information from public disclosure.*

**I.3.2 Comment Period**

**Comment: 037-1; 037-2; 358-35; 358-36**

Several commenters requested that the NRC extend the Draft EIS comment period for at least 30 days beyond the final deadline. One commenter stated that the comment period should be extended from the time the NRC makes publicly available its criteria for removing sensitive information from public view.

*Response: The NRC reviewed the comments requesting additional time to comment and concluded that the participation process had provided sufficient time and opportunities for the public to bring forward issues and concerns for the NRC's consideration. The NRC provided a 113-day comment period on the Draft EIS, a period which exceeds the 45-day period generally provided under NRC regulations (10 CFR § 51.73). In view of the expanded opportunities for public comment on the Draft EIS, earlier NRC staff efforts to solicit public involvement in the EIS scoping process, and public meetings held during the comment period, the NRC staff concluded that an additional extension of the comment period was not warranted. The NRC received thousands of comments from several hundred commenters by the January 7, 2005, comment period closing date. The NRC staff concluded, therefore, that the short length of time during which the EIS was not available did not preclude meaningful and substantial public comment on the Draft EIS. Additional information on the opportunity for comment during the public comment period is provided in section H.2.4 in Appendix H.*

**Comment: 041-5; 151-3; 151-10**

Commenters expressed disappointment that the public participation process was hindered by the NRC's effort to remove sensitive information from its publicly available document library. One commenter noted that the written notice of deadline extension was received on January 3, 2004, and that this was insufficient notification. A commenter also noted that the link to the NRC's web site provided out-of-date information concerning the deadline extension. The commenter stated that the unavailability of this information effectively served to "confuse and deflect additional public scrutiny of this project."

*Response: The NRC staff extended its public comment period until January 7, 2005. This extension allowed for a 113-day comment period. The NRC staff recognizes that deadline notifications transmitted via regular mail were indeed slower to reach their recipients. However, the NRC staff also published a notice in the Federal Register (69 FR 76485; December 21, 2004) and issued press releases on the extension of the public comment period. Further, all concerned were encouraged to call or email the staff directly with any questions regarding the EIS process. The NRC staff regrets that the web site was not updated immediately to reflect the change in status of the EIS comment period. It was not the NRC staff's intent to deflect public scrutiny. The staff considered comments received after the January 7, 2005, deadline and concluded that none had raised issues not already captured in timely comments or considered in the EIS.*

**Comment: 151-2**

A commenter stated that there was inadequate notification and solicitation of comment. The commenter questioned whether due consideration was provided to the solicitation of input from stakeholders, tribes, or regional authorities.

*Response: Section H.2 of Appendix H discusses public participation opportunities. The publication of the Draft EIS was announced in the Federal Register. Since publication, any party who wished to comment on the Draft EIS could receive a copy of the report and submit comments. The Draft EIS was also available on NRC's web site and in NRC's ADAMS, which is also available through the web site. State agencies were consulted on an as-needed basis.*

**I.3.3 Public Meetings**

**Comment: 041-5**

A commenter expressed disappointment in the public meeting on the Draft EIS in Eunice, New Mexico, and in the lack of opportunity to address the meeting participants in person. The commenter stated that the meeting was too long and no effort was made to allow far-traveled individuals to speak first.

*Response: The NRC staff intends that those who wish to be heard during NRC public meetings are given a chance to speak. The NRC staff provided an opportunity for interested members of the public to register to speak in advance of the meeting. In addition, members of the public could also sign up to speak at the meeting. The NRC staff encourages people who wish to speak first at public meetings to notify the meeting facilitator of their time and travel constraints. Everyone who requested to speak at the meeting was given this opportunity.*

### **I.3.4 Completeness (General)**

#### **Comment: L-1; 316-3**

Many commenters stated that the Draft EIS does not fully meet the NEPA requirement that an EIS must consider the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. The commenters stated that the cumulative impacts of the nuclear fuel cycle, nuclear power generation, and nuclear waste management should be analyzed in the EIS.

*Response: The assessment of the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity is presented in section 4.7 of the Draft EIS. The NRC staff determined that the discussion in section 1.4.3 of the Draft EIS adequately addresses the impacts of the proposed NEF in the fuel cycle. Impact assessments of the nuclear fuel cycle, nuclear power generation, and nuclear waste management are presented in the NEPA-required documents when those separate licensing actions are undertaken.*

#### **Comment: L-16; 151-6; 356-9**

Many commenters stated that the Draft EIS does not include a complete evaluation of the environmental impacts of the proposed facility. Until the comments are adequately addressed and resolved, commenters suggested that the NRC staff's recommendation that the license for the proposed NEF be approved is premature. One commenter stated that the license application process for the proposed NEF has segmented activities that are directly connected to the proposed action. (The commenter cited as an example a lack of detail concerning management plans for interstate transportation of nuclear materials and wastes.) The commenter asked how affected communities are expected to provide input if the no-action alternative is not available.

*Response: The NRC staff believes the Draft EIS presents a complete analysis of the impacts of the proposed action. The EIS has been revised in light of public comments, information provided during the hearings, and updated information about the proposed NEF. Changes to the EIS as a result of these sources of input are summarized in Chapter 1 of the EIS. If the NRC determines that the license application for the proposed NEF sufficiently satisfies regulatory requirements for safe operation and protection of health, safety, and the environment, then the NRC would issue a license following a hearing before the licensing board. The no-action alternative remains a possibility because the NRC could determine that a license should not be issued for the proposed NEF. In this case, the proposed NEF would not be constructed, operated, or decommissioned.*

*All of the impacts associated with activities under the proposed action (construction, operation, and decommissioning of the proposed NEF) are addressed in the EIS. The NRC staff believes that the EIS does not segment activities that are directly connected to the proposed action. Connected actions are considered regardless of whether they are within the licensing scope or are regulated by the NRC. For example, impacts associated with the transportation of feed material, product, and waste are analyzed in section 4.2.11 of the EIS. The NRC regulates the packaging of transported materials, but such activities are licensed separately. Transportation routes and modes are under the jurisdiction of other agencies (such as the U.S. Department of Transportation [DOT]).*

#### **Comment: M-10**

Several commenters requested that the phrases "short-term uses of the environment" and "long-term productivity" be defined. The commenters suggested that if 30 years is considered long-term, then many of the environmental effects of the proposed NEF, particularly emissions of uranium to air and water,



should also be considered long-term. The commenters requested that the NRC identify areas in the EIS where this is considered.

*Response: The NRC staff revised section 4.7 of the EIS to define short-term and long-term to be consistent with the Council on Environmental Quality's definition as well as the definition provided in section 5.8 of NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." Short-term represents the period from start of construction to end of the proposed action, including decommissioning (NRC, 2003). Long-term represents the period beyond license termination.*

**Comment: 031-4; 032-8**

Commenters requested that the NRC allow the New Mexico Attorney General and the New Mexico Environment Department to participate in the LES hearings on the issues of terrorism, national security, LES financial qualifications, decommissioning funding, and waste disposal.

*Response: The hearing process is explained in section H.4.1.1 of Appendix H. Contentions from the New Mexico Attorney General and the New Mexico Environment Department were reviewed by the NRC's Atomic Safety and Licensing Board (ASLB) independently from the EIS and licensing processes, and the appropriate contentions were allowed into the hearings. Terrorism and national security are discussed in section H.4.1.5 of Appendix H.*

**Comment: 031-5**

A commenter requested that the NRC include in the Draft EIS a clear statement of why the license for the Almelo Urenco plant in the Netherlands was revoked twice.

*Response: The NRC does not regulate foreign facilities including the Almelo Urenco plant. This comment is beyond the scope of the EIS.*

**I.3.5 Completeness (Redaction)**

**Comment: 151-9; 284-6; 356-3**

Commenters expressed a concern that the redaction of portions of the EIS due to security concerns is contradictory to NRC's policy not to consider issues of terrorism in an EIS. One commenter recommended that the license proceeding be halted until a consistent policy is defined. Another commenter stated that issues raised previously concerning security were not addressed. The commenter also expressed concerns about Urenco's handling of sensitive technical information. Another commenter stated that the NRC must exercise caution in its consideration of the license application, especially in light of challenges such as waste disposal and security threats.

*Response: As the commenters noted, the NRC has determined that issues of terrorism in the context of NEPA (NRC, 2002) should not be addressed. The decision to withhold sensitive information in the Draft EIS from public view addresses a need to ensure security with regard to currently available information about existing facilities and operations. This issue is separate from the NRC's decision to license the proposed NEF. The licensing decision will be based on an assessment of the applicant's license application and consideration of the environmental impacts of the proposed action. Security issues associated with the proposed NEF will be evaluated in the NRC staff's safety review. The results of that evaluation will be documented in the SER.*

*Any facility licensed by the NRC is required to fully comply with NRC regulations and license conditions, including those that relate to security. The NRC agrees that it needs to be cautious in its decision*

*making, and takes seriously its responsibility to protect public health and safety and the environment. The NRC would not issue a license for the proposed NEF without a strategy for managing the depleted uranium wastes, which is discussed in section 4.2.14.*

**Comment: 295-1; 316-1; 358-1; 358-2; 358-4; 358-5; 358-28; 358-29; 358-37; 365-8**

Several commenters asked about the status of the original (unredacted) Draft EIS and stated that the redacted Draft EIS contains less information about some issues, hindering a thorough review of the document. Commenters indicated they wished to comment on the redacted information and listed a number of areas in the Draft EIS where they were not able to comment adequately. One commenter stated the redacted EIS does not include a “hard look” analysis of impacts.

*Response: The September 2004 Draft EIS was replaced by the redacted Draft EIS in December 2004. The NRC believes the redacted Draft EIS provides a complete discussion of the environmental impacts stemming from the proposed action. Where possible, information previously redacted in the Draft EIS has been made available with modifications as necessary to protect sensitive information. However, if part of a NEPA document, such as an EIS, would be exempt from public disclosure under the Freedom of Information Act, the Agency has the authority to restrict public access to that part of the EIS.*

### **I.3.6 Role of the NRC**

**Comment: 025-3**

A commenter stated that the NRC should monitor the construction and operation of the proposed NEF to ensure that it meets standards and specifications necessary to maintain the existing quality of life.

*Response: The NRC would monitor the proposed NEF against the terms of the license, if a license is issued.*

**Comment: 343-9**

The commenter stated that there are many objections to locating the proposed NEF in Lea County. The commenter stated that the NRC must protect the public and not be an advocate for the nuclear industry.

*Response: The NRC agrees that its mission is to protect public health and safety and the environment. The NRC’s mandate is to ensure the safe use of nuclear materials and, as such, it must consider the issuance of licenses to applicants who wish to conduct operations involving these materials. Because LES submitted an application for a license at a facility to be located in Lea County, the NRC staff must evaluate that application as submitted. As discussed in section 2.2.2.1 of the EIS, LES evaluated other sites before submitting its license application. These were eliminated from further consideration.*

### **I.4 Purpose and Need**

**Comment: L-5; 316-13; 343-2; 356-2**

Several commenters questioned how the NRC justifies its statement that nuclear-generating capacity is expected to increase in the United States. The commenters stated that (1) no new nuclear power reactor has been ordered in a quarter of a century and many reactors are reaching the end of their operating licenses; (2) no company has received a license to build a new reactor; (3) no company has expounded an explicit plan to build a new nuclear reactor; and (4) Wall Street does not seem to have an interest in funding a new generation of nuclear reactors, even with government support.

*Response: Section 1.3 of the Draft EIS states that current nuclear-generating capacity in the United States is projected to increase. The approximate 5-percent increase in nuclear-generating capacity that*

*is expected to occur through 2025 is primarily based on the ongoing reviews and approvals of uprate licensing requests for existing nuclear plants. Plant uprates (i.e., the process of increasing the maximum power level at which a commercial nuclear power plant may operate) are expected to add approximately 3.9 gigawatts of nuclear-generating capacity. Some plants are also expected to submit applications to install additional reactors at existing sites (e.g., Dominion Power has submitted an early site permit application to expand its plant by up to two reactors). The nuclear-generating capacity is therefore currently increasing and is projected to continue to do so.*

**Comment: M-4; M-9; Z-1; 048-1; 103-5; 103-11**

Several commenters noted the following statements in the Draft EIS should be clarified because they appear to be inconsistent with respect to the percent of separative work units (SWUs)/enrichment services provided by domestic services.

- Section 1.3 - The following statement refers to SWUs purchased by U.S. nuclear reactors: “In 2003, the domestic enrichment services provided 14 percent of the 12 million SWUs purchased.”
- Section 1.3 - “United States Enrichment Corporation (USEC) provides approximately 56 percent of the U.S. enrichment market.”
- Section 4.8 - “In the domestic market, USEC currently supplies approximately 56 percent of enriched uranium needs while foreign suppliers provide the remaining 44 percent.”

Several commenters asked for the total yearly percentage of U.S. enriched uranium supply that the proposed NEF would produce.

*Response: The NRC staff revised and clarified sections 1.3 and 4.8 of the EIS regarding the percentage of enrichment services provided by domestic services. USEC operates the Paducah Gaseous Diffusion Plant which is able to produce approximately 14 percent of the current U.S. demand for low-enriched uranium. USEC also imports down-blended (diluted) weapons grade uranium from Russia which is used to satisfy an additional 42 percent of the U.S. demand. The combination of low-enriched uranium from U.S. production plants and low-enriched uranium from down-blended Russian weapons provides about 56 percent of the low-enriched uranium required by the U.S. market. Beginning production in 2008 and achieving full production output by 2013, the proposed NEF would provide roughly 25 percent of the current and projected U.S. enrichment services demand.*

**Comment: M-8**

Several commenters stated that the EIS should explain how the proposed NEF is anticipated to increase U.S. independence from foreign enriched uranium sources. In addition, the commenters requested that a table be provided to show the total estimated amount of enriched uranium that would be required for U.S. energy production by year, in comparison with the amount that would be produced by the proposed NEF.

*Response: As discussed in section 1.3 of the Draft EIS, although the proposed NEF would increase the quantity of domestically produced low enriched uranium, it would not totally eliminate the need to import low enriched uranium from foreign sources. Any increase in domestically produced product would correspondingly reduce the need for imported material. Table 1-1 provides the projected uranium enrichment demand in the U.S. for 2002 to 2025; beginning production in 2008 and achieving full production output by 2013, the proposed NEF would provide roughly 25 percent of the current and projected U.S. enrichment services demand.*

**Comment: S-1; 151-4**

Commenters stated that definitive uses for all material produced by the proposed NEF must be provided, and it should be made clear if any material produced would be used outside the United States or for any other purpose than power generation within the United States. One commenter stated that basic questions arise regarding actual production from U.S. enrichment facilities in comparison with actual demand from existing generating facilities. The commenter asked whether unstated administration policy exists to expand the construction of nuclear power plants in the near future.

*Response: Although it is possible that LES could export enriched product, LES has not committed to the export of low-enriched uranium UF<sub>6</sub> from the proposed NEF. Any export from the proposed NEF would require a NRC export license in accordance with 10 CFR Part 110. Shipments of low-enriched uranium in the form of UF<sub>6</sub> must be made in accordance with DOT and appropriate NRC regulations. As stated in section 1.3 of the Draft EIS, “the Administration’s energy policy...called the expansion of nuclear energy dependence ‘a major component of our national energy policy.’”*

**Comment: 038-9**

A commenter stated that the NRC needs to carefully consider the need of the facility given alternatives at USEC.

*Response: Section 1.3 of the Draft EIS discusses the need for the proposed NEF. Based on an assessment of the need, it is expected that sufficient demand exists for the proposed NEF. Alternatives to the proposed action were discussed in section 2.2 of the Draft EIS. The NRC staff considered alternatives at USEC, including the more energy-intensive gaseous diffusion technology and the proposed American Centrifuge Plant, which would support the demand for enriched uranium.*

**Comment: 103-3; 103-10**

A commenter stated that the NRC should consider the need for the proposed NEF in light of several considerations, such as the supply that could be provided by mixed oxide fuel (MOX), the disposition of the surplus of weapons plutonium, any additional enriched uranium from Russia, increased burnup of fuel at the power reactors, relative costs of domestic and foreign provided SWUs, and cost of uranium, among others. The commenter suggested that the EIS evaluate plausible scenarios relating to these important economic variables.

*Response: Increased burnup of fuel at commercial nuclear power reactors and the current increasing cost of uranium are too speculative to reasonably consider at this time. The use of MOX fuel and downblending of Russian highly enriched uranium were considered in the assessment of need for the proposed NEF in section 1.3 of the Draft EIS .*

**Comment: 103-4**

A commenter referred to a statement in the Draft EIS indicating that only 15 and 14 percent of enrichment services purchased by U.S. nuclear power plants in 2002 and 2003, respectively, were provided by U.S. enrichment facilities. The commenter asked why this is so and stated that the EIS should clarify the reason for the specified percentages.

*Response: As stated in section 1.3 of the EIS, the only operating enrichment plant in the United States is operated by the USEC in Paducah, Kentucky, which is able to produce about 14 percent of the U.S. demand. USEC also down-blends (dilutes) high-enriched uranium from Russian atomic weapons to furnish an additional 42 percent of the U.S. demand. The remainder of the U.S. demand is met by importation from foreign suppliers. This importation is required because the United States does not have sufficient production capacity. Construction and operation of the proposed NEF would provide the United States with additional production capacity and another supplier of low enriched uranium.*

**Comment: 103-5**

A commenter stated that the EIS should specify what fraction of uranium to uranium hexafluoride (UF<sub>6</sub>) conversion services were provided by domestic facilities as opposed to foreign facilities. The commenter stated this should be compared with the fraction of oil consumed in the United States that is refined in domestic facilities.

*Response: As discussed in section 2.1.7 of the Draft EIS, the United States has one operating uranium conversion facility in Metropolis, Illinois. The closest foreign source for uranium to UF<sub>6</sub> conversion is Port Hope, Ontario, Canada. These two facilities would be the primary suppliers of the feed material for the proposed NEF. A percentage breakdown would depend on supply and cost of the feed material and is beyond the scope of this EIS. The ratio of oil consumed in the United States versus oil refined in the United States is beyond the scope of the EIS.*

**Comment: 358-7**

A commenter stated that the Draft EIS should consider the alternative of purchasing low-enriched uranium from foreign sources, an alternative which the Draft EIS rejects. The commenter stated that the U.S. Department of Energy's (DOE's) "Report to Congress on Maintenance of Viable Domestic Uranium, Conversion and Enrichment Industries" does not support the development of the proposed NEF.

*Response: As discussed in section 1.3 of the Draft EIS, utilities in the United States want alternative domestic sources of enrichment. DOE supports use of Urenco technology in the United States (DOE, 2002).*

**Comment: 358-34**

A commenter stated that the proposed NEF is not needed or financially viable, and the EIS should reach the same conclusion.

*Response: Section 1.3 of the Draft EIS discusses the purpose and need for the proposed action. Issues related to safety and financial qualifications that are not within the scope of the EIS are addressed in the NRC staff's SER. The issue of financial viability is beyond the scope of the EIS.*

## **I.5 Scope of the Analysis**

### **I.5.1 General**

**Comment: 031-10**

A commenter requested that the NRC include in its EIS a statement that the NRC has investigated Citizens' Nuclear Information Center's web site and found no false information regarding the NRC.

*Response: The NRC does not verify the credibility or factual content of privately-held individual web sites.*

**Comment: 032-25; 047-7; 316-48**

Commenters stated that the proposed NEF could remain in operation longer than 30 years and asked about the likelihood that this would occur. One commenter asked how long comparable European Urenco facilities operate.

*Response: 10 CFR § 70.33 allows a licensee to file an application to extend the duration of the license. If LES chooses to apply for NRC approval to continue operations beyond 30 years, the NRC would perform a separate safety and environmental review. The NRC cannot project the likelihood that LES would*

apply for an extension. Uranium enrichment using gaseous centrifuge technology in Europe began in the 1970's at the Urenco-Capenhurst and Almelo facilities, which are currently operating.

**Comment: 032-49**

A commenter expressed concern regarding issues that were identified as being outside the scope of the EIS by the NRC.

*Response: The NRC staff included a discussion of out of scope issues in section H.4.1 of Appendix H.*

**Comment: 105-6**

A commenter stated that it is necessary to fully evaluate every contingency of operation that has not yet been decided upon.

*Response: The NRC staff performs detailed safety and environmental reviews that inform any decision to issue a license. If a license is granted to LES for construction, operation, and decommissioning of the proposed NEF, the NRC staff would ensure that public health, safety, and security would be protected. The NRC staff would also ensure that emergency situations are accounted for in the proposed NEF's comprehensive emergency response plan.*

**Comment: 284-5**

A commenter expressed concern that the EIS uses different levels of analysis (local, regional, State, national, global) without accounting for problems that arise when shifting from one level to another.

*Response: The scope of the analysis of impacts is specific to the resource being reviewed. For example, land use impact is primarily a local issue and does not have national or global implications. Air quality is typically a regional issue because regulators primarily manage air quality on a regional basis. Impacts to water resources is a local and regional issue, but does not have national implications. The need for the facility is presented nationally because the proposed NEF is needed to supply fuel production facilities and, ultimately, power plants nationwide; but the need is not impacted by local influences because there are no nuclear power plants in the area.*

**Comment: 316-5**

A commenter noted that Chapter 4 of the Draft EIS is limited in scope and vision. As an example, the commenter stated that section 4.7, "Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity," fails to adequately consider the long-term hazards created by depleted uranium waste (or irradiated fuel rods) upon the long-term productivity of natural resources.

*Response: Section 4.7 discusses short term uses and long-term productivity with respect to the proposed NEF, as required under NEPA and NRC's implementing regulations. The NRC staff believes the Draft EIS presents a complete analysis of the direct, indirect, and cumulative impacts of the proposed action. The impacts associated with the management of DUF<sub>6</sub> are presented in section 4.2.14.3 of the Draft EIS.*

## **I.5.2 Safety Review Process**

**Comment: M-11**

Several commenters stated that the NRC's inspection program must be outlined in either the EIS or the SER. If in the SER, the commenters also requested that the public be allowed to review and comment on the SER to make certain that the NRC is adequately ensuring the health and safety of community members through proper and timely inspections.

*Response: Inspections would be addressed during the safety review; however, details of the inspection program would not be included in the SER. Inspection schedules and procedures would be developed and implemented by the NRC regional office (Region II) responsible for conducting inspections. The purpose of these inspections is to ensure the licensee meets regulatory requirements and licensee commitments. Inspection procedures for routine inspections during operations are available to the public on the ADAMS, which is accessible via the NRC's web site. Section H.4.1.3 of Appendix H discusses the NRC staff's safety review process. The NRC's standard practice is not to issue a Draft SER for public comment. However, the NRC intends to hold a public meeting after the SER is published.*

**Comment: M-62; M-63**

Several commenters requested that the SER address the funding and emergency preparedness of first responders, fire departments, and police departments in Lea and Eddy Counties in New Mexico and Andrews County in Texas. The commenters requested that the analysis address the capability of the Lea County Regional Medical Center to respond to an emergency at the proposed NEF.

*Response: Issues of emergency preparedness at the proposed NEF are not directly related to the EIS but to the NRC staff's safety evaluation. LES's emergency plan is intended to address emergency response activities for the proposed NEF. The NRC staff's review of the emergency response plan is documented in the SER. Additional information about NRC's emergency preparedness and response program is available on the NRC's web site.*

**Comment: M-64**

Several commenters asked what the NRC's rationale is for not releasing the SER for public comment. The commenters asked whether the SER is required by a regulation and, if so, which regulatory agency would authorize the SER. The commenter asked if the information contained in the SER would be sensitive or classified and requested that the SER be released for a public comment period.

*Response: The SER is generated by the NRC staff to document the staff's evaluation of the safety aspects of the proposed facility. It provides the technical basis for issuing a license, and is not required by regulations. Section H.4.1.3 of Appendix H discusses the NRC's safety review process. The NRC's standard practice is not to issue a Draft SER for public comment. However, the NRC's staff intends to hold a public meeting after the SER is published.*

### **I.5.3 Ownership**

**Comment: 031-1; 032-22; 033-4; 358-8**

Several commenters expressed concern that LES would be foreign-owned and that the proposed NEF should not be considered a domestic enrichment source. Other commenters questioned the reputation of LES or Urenco.

*Response: The comments raise issues that are beyond the scope of the EIS. As discussed in section 1.6 of the Draft EIS, the issues of foreign influence and control will be addressed in the NRC staff's SER. Regardless of ownership, the proposed NEF would be fully subject to NRC regulations for uranium-enrichment facilities.*

**Comment: 103-1; 103-2; 103-7; 103-25**

A commenter stated that the EIS should specify what organization would own the proposed NEF, special nuclear material, source material, and byproduct material during various stages. The commenter asked when ownership would transfer from the customer to LES, if LES would own the DUF<sub>6</sub>, at any stage.

*Response: The NRC staff revised section 3.1 of the EIS to clarify that LES would own the proposed NEF operations, while the property and facilities would remain under Lea County ownership until they are deeded over to LES at license termination. As discussed in section 1.2 of the Draft EIS, a license for the proposed NEF would allow LES to possess feed and product materials so that it could process its own materials. As a general rule, however, the utility would own the feed material (classified as source material) and the enriched uranium (special nuclear material). LES would own the waste (source material) and byproduct material (in the form of sealed sources and residual contamination from processing). The NRC staff revised section 2.1.9 of the EIS to reflect this information.*

### **I.5.4 Nuclear Fuel Cycle**

**Comment: 185-1**

A commenter expressed concern about uranium mining and enrichment and stated that spent nuclear fuel should be reprocessed and used.

*Response: The United States did not develop a policy to reprocess spent nuclear fuel because of concerns that plutonium from reprocessed civilian spent nuclear fuel potentially could be used for nuclear weapons production. Also, natural uranium is relatively abundant. On April 7, 1977, President Carter announced that the United States would defer indefinitely the reprocessing of spent nuclear fuel from commercial nuclear power reactors and discourage reprocessing of spent nuclear fuel abroad. President Clinton reiterated the United States' position on reprocessing in a statement on Nonproliferation and Export Control Policy, saying that, "the United States does not encourage the civil[ian] use of plutonium and, accordingly, does not itself engage in plutonium reprocessing for either nuclear power or nuclear explosive purposes" (White House, 1993). Since the consideration of a reprocessing alternative would require a change in U.S. nonproliferation policy and could introduce foreign policy and national security concerns, the NRC staff did not consider reprocessing to be a reasonable alternative and, therefore, did not discuss it in the EIS.*



### **I.5.5 Proposed NEF Facilities**

#### **Comment: 048-16**

A commenter stated that the EIS should also discuss the Separations Building gaseous effluent vent system in section 2.1.7 of the Draft EIS.

*Response: The NRC staff revised section 2.1.7 of the EIS to include the Separations Building gaseous effluent vent system.*

#### **Comment: 316-47**

A commenter requested that the EIS indicate whether any chlorofluorocarbons would be used, produced, or released by the proposed NEF as is the case at other uranium enrichment plants.

*Response: Table 4-21 of the EIS provides the process chemicals and gases to be used at the proposed NEF. No chlorofluorocarbons or hydrochlorofluorocarbons would be used at the proposed NEF. The expected emissions at the proposed NEF are summarized in section 4.2.4 of the EIS.*

### **I.5.6 Licensing Period**

#### **Comment: 048-9**

A commenter suggested the title of Table 2-5 of the Draft EIS may not accurately reflect the values given. The term “Maximum” should be removed from the table because the information provided in the table under the heading ‘Maximum’ is based on a nominal 30-year operating period (i.e., the facility operates with all available equipment up to the 30-year operating period).

*Response: As discussed in section 2.1.7 of the Draft EIS, the “Maximum” production column shown in Table 2-5 provides an upper limit bounding guide for the operation of the proposed NEF. Since the information in the table under the heading “Maximum” is based on the facility operating with all available equipment up to the 30-year time limit, the NRC staff believes the title “Maximum” is more appropriate than “Nominal.”*

#### **Comment: 048-10**

A commenter stated the information in the last three lines of Table 2-5 under the heading “Anticipated” should be deleted to be more consistent with a 30-year license period and the response provided by LES based on the NRC staff’s request for additional information.

*Response: The production totals in Table 2-5 of the Draft EIS are the same as the numbers shown in Table ER RAI 2-4A.2, which was submitted to the NRC in a letter dated May 20, 2004 (LES, 2004). The production figures are consistent with the 30-year license period, which includes the scheduled time period for decommissioning. The current operating license calls for decommissioning the proposed NEF in a staged progression.*

### **I.6 Cooperating Agencies and Consultation**

#### **Comment: M-60**

Several commenters noted that Chapter 8 of the Draft EIS indicates that ConverDyne and U.S. Ecology were not consulted in the production of the Draft EIS. The commenters stated that, if these facilities are considered options for conversion and disposal, they should be consulted and their responses to LES’s proposals discussed in the EIS.

*Response: Consultation was not necessary because information could be obtained through open sources regarding the potential that the mentioned facilities would be considered for conversion and disposal.*

**Comment: M-61; W-1; 035-1; 036-8; 151-8**

Many commenters asked why the Western Interstate Energy Board was not consulted during the development of the EIS. Other commenters asked why the Western Governors' Association, Western States, and other regional entities were not consulted or given a copy of the Draft EIS. Commenters requested that the NRC consider the input of these organizations in developing the EIS.

*Response: The NRC staff consulted with all appropriate agencies and groups, as noted in Chapter 8 of the EIS. The Western Interstate Energy Board serves as the energy arm of the Western Governors' Association. The Western Interstate Energy Board has three committees for high-level radioactive waste, mine reclamation, and regional electric power cooperation. The committee on regional electric power cooperation works to improve the efficiency of the western electric power system. The proposed NEF would be licensed to possess and use source, byproduct, and special nuclear material. Since the license, if granted, is not for the generation of electricity and the subsequent distribution, the NRC staff did not identify a need to consult with the Western Interstate Energy Board. However, the NRC did provide the Western Governors' Association copies of the Draft EIS requesting their comments. The Western Governors' Association provided comments to the NRC. (The Western Interstate Energy Board was assigned commenter number 103. See original letter in Appendix J or comments and responses in this appendix for commenter 103.) The NRC has not precluded any of the mentioned entities, or any other groups or persons, from commenting on the Draft EIS or participating in the NEPA process. Comments received from any of these entities have been catalogued and responses incorporated into the EIS text, as appropriate.*

**Comment: 034-7**

A commenter stated the State of New Mexico should be listed as an organization involved in the proposed action because the State owns the fee interest in the land upon which the proposed NEF would be sited.

*Response: The NRC staff added the State of New Mexico and Lea County as involved organizations listed in section 1.6 of the EIS.*

**Comment: 034-69**

A commenter stated that the EIS should describe the time frame for completion of tribal consultation. The commenter requested a copy of any report generated as a result of the consultation process.

*Response: In the consultation process required by Section 106 of the National Historic Preservation Act (NHPA), the NRC has consulted with the Apache Tribe of Oklahoma, Kiowa Tribe of Oklahoma, Comanche of Oklahoma, Mescalero Apache, and Ysleta del Sur Pueblo as well as Federal and State agencies including the New Mexico State Historic Preservation Office and the New Mexico State Land Office, regarding cultural and historical resources in the vicinity of the proposed NEF. A Memorandum of Agreement on archaeological sites eligible for inclusion on the National Register of Historic Places and a Treatment Plan for the archeological sites have been developed. The consultation process with the affected tribes is ongoing until the stipulations of the Memorandum of Agreement are fulfilled and the parties concur on the final report. The NRC staff included the final Memorandum of Agreement to Appendix B of the EIS.*

**Comment: 042-45**

The commenter stated that the New Mexico Environment Department and Office of the State Engineer should be contacted during the development of the EIS regarding impacts to water quality and quantity.

*Response: As stated in section 1.5.3 of the Draft EIS, the New Mexico Environment Department was not contacted regarding surface waters because the National Pollutant Discharge Elimination System (NPDES) program is administered by the EPA in New Mexico, although the State is in the process of obtaining authorization to manage the permitting process. As stated in Chapter 8 of the Draft EIS, the NRC staff contacted the Oil Conservation Division of the New Mexico Energy, Minerals and Natural Resources Department to obtain information regarding possible nearby lagoons and land farms. The NRC staff also met with the Office of the State Engineer to gather more information concerning water quality and quantity impacts. Information from that meeting has been incorporated into the EIS, as appropriate. The NRC staff also reviewed and considered New Mexico Environment Department scoping comments and any contentions admitted to the licensing proceeding that are relevant to the water resources analyses.*

**Comment: 043-4**

A commenter noted that the Draft EIS was released without complete consultation with the U.S. Fish and Wildlife Service (FWS) regarding the northern aplomado falcon and black-footed ferret.

*Response: Section 1.5.6.1 of the EIS discusses the consultation process with the FWS as mandated by the Endangered Species Act. The NRC transmitted to the FWS a copy of the Draft EIS with a letter stating its determination of “no effect” (see Appendix B). The NRC has completed consultation with the FWS.*

**Comment: 044-1**

The EPA submitted a statement indicating it has a “lack of objection” to the Draft EIS.

*Response: The NRC staff acknowledges the EPA’s conclusion.*

## **I.7 Alternatives Considered but Eliminated**

### **I.7.1 General**

**Comment: 032-20; 032-31; 284-3; 316-4**

Several commenters stated that the EIS should discuss a broader range of alternatives such as wind and solar power. Another commenter stated that the Draft EIS does not identify negative impacts (or opportunity costs) of a taxpayer-supported revival of the nuclear power industry at the expense of emerging renewable energy sources.

*Response: National energy policy issues are not within the scope of the EIS for the proposed NEF. The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of uranium enrichment services. The alternatives in the comments raise national policy issues (e.g., finding other sources of energy) that would not satisfy the need of the proposed action and therefore, such alternatives are beyond the scope of the EIS.*

**Comment: 316-12**

A commenter stated that the discussion of the no-action alternative should evaluate the benefits to public health (e.g., from deferred mining) from purchases of highly enriched uranium and from the use of other down-blended reactor fuel, including fuel from the U.S. surplus of highly enriched uranium.

*Response: The proposed action in this EIS is limited to the construction, operation, and decommissioning of the proposed NEF. The impacts associated with the no-action alternative, which is discussed in section 2.2.1 of the Draft EIS, would include only the impacts associated with not constructing, operating,*

or decommissioning the proposed NEF (i.e., direct, indirect, and cumulative environmental impacts and local socioeconomic impacts). Section 4.8 discusses these impacts.

**Comment: 358-8**

A commenter stated that if the NRC's position is that a domestic uranium enrichment plant is necessary, the NRC should consider the proposed American Centrifuge Plant at Portsmouth as a reasonable alternative to the proposed NEF.

*Response: The NRC staff considers that the proposed NEF would satisfy the need for an additional, reliable, and economical domestic source of enrichment services. The NRC staff recognizes the proposed American Centrifuge Plant as contributing to domestic enrichment services in section 1.3 of the Draft EIS. In addition, section 4.8 of the Draft EIS recognizes USEC's intentions to construct and operate the proposed American Centrifuge Plant that could supplement domestic and international demand. The section also discusses the impacts of these additional domestic enrichment facilities in the future.*

**Comment: 365-3**

A commenter stated that the safety and widespread promise of wind and solar power makes nuclear reactors obsolete, and that the United States is not capable of safely handling nuclear reactor wastes.

*Response: Alternative energy sources are beyond the scope of the EIS. Further, the commenter's statement regarding U.S. capability to safely handle nuclear wastes is beyond the EIS scope.*

## **I.7.2 Site Selection Process**

**Comment: L-2; 316-6**

Commenters stated that the description of LES's site selection process is misleading because it refers only to objective criteria and neglects the political context that led to the selection of the site in New Mexico. Commenters stated that Senator Pete Domenici of New Mexico "wooed" the company to the State of New Mexico. Commenters stated that the EIS does not mention that officials at the Federal, State, and local level in New Mexico were generally favorable to the proposed NEF.

*Response: The political context in the comment is beyond the scope of this EIS.*

**Comment: M-21**

Several commenters noted that section 2.2.2.1 of the Draft EIS states that sites under consideration by LES were disqualified if they were in proximity to operating nuclear power plants because they would require additional security measures. The commenters questioned how this rationale does not disqualify the Lea County site given that it is approximately 97 kilometers (60 miles) from the Waste Isolation Pilot Plant.

*Response: As discussed in section 2.2.2.1 of the Draft EIS, the disqualified sites were adjoining existing nuclear power plants. The distance between the proposed NEF and the Waste Isolation Pilot Plant site is over 73 kilometers (45 miles) and these locations, therefore, are not adjoining sites. The Draft EIS, as required by NEPA, provides an analysis of cumulative impacts of other past, present, and reasonably foreseeable future actions, including, where appropriate, the presence of other industrial facilities in the region to determine cumulative impacts. Due to the distance of separation, the mentioned historical activities within the State of New Mexico and the proposed NEF would not have significant cumulative impacts associated with each other.*

**Comment: 316-7**

A commenter stated that the location of the proposed NEF is isolated from other related nuclear fuel cycle facilities, requiring the shipment of radioactive and hazardous materials over great distances. The commenter stated that none of the waste processing/disposal facilities cited by LES is closer than 1,609 kilometers (1,000 miles) from the site, yet proximity to these sites does not appear to have been a criterion considered in the selection of the Lea County site. The commenter stated that previously evaluated sites in Louisiana and Tennessee would have been closer to waste processing/disposal facilities, and asked if it would be correct to assume that distance was a factor for these sites, but not for the Lea County site.

*Response: As discussed in section 2.2.2.1 of the Draft EIS, LES undertook a site selection process to identify viable locations for the proposed NEF. Among the criteria applied by LES in its site selection process were availability of good transportation routes and issues related to the disposal of low-level radioactive waste. Based on its evaluation, LES selected the proposed NEF site as its preferred site. The purpose of the NRC staff's review of the LES's site selection process was to determine whether an alternative site the applicant considered was obviously superior to the proposed NEF. The NRC staff has 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.*

### **I.7.3 Candidate Sites**

#### **Comment: L-3; L-4; 316-6; 343-3; 356-6**

The commenters stated that seven sites were eliminated because of the risk of an earthquake, but that the proposed NEF site is in a seismically active area.

*Response: The NRC staff's analysis of the site-specific seismic characteristics and the proposed NEF's design to withstand an earthquake are documented in the SER. The Lea County site does not lie in a seismically active area. According to the United States Geological Survey, the area around the proposed NEF site in Lea County has a low historical incidence of seismic activity and a low probability of future seismic activity. A map of the seismic regions of New Mexico is provided at [http://neic.usgs.gov/neis/states/new\\_mexico/hazards.html](http://neic.usgs.gov/neis/states/new_mexico/hazards.html) (USGS, 2003).*

#### **Comment: L-4; M-1; M-22; N-1; 036-2; 316-6; 343-3**

Many commenters questioned the evaluation and elimination from further consideration of the Bellefonte, Alabama, site in comparison with the Lea County site. Some commenters noted that the Bellefonte site was eliminated because a historic preservation assessment may have been required, but seven archaeological sites were identified at the Lea County site. Commenters also stated that the relocation of high-voltage transmission lines was a reason for lowering Bellefonte's rating, but a high-pressure carbon-dioxide gas line at the proposed NEF site would have to be relocated. One commenter stated that the EIS should outline the methods by which the relocation of a high-pressure CO<sub>2</sub> pipeline would be funded and the potential environmental impacts from this relocation.

*Response: As discussed in section 1.5.6.2 of the Draft EIS, the seven archaeological sites identified at the Lea County location have been evaluated by the New Mexico State Historic Preservation Office and New Mexico State Land Office. Consultation with Federally recognized Indian Tribes identified no traditional cultural properties or other culturally significant resources at any of the seven sites. A Memorandum of Agreement among LES, the NRC, Lea County, the New Mexico State Land Office, affected Indian Tribes, and the New Mexico State Historic Preservation Office has been prepared to document the sites and describe the actions taken to minimize adverse impacts on the sites (see Appendix B). Chapter 4 of the Draft EIS discusses the environmental impact of relocating the line for construction of the proposed NEF (e.g., section 4.2.1.1 discusses the land use impacts resulting from relocating the CO<sub>2</sub> pipeline). Chapter*

7 of the Draft EIS also discusses the cost of relocating the high-pressure carbon dioxide line on the Lea County site, which is included in the cost of construction of the facility.

As discussed in section 2.2.2.1 of the Draft EIS, the Bellefonte, Alabama, site contained multiple transmission lines as well as archaeological sites that did contain traditional cultural properties or other culturally significant resources and would have required more costly preservation efforts to minimize adverse impacts on the sites. For these reasons, LES ranked the Bellefonte, Alabama, site third just behind the Lea County Site.

**Comment: M-5; X-1; 036-1**

Commenters asked why the formerly proposed Claiborne facility in Homer, Louisiana was not addressed in the site-selection process and stated that the Draft EIS does not provide a reason for its rejection.

*Response: In January 1991, the NRC received an application from LES to construct and operate a proposed facility in Homer, Louisiana. As a result of an extended licensing hearing process, LES decided to withdraw its application in 1998. Therefore, the Claiborne facility was never constructed and LES did not consider the site in its current application to construct and operate an enrichment facility.*

**Comment: M-23; M-24; M-29; M-30**

Several commenters identified reasons eliminating the Carlsbad, New Mexico, site from further consideration that they believe should also apply to the Lea County site, including groundwater contamination and the installation of transmission lines and a new substation. The commenters asked whether the determination to eliminate Carlsbad was based on groundwater and surface water contamination as well as soil contamination. The commenters stated that the Draft EIS does not discuss the effects of the oil and gas industry in Lea County and requested that the EIS include a soils chemistry analysis for the proposed NEF site that would address potential oil and gas contamination.

*Response: As discussed in section 3.2 of the Draft EIS, the Lea County site is undeveloped. The groundwater contamination at the proposed NEF site affected the ranking of the Lea County site.*

*The Carlsbad, New Mexico, site received a low site score in part due to the potential for soil contamination from former potash mining and oil-field welding services. It is not known whether there is actually soil, surface water or groundwater contamination, but groundwater contamination is less likely because groundwater is expected to be deep and no surface water is present except in the form of a dry arroyo. Section 2.2.2.1 of the Draft EIS notes there are abandoned structures on the Carlsbad, New Mexico, site that at one time housed a potash mine and a company involved in rehabilitating oil well drilling and pipeline equipment. Additionally, an operating oil field service and welding company is on an adjacent parcel of land. For these reasons, LES ranked the Carlsbad, New Mexico, site sixth behind the Lea County Site.*

**Comment: 034-2**

A commenter noted that the EIS considers only the preferred alternative and the no-action alternative. The commenter stated that the EIS may fail to comply with NEPA and suggested the NRC revisit the issue of selection and analysis of alternative sites.

*Response: NEPA does not specify the number of alternatives that must be addressed in an EIS. As discussed in section 2.2.2.1 of the Draft EIS, LES undertook a site selection process to identify viable locations for the proposed NEF. The purpose of the NRC staff's review of the LES's site selection process is to determine whether an alternative site the applicant considered is obviously superior to the proposed NEF. The NRC staff has determined that the LES site selection process has a rational, objective structure and appears reasonable and 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.*

**I.8 Land Use**

**I.8.1 Offsite Actions**

**Comment: M-14; 048-40; 151-7**

Several commenters stated that the EIS should address the installation of and impacts associated with natural gas supply piping, water supply piping, and power transmission lines. One commenter also asked about plans for water supply and wastewater systems.

*Response: The NRC staff evaluated the environmental impacts of installation of the necessary utility pipelines and electric transmission lines in section 4.2.1.1 of the EIS. As presented in Chapter 5 of the EIS, Table 5-1, LES has committed to working with the utility companies to ensure mitigative measures that would be employed during trenching activities on the proposed NEF site are extended as much as possible to offsite trenching activities. Table 5-1 also notes that LES has committed to working with the electric utility to mitigate any impacts. Water supply and wastewater systems and associated impacts are discussed throughout the EIS (for example, see sections 1.5.4, 2.1, 3.7, 3.8.2, 3.10.4.3, and 4.2.6).*

**Comment: M-16**

Several commenters noted that Chapter 2 of Draft EIS indicates that the proposed NEF would require 30 megawatts of electricity that would be supplied through two new overhead transmission lines. The commenters requested that the NRC discuss environmental impacts from the construction of the transmission lines and two independent substations, and from the installation of additional power support structures.

*Response: In section 4.2.1 of the EIS, the NRC staff evaluated the environmental impacts of installing the transmission lines, which would result in temporary land use impacts. Section 4.2.7 of the EIS discusses the impacts of installation of the lines on ecological resources. As presented in Chapter 5 of the EIS, Table 5-1, LES has committed to working with the utility company and the New Mexico Department of Game and Fish to ensure mitigative measures and guidelines for the protection of birds are implemented. Two onsite transformers would be constructed on the proposed NEF property. Impacts from construction of these onsite transformers are assessed under overall facility construction impacts. The NRC staff has revised section 2.1.6 of the EIS to clarify that the two transformers would be installed on the proposed NEF site.*

**Comment: 048-7**

A commenter provided additional information on the natural gas supply to the proposed NEF. As reflected in section 4.1.2 of the Environmental Report, a separate pipeline would be provided to supply natural gas to the proposed NEF. This separate pipeline would be designed and located such that the existing analysis provided in the natural Gas Pipeline Hazard Risk Determination Calculation remains bounding.

*Response: The NRC staff revised section 2.1.6 of the EIS to indicate the natural gas line feeding the site would connect to an existing, nearby line. This would minimize impacts of short-term disturbances related to the placement of the tie-in line.*

## **I.8.2 Commitment of the Land**

### **Comment: M-65**

Several commenters stated that the U.S. Department of Interior identified several Urban Park and Recreation Recovery Programs in the Eunice and Hobbs area that may be adversely affected by the proposed NEF. The commenter asked whether LES has addressed these concerns and how potential effects on the programs would be mitigated.

*Response: As described section 3.2 of the EIS, no significant recreational areas are located within eight kilometers (five miles) of the proposed NEF site. The NRC staff revised the section to clarify that a picnic table and historical marker are located 3.2 kilometers (2 miles) west of the proposed site. The NRC staff concluded land use impacts would be SMALL.*

### **Comment: 034-58**

A commenter stated that it is unclear whether the commitment of 81 hectares (200 acres) of natural land is inclusive of the footprint for the proposed NEF that would constitute a long-term commitment of terrestrial resources. The commenter suggested that the EIS identify the amount of land that would be subject to a long-term commitment.

*Response: The NRC staff revised section 4.7 of the EIS to clarify the meanings associated with short term uses and long term commitments. The commitment of 81 hectares (200 acres), which includes all of the land that would contain the footprint of the proposed NEF facilities, is a long-term commitment.*

### **Comment: 316-42**

A commenter asked whether the area of the proposed NEF site that would not be disturbed by construction activities (discussed in section 2.1.4 and shown in Figure 2-6) is necessary for the operation of the facility. The commenter asked about the likelihood that, after the lease term, ownership of the land would transfer from the State to LES and the land would be subject to industrial development. The commenter asked whether the site would be classified as a brownfield and wanted to know the potential uses of any structures remaining after decommissioning.

*Response: During operations, the unused area adds to the security of the site and helps protect offsite resources from impacts associated with operations. As discussed in section 3.1 of the EIS (which the NRC staff revised to discuss the land exchange process), Lea County currently owns the site. Once the lease term ends, LES would purchase the land from Lea County. LES could use or sell the land for other industrial purposes, but the likelihood of such uses cannot be determined at this time. Remaining structures on the site could be used for other industrial purposes or commercial purposes. Brownfields, as defined by the EPA, are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.*



*If the site is shown to meet State and Federal regulatory standards after decontamination and decommissioning, then the site would not be considered a brownfield.*

## **I.9 Historic and Cultural Resources**

### **Comment: L-15; M-36; 316-40; 316-41; 343-8; 365-1**

Many commenters questioned the NRC's assessment of the proposed NEF's impact on cultural resources as small and requested a description of the terms of the Memorandum of Agreement and the historic properties treatment plan. The commenters asked whether a comprehensive archaeological investigation and excavation would be conducted prior to construction activities. The commenters also asked about the nature and preservation of the artifacts discovered, expressing concern that some of the artifacts could not be removed from the site intact. Commenters asked how the NRC justifies its conclusion that under the no-action alternative, cultural resources at the site could be exposed to possible human intrusion.

*Response: Sections 3.3 and 4.2.2 of the Draft EIS discuss the NRC staff's assessment of cultural resources. In accordance with the NHPA and the implementing regulation, 36 CFR Part 800, potential impacts to all identified and evaluated cultural resources would be mitigated through implementation of an intensive and thorough treatment undertaking. This approach would include both surface and subsurface data recovery efforts at each of the seven sites, along with additional monitoring of construction activities at those archaeological sites located near proposed NEF features. Recovery of all relevant data, along with detailed reports and long-term maintenance of all cultural resources items and recovery records, would adequately mitigate potential impacts to resources. Therefore, the overall impact from the proposed activities is considered SMALL.*

*A Memorandum of Agreement and supporting cultural resources treatment plan have been approved by the NRC, New Mexico State Historic Preservation Office, New Mexico State Land Office, Lea County, the Advisory Council on Historic Preservation, LES and affected Indian tribes (see Appendix B). Due to the present sensitivity regarding the precise nature and locations of the cultural resource properties, only the Memorandum of Agreement is included in Appendix B. The NRC staff revised section 1.5.6.2 of the EIS to update the discussion of the NHPA consultation process. In the collective opinion of the organizations listed above, the proposed treatment, once implemented, would satisfactorily mitigate potential impacts at each of the resource properties, and further preservation consideration would not be necessary.*

*Under the no-action alternative, the proposed NEF would not be constructed. Now that these resources have been identified, they could remain protected through a similar agreement involving one or more of the organizations listed above. Without any protective actions, the identified sites would be subjected to continued weathering and, if the locations become known, potential human intrusion or vandalism. Therefore, the NRC staff concludes in section 4.8.2 of the EIS, that impacts from the no-action alternative would be SMALL to MODERATE.*

## **I.10 Climatology, Meteorology, and Air Quality**

### **I.10.1 Climatology and Meteorology**

#### **Comment: M-27**

Several commenters requested that the NRC include data collected from Andrews County, Texas, in its analysis of tornado frequency and effects. The commenters stated that Andrews County is very close to the proposed NEF site, and high winds generated by a tornado in Andrews County may affect the proposed site.

*Response: Winds from tornados are highly localized and the winds from a tornado in Andrews County, Texas, even if located on the state/county line, would not be expected to impact the proposed NEF. Andrews County is located east of the proposed NEF site. Because prevailing weather patterns influence tornado movement generally from west to east, any tornado that forms in Andrews County would be expected to move east, away from the proposed NEF.*

#### **Comment: M-28**

Several commenters referenced a National Oceanic and Atmospheric Administration's web site indicating that there have been 88 tornadoes in Lea County, New Mexico since 1954, and that these tornadoes have caused more than \$26,000,000 in damage. The commenters stated that the NRC should justify the statement in section 3.5.2.5 of the Draft EIS that "All the reported tornadoes were associated with very light damage."

*Response: According to the referenced web site (NCDC, 2004), the 88 tornadoes caused approximately \$27 million in damage, of which \$25 million was caused by a single class F2 tornado on May 27, 1982. No other information is available regarding this tornado. A total of 26 tornadoes caused measurable property damage in Lea County, New Mexico since 1950. The NRC staff revised section 3.5.2.5 of the EIS to reflect this information.*

#### **Comment: 284-10; 355-1**

Two commenters stated the rainfall data described in Table 3-3 of the Draft EIS is not reflective of annual trends over the last 20 years. One commenter stated that rainfall in the area is either generally increasing or that earlier recordkeeping was faulty, and that the 90-year Hobbs Station average may not be scientifically correct. The commenter suggested that the NRC augment the rainfall measurements with data from other nearby stations, and potentially "weight" the analysis toward newer readings suggesting higher rainfall measurements. The commenter noted that rainfall measurements impact interpretations of runoff, surface, and below-surface hydrology.

*Response: Calculating rainfall averages over a long period of time is standard practice. Rainfall can fluctuate not just year-to-year, but over decades. The design of the retention/detention basins is based on a 24-hour, 100-year storm event and not on average rainfall. Any effects on hydrology from increasing historical rainfall trends would be reflected on a regional basis regardless of the presence of the proposed NEF. Because onsite runoff and drainage would be controlled within the proposed NEF site, any increasing trends in annual rainfall would not result in significantly different impacts.*

## **I.10.2 Air Quality and Air Emissions**

### **Comment: L-13; 103-12; 103-19; 316-44**

Commenters stated the Draft EIS should indicate the source(s) of hydrogen fluoride air emissions. The commenters asked about environmental and health impacts and mitigation measures associated with emissions of helium, argon, nitrogen, methylene chloride, ethanol, volatile organic compounds, carbon monoxide, and nitrogen dioxide.

*Response: The NRC staff revised section 2.1.7 of the EIS to clarify that hydrogen fluoride would be produced through the chemical reaction between UF<sub>6</sub> and water vapor. The chemical reaction generates uranium oxyfluoride, and hydrogen fluoride.*

*Because the pollutants listed in the comment are not emitted in quantities that would require a Clean Air Act Title V permit and the nitrogen dioxide emissions would be 10 to 100 times below the allowable limits under the National Ambient Air Quality Standards (NAAQS) (Table 4-1 of the EIS), mitigation measures would not be required. LES would have a maintenance program to help ensure proper operation of equipment which would help limit emissions. Since the emissions would be well below regulatory limits as described in section 4.2.4.2 of the EIS, environmental and health impacts would be SMALL.*

### **Comment: M-37; M-38; 032-46; 316-46**

Several commenters referred to the discussion of diesel generators in section 4.2.4 of the Draft EIS. The commenters requested that the NRC identify the pollutant and the quantity emitted from the generators, the basis and how verified, disciplinary measures should LES exceed its 91-metric ton (100-ton) standard, and the entity responsible for enforcement. Commenters requested that LES be required to have a Title V permit. Another commenter inquired about comparable uranium enrichment plants and their use of emergency generators.

*Response: Pollutants emitted by the emergency generators are provided in manufacturer technical specifications. If both emergency diesel generators operated continuously for 1 year (24 hours per day for 365 days), the maximum atmospheric discharge from both units could be more than 90,700 kg (100 tons) of pollutants such as nitrous oxide, carbon monoxide, volatile organic compounds, and particulate matter. However, the generators are for emergency use and would be operated for periodic testing and during power outage only. They would be used to protect equipment associated with the proposed NEF and would not be regulated by the NRC (they would not be safety-related). Assuming monthly testing of the generators and up to two electrical power outages per year, the NRC staff estimated that the total atmospheric discharge from the two emergency diesel generators would be approximately 12,300 kg (13.5 tons) of regulated air pollutants, over 90 percent of which would be nitrous oxide. The New Mexico Environment Department Air Quality Bureau would have jurisdiction, as indicated in Table 1-3 of the Draft EIS, and could issue penalties for any enforcement action. The use of generators by other enrichment plants is not within the scope of this EIS.*

### **Comment: 032-14**

A commenter stated that the EIS does not clearly discuss the gaseous effluent vent system emissions and requested that the EIS clearly state the regulatory limits for each of the discharges.

*Response: Section 4.2.4.2 of the Draft EIS discusses the gaseous effluent vent system' allowable emissions. Specifically, the released quantities and appropriate regulations (Clean Air Act and National Emissions Standards for Hazardous Air Pollutants [NESHAP]) are described under the overall air-quality impacts. Occupational impacts of emissions and the related regulatory standard (e.g.,*

*Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health) are provided in section 4.2.12.2 of the Draft EIS.*

**Comment: 032-17; 032-38; 040-5**

A commenter stated that Eunice residents breathe air already polluted with hydrogen sulfide gas and other emissions. The commenter questioned why residents would be additionally exposed to radiation and other emissions from the proposed NEF. The commenter stated that the additional potential exposures would not be worth the jobs that would be created, and that specially-qualified, full time employees would be employed for less than 15 years. Another commenter stated that cumulative impacts for emissions should be analyzed in conjunction with other nearby industrial facilities.

*Response: Section 3.5 of the Draft EIS discusses the air quality at the proposed NEF. The impacts to human health and environment are analyzed in Chapter 4 of the Draft EIS. The NRC staff determined that most impacts would be SMALL or SMALL-to-MODERATE. While peak operations would occur over a 14 year period, operations would actually be conducted over approximately a 25-year period. According to section 4.2.4 of the Draft EIS, the impact on the local and regional air quality would be SMALL. Section 4.4.4 of the Draft EIS addresses the cumulative impacts of air quality, and Table 4-20 shows the current emissions from all industries in the area. Because the proposed NEF would not contribute significantly to the existing airborne emissions from nearby oil and gas activities, the cumulative impacts to air quality would be SMALL.*

**Comment: 033-2; 033-6**

A commenter stated that seasonal winds would blow contaminated soil and other radioactive pollutants north over Hobbs and west over Eunice, New Mexico. The commenter stated that the State and Federal governments should be financially responsible for all new cancer cases in the “contaminant field.”

*Response: As stated in section 4.2.12.2 of the Draft EIS, the NRC staff determined that the quantity of radioactivity in the soils of the proposed NEF site would be minimal. This assessment accounts for residual sediments in the ponds when they are dry. Public exposure to radiological emissions from the proposed NEF were estimated to result in 8.4 in 1 million (or  $8.4 \times 10^{-6}$ ) latent cancer fatalities per year from normal operations (see section 4.2.12.2 of the EIS). This means that all of the population within 80 kilometers (50 miles) of the proposed NEF (including Eunice) would receive a total dose of 0.00014 sievert (0.014 person-rem) (or 14 millirem for all persons). This total dose to all of the population in that area would be less than 5 percent of the dose each U.S. citizen typically receives just from naturally occurring radioactivity (about 3 millisieverts [300 millirem]). Additionally, the radiation dose to the nearest resident (Table 4-11) would be about 0.000013 millisievert (0.0013 millirem) per year from normal operations. This would be about 0.0004 percent of the dose that the average U.S. citizen receives per year from naturally occurring radioactivity. Therefore, public health impact from the normal operation of the proposed NEF would be SMALL.*

*Under 10 CFR § 140.13b, a uranium enrichment facility licensee is required to carry liability insurance to cover public claims arising from any occurrence within the United States that results from the radioactive, toxic, explosive, or other hazardous properties of chemicals containing licensed material and causes, within or outside the United States, the losses and injuries enumerated in the regulation. The SER discusses how LES would fulfill the liability insurance requirements listed in section 140.13b.*

**Comment: 034-15; 034-16; 042-32; 042-33**

Commenters stated the following concerns with regard to particulate matter impacts on air quality:

- The Draft EIS states incorrectly that there have been no instances where particulate matter has exceeded NAAQS. An exceedance of particulate matter 10 microns or less in diameter (PM<sub>10</sub>) has been recorded in Hobbs, New Mexico. The EIS should contain a more detailed explanation of how an exceedance for PM<sub>10</sub> would be prevented.
- The EIS should address how the proposed NEF would address Best Available Control Measures identified in the New Mexico Environment Department's Natural Events Action Plan for Lea County.
- The Draft EIS conclusion that the potential impact to air quality is small is unsupported. The 24-hour maximum of 144 micrograms/cubic meter of PM<sub>10</sub> is close to the primary regulatory limit of 150 micrograms/cubic meter. This limit could be exceeded when NEF emissions are added to other nearby sources, such as the nearby quarry. The EIS should include a discussion of cumulative impacts associated with PM<sub>10</sub>.
- Table 3-6 of the Draft EIS erroneously identifies the PM<sub>10</sub> standard as secondary. The standard is primary.

*Response: The NRC staff revised sections 3.5.3 and 4.2.4.3 of the EIS to include a discussion of the exceedance of the NAAQS in Hobbs, New Mexico, and the related Natural Events Action Plan. The exceedance was the result of a dust storm. The impacts from the proposed NEF would be SMALL because the impacts would be localized to within the proposed NEF property boundary. Fugitive dust emissions could occur for short time periods during construction. Mitigative measures would be employed to limit the emission of fugitive dust during construction. No fugitive dust emissions are anticipated during operations because soils would not be disturbed.*

*The predicted maximum modeled concentration of PM<sub>10</sub> would remain below the standard and would occur inside the property boundary. Section 4.2.4.1 of the EIS has been revised to state that the concentration from an event that generated a 144 micrograms/cubic meter reading would result in a concentration of 48 micrograms/cubic meter at a distance of 1 kilometer (0.6 mile). These are conservative estimates, since fugitive dust emissions were assumed to occur throughout the year without implementation of mitigation measures. As stated in section 4.4.4 and shown in Table 4-20, the proposed NEF would not be expected to have a noticeable impacts on PM<sub>10</sub> concentrations in the area. Table 3-6 of the Draft EIS identifies the standard for PM<sub>10</sub> as primary and secondary, because the Federal standards are equivalent.*

*Best Available Control Measures for the Lea County Natural Events Action Plan are still under development. LES would review Lea County best available control measures as they become available and implement those that are applicable for the proposed NEF facility during construction and operation to minimize dust and particulate emissions. Tables 5-1 and 5-2 of the EIS provides current proposed NEF mitigation methods to minimize dust and particulate emissions during construction and operation activities.*

**Comment: 034-50**

A commenter stated that the EIS does not identify what solvents would be used during the decommissioning and decontamination of the site and whether these solvents would be classified as hazardous air pollutants. The commenter stated that, if they are so classified, the EIS should analyze whether the proposed NEF would have the potential to emit more than 9 metric tons (10 tons) per year of any single pollutant or more than 23 metric tons (25 tons) per year of any combination of pollutants. The commenter stated that the EIS appears to rely erroneously on an estimate of actual emissions.

*Response: As noted in section 4.1 of the Draft EIS, because decommissioning would take place many years in the future, it is not possible to predict all the technological changes that could improve the*

*decommissioning process, and the quantity of solvents to be used during decommissioning cannot be determined at this time. The specific type and quantities of solvents that would be used during decommissioning and the specific environmental impacts would be determined at that time. The NRC staff expects that appropriate equipment, sealed rooms, treated ventilation systems, and management controls would be applied to maintain any solvent releases within the current regulatory requirements of the Clean Air Act. The NRC staff revised section 4.3.4 of the EIS to clarify the expected solvent emissions.*

**Comment: 040-4**

A commenter stated that construction emissions would consist of pollutants in addition to dust, depending on equipment and fuels used.

*Response: The NRC staff agrees that other emissions would be associated with construction. Table 2-2 of the Draft EIS identifies the anticipated average vehicle emissions for hydrocarbons, carbon monoxide, nitrogen oxides, sulfur oxides, and particulates (from fuel and fugitive dust). Additionally, section 4.2.6.1 of the Draft EIS identifies potential effluent releases, such as spills, during construction activities. A NPDES construction permit would be obtained from Region 6 of the EPA and all construction activities would comply with permit requirements for construction emissions.*

**Comment: 042-34**

A commenter stated that the EIS should address New Mexico State Ambient Air Quality Standards outlined in Title 20, Chapter 2, Part 3 of the New Mexico Administrative Code. The commenter also suggested that Table 3-6 should be expanded to include the State standards for hydrogen sulfide, total reduced sulfur, and total suspended particulates.

*Response: The State standards for total suspended particulates are included in the listing for  $PM_{10}$  in Table 3-6 and the impacts are presented in section 4.2.4 of the Draft EIS. The NRC staff revised Table 3-6 to include State standards for hydrogen sulfide and total reduced sulfur; however, the proposed NEF would not be expected to have sources of hydrogen sulfide or total reduced sulfur.*

**Comment: 048-17**

A commenter stated that the hydrogen fluoride gaseous effluent annual release quantity should be included in the listing of non-radioactive gaseous effluents.

*Response: The NRC staff updated section 2.1.7 of the EIS to reflect the commenter's suggestion.*

**Comment: 343-5**

A commenter expressed concern about toxic emission of the proposed plant, both air and water discharges, and disposition of toxic solid wastes. The commenter asked if there have been adequate studies conducted about the health impact of the atmospheric emissions and whether their impact affects minority residents (or workers). In addition, the commenter asked if there are plans to mitigate these toxic emissions.

*Response: The environmental impacts due to emissions from the proposed NEF to residents and workers are presented in Chapter 4 of the Draft EIS, with supporting information in Appendix C. The health and environmental justice analysis demonstrate the small impacts due to the low quantities of radioactive or hazardous materials in atmospheric emissions.*

**Comment: 365-6**

A commenter stated that the contamination of land, air, and water by the emission of tons of carbon monoxide, nitrogen dioxide, and volatile compounds is not acceptable to American citizens.

*Response: As discussed in section 1.5 of the Draft EIS, all emissions, whether to the air or water, must meet Federal and State regulations to ensure the safety and health of the public. As presented in section 4.2.4 of the Draft EIS, releases from the proposed NEF would be within regulatory limits and would not endanger members of the public.*

### **I.10.3 Regulatory Compliance**

#### **Comment: T-1; T-2**

Several commenters noted that the Draft EIS does not identify the regulatory agency that would be in charge of effluent monitoring. Currently, there are no mechanisms in place to revoke an operating license pursuant to unacceptable levels. The commenters suggested that the EIS address specific safety measures to protect citizens from dangerous materials exceeding Federal or State standards.

*Response: Both Federal and State agencies would have enforcement authority over various aspects of the proposed NEF, as described in section 1.5.4 of the Draft EIS. The NRC would have jurisdiction concerning radiological monitoring. Further, under its authority to regulate the safe use of nuclear materials (Atomic Energy Act and Energy Reorganization Act), the NRC has the authority to suspend or revoke a license to ensure public health and safety. As discussed in section 1.4, while the EIS is the result of the NRC staff's environmental review of the LES license application and Environmental Report, the SER is the vehicle through which the NRC staff addresses safety concerns.*

#### **Comment: 042-35; 042-36; 048-3; 048-18**

Several commenters stated that Table 1-3 of the Draft EIS should be updated with information provided in the Environmental Report Table 1.3-1, Revision 2, dated July 2004. In particular, commenters noted that the New Mexico Environmental Department Air Quality Bureau has determined that the proposed NEF would not need a construction or operation air permit.

*Response: The NRC staff updated Table 1-3 and sections 2.1.7 and 4.2.4.2 of the EIS, to reflect the commenters' suggestions. Section 2.1.7 of the EIS has been revised to state that the boilers would not require an air quality permit for operation because NESHAP does not apply. The New Mexico Environment Department Air Quality Bureau acknowledged receipt of the Notice of Intent in accordance with 20.2.73 NMAC. The New Mexico Environment Department Air Quality Bureau also notified LES of its determination that an air quality permit under 20.2.72 NMAC is not required and that New Source Performance Standards and NESHAPs do not apply to the proposed NEF. Lastly, the New Mexico Environment Department Air Quality Bureau stated that operation of the two emergency diesel generators and surface-coating activities are exempt from permitting requirements, provided all requirements specified in 20.2.72.202 B (3) and 20.2.72.202 B (6) NMAC, respectively, are met.*

## **I.11 Geology, Minerals, Soils and Seismic Issues**

### **I.11.1 Geology, Minerals, and Soils**

#### **Comment: M-13**

Several commenters requested that the NRC specify inspection plans for the earthwork operations required to construct the proposed NEF to ensure its structural stability. These commenter also requested that the contractors performing the construction perform the greatest oversight possible. These commenters are concerned that there may be structural instability because a portion of the proposed NEF would be constructed on fill and excavated areas.

*Response: Inspection schedules and procedures would be developed by the NRC's regional office (Region II) responsible for conducting inspections. Their purpose is to ensure the licensee meets regulatory requirements and licensee commitments. Inspection procedures for routine inspections are available to the public.*

#### **Comment: M-39; 034-18; 316-24**

Several commenters expressed concern about the effect of onsite activities on the integrity of underlying geology. Some commenters referred to a statement in section 4.2.5.1 that if final design studies indicate a need to extend footings into the Chinle Formation, the clay layer could be penetrated. Another commenter stated that preparations for construction of the proposed NEF would require surface grading, excavation into the caliche layer, and the relocation of a subsurface carbon dioxide pipeline crossing the site. The commenters suggested that the EIS explain how disturbance of site geology and penetration of the clay layer could affect its permeability and create new pathways for contaminants to enter and migrate through groundwater.

*Response: Although there is a possibility that the clay layer could be penetrated, LES does not plan to penetrate this layer under the site (as described in section 2.1.4, with the deepest cut being 4 meters [13 feet]). Penetration of this clay would not be expected to result in the introduction of new pathways of water or contaminant transmission. As described in section 3.8.1 of the EIS, this clay layer is thick (over 305 meters [1,000 feet]) and continuous, with few fracture planes.*

*Section 3.6.2 of the Draft EIS states that site borings indicate the presence of a limited amount of scattered caliche beneath the site. All grading and excavation would be expected to be in the alluvium. It is likely that the permeability of the alluvium would decrease because of the compaction associated with filling operations. Further, areas of the site developed with buildings or pavement would reduce any opportunities for surface water to penetrate underlying soils. Disturbances due to construction activities would not be expected to result in the creation of new pathways for groundwater or contaminant migration.*

#### **Comment: 034-19; 316-43**

A commenter questioned the NRC staff's determination that impacts to geology and soils during site preparation and construction would be small, and suggested they would be at least moderate. The commenter added that construction of the proposed NEF would require grading the site and introducing a large industrial facility that may require penetrating subsurface soils and the Chinle clay layer. The commenter also stated that because the proposed NEF would alter the geology and soils of the site beyond the preparation and construction phase, it is inappropriate to consider the impacts of site preparation and construction separate from the operational phase. This approach ignores the long-term effects of the initial development of the proposed NEF. Another commenter stated that the effects on geology and soils of site preparation and construction would be long-term, not short-term as concluded in the Draft EIS.



*Response: As discussed in Section 4.2.5.1 of the Draft EIS, site preparation and construction activities for the proposed NEF would disturb only 81 hectares (200 acres) of the 220-hectare (543-acre) site. These activities would modify the gently sloping terrain in the affected area so that the resulting terrain would be flat. Construction is not expected to penetrate the Chinle Formation, and penetration of the surface soils is not expected to change the local geology. The composition of the soils affected by the construction activity would not change; and although these soils could be more prone to erosion due to wind or water, LES would implement mitigation measures during construction to minimize soil erosion and control fugitive dust. For these reasons, the NRC staff considered impacts to soils and geology during site preparation and construction to be SMALL.*

*The NRC staff considers it appropriate to evaluate impacts to soils and geology from site preparation and construction separately from those associated with operations, because the activities and the associated impacts are markedly different for site preparation and construction as compared to operations.*

*As discussed in section 4.7 of the Draft EIS, the NRC staff recognizes that construction and operation of the proposed NEF would require a long-term commitment of terrestrial resources. Because LES plans to leave the building shells and site infrastructure in place following decommissioning, these long-term commitments would include the permanent footprint of the proposed NEF facility and the soils in the area of the footprint .*

**Comment: 034-20**

A commenter questioned the basis of the NRC staff's conclusion in section 4.2.5.2 of the Draft EIS that the rate of wind and water erosion of exposed surface soils surrounding the proposed NEF site would likely be small.

*Response: Section 4.2.5 of the Draft EIS indicates that most of the site surface soils would not be disturbed by the construction of the proposed NEF. The rate of erosion of such soils would, therefore, not be impacted by site operations. Mitigating actions described in Chapter 5 of the Draft EIS, such as the use of earthen berms and sediment fences, would be enacted during construction; therefore, the NRC staff determined that impacts would be SMALL.*

**Comment: 042-7**

A commenter noted that the reference on page 3-26 of the Draft EIS (lines 33-36) to "Cretaceous Antlers Formation" is incorrect and that Table 3-8 indicates the Antlers Formation is of the Tertiary Age. If correct, the commenter suggested that the sentence be rewritten to explain the evidence of a reverse fault in Triassic Beds, and that there is no fault displacement through the younger Antlers Formation.

*Response: The age of the Antlers Formation is identified in various sources as either Cretaceous or Tertiary, although the latter is referenced more frequently. The NRC staff revised section 3.6.1 of the EIS to indicate that the Antlers Formation is of the Tertiary Age.*

**Comment: 042-8**

A commenter suggested that the geologic cross section shown in Figure 3-16 of the Draft EIS be revised to indicate how many drilling locations were used to delineate the cross section and asked whether there is a plan that shows the control points for the cross section.

*Response: The geologic cross-section in Figure 3-16 of the Draft EIS (Figure 3-17, section 3.6.1 of this EIS) illustrates the strata underlying the proposed NEF site. The figure was derived from information associated with the WCS site; LES drilling locations were not included.*

**Comment: 042-9**

A commenter stated that the EIS should provide a discussion of petroleum resources, exploration drilling, and existing or former petroleum wells on the proposed NEF site. Improperly sealed or abandoned drill holes would provide conduits for contamination.

*Response: Section 3.1 of the Draft EIS describes the proposed NEF site. The site consists of mostly undeveloped land that is used for cattle-grazing. No abandoned petroleum drill holes or existing or former well locations for petroleum have been found within the site boundaries. The NRC staff revised section 3.6.1.2 of the EIS to state that no petroleum resources occur at the proposed site.*

**I.11.2 Seismic Issues**

**Comment: 039-1; 365-2**

A commenter referred to a 1996 study (Hill, 1996), which differs in its conclusions from the Draft EIS regarding tectonic earthquake potential in the area of the proposed NEF. The commenter suggested that Chapter 4 include a discussion of the potential for earthquakes, as well as measures to mitigate potential earthquake activity. Another commenter stated that Lea County is potentially over a fault and that it is in a seismically vulnerable area.

*Response: Faults in the vicinity of the proposed NEF are identified in section 3.6.1 of the Draft EIS. The NRC staff revised section 3.6.1.1 of the EIS to clarify the discussion of regional seismicity and included a reference to the 1996 Hill report. In the SER, the NRC staff evaluated the applicant's proposed NEF design features that would reduce the risk of a release of licensed material caused by a postulated earthquake. A summary of the environmental impacts of such a release is provided in section 4.2.13.2 of the EIS.*

**Comment: 042-42**

A commenter suggested that the EIS identify the magnitude associated with seismic events that are considered of low to moderate size.

*Response: The NRC staff revised section 3.6 of the EIS to clarify that a low to moderate size earthquake would range from 3 to 5.9 on the Richter scale (USGS, 2005).*

**I.12 Water Resources**

**I.12.1 Surface Water**

**Comment: 032-27**

A commenter stated that sludge from the Treated Effluent Evaporative Basin must be removed on a regular basis because the area receives periodic heavy rainfalls. The commenter noted that section 2.1.7 of the Draft EIS states sludges would be removed only once, during the decommissioning phase.

*Response: The Treated Effluent Evaporative Basin would be designed to have adequate volume not to overflow in the event of heavy rains. The quantity of sludges expected to accumulate in the basin would not be expected to affect liquid storage capacity to a noticeable degree. As stated in section 4.2.6.2 of the Draft EIS, in the unlikely event of consecutive years of very heavy precipitation, it could become necessary for site operators to develop strategies to prevent basin overflows.*

**Comment: 042-29**

A commenter noted that because the proposed NEF site exceeds 0.4 hectare (1 acre) (including staging areas), it would require a NPDES permit or waiver prior to beginning construction. A permit would require that a Stormwater Pollution Prevention Plan be prepared and appropriate Best Management Practices (BMPs) be implemented throughout construction.

*Response: Section 1.5.4 of the Draft EIS identifies the need for a Stormwater Pollution Prevention Plan and a NPDES Construction Stormwater General Permit. Chapter 5 includes the use of BMPs under proposed mitigation measures.*

**Comment: 042-30**

A commenter noted that once all associated construction activities are terminated and final stabilization is achieved, the proposed NEF may require coverage under Sector F, Chemical and Allied Products, under the NPDES multi-sector general permit.

*Response: Section 1.5.4 of the Draft EIS identifies the potential need for multiple Federal and State permits (include the above-referenced permit) during construction and operation of the proposed NEF.*

**Comment: 042-31**

A commenter noted that the Draft EIS stated that LES is in the process of deciding whether to submit a “No Exposure Certification for Exclusion from NPDES Stormwater Permitting.” While the EPA makes this exclusion available to most industries that may otherwise require permit coverage under the multi-sector general permit, the commenter noted that such an exclusion is rarely granted for facilities of the size proposed in the Draft EIS.

*Response: LES is responsible for applying for and receiving the required permits and approvals prior to construction or operation. As stated in Table 1-3 of the Draft EIS, LES has the option of claiming no exposure or filing for coverage under the multi-sector general permit.*

**Comment: 093-2**

A commenter referred to discussions of surface water features in sections 3.2 and 3.7.1 of the Draft EIS, indicating that the EIS appears to imply that these features provide a significant amount of surface water to the Wallach Concrete, Inc., property. The commenter requested that the EIS clarify that the source of water for the fish pond on the Wallach Concrete, Inc., property be identified as municipal water supply. The commenter also noted that a shallow surface depression located at the base of a sand and gravel pit does not contain sufficient water to supply quarry operations. Water is perennially present in the pit due to a seep at the tip of the Chinle formation clay.

*Response: The seep in the shallow surface depression located at the base of one of the gravel pits, as stated in section 3.7.1 of the Draft EIS, is insufficient to supply quarry operations. The NRC staff revised section 3.2 of the EIS to state that the stocked fish pond is recharged using municipal water. The seep and the fish pond are in two separate locations on the Wallach Concrete, Inc., property.*

**Comment: 358-23**

A commenter noted that the Draft EIS does not discuss the impacts on LES operations of a reduction or cutoff of water supply for hours or days.

*Response: If water supply temporarily halts, then proposed NEF operations that require water may be halted. The cessation of operations would not cause any environmental releases exceeding those that would occur during normal operations.*

## **I.12.2 Groundwater**

### **Comment: L-10; 034-3; 284-11; 284-13; 316-21; 355-4; 356-5**

Many commenters stated that the proposed NEF site lies in the vicinity of several geologic faults, and that earthquakes frequently occur around the proposed NEF site. The commenters noted that characterization of the hydrogeology is complicated by the presence of numerous wells and fault pathways that connect widely separated strata. The commenters noted that the NRC has not conducted an investigation of the possible effects of earthquakes on ground water flow and has not considered the possibility of contaminant infiltration into ground water due to seismic activity. One commenter noted that the Draft EIS does not adequately explore possible subsurface connections between Monument Draw and the West Platform Fault Zone to the south.

*Response: As discussed in section 3.6.1 of the Draft EIS, no active faults have been identified within the immediate area of the proposed NEF site. A fault was identified at the nearby WCS site, but a detailed geologic investigation determined that movement on the fault last occurred over 135 million years ago, and that the fault does not result in increased vertical flow through the approximately 305-meter (1000-foot) thick, impervious Chinle clay formation (Cook-Joyce, 2004). In the SER, the NRC staff evaluated the applicant's proposed NEF design features that would reduce the risk of a release of licensed material caused by a postulated earthquake. A summary of the environmental impacts of such a release is provided in section 4.2.13.2 of the EIS. Any subsurface connections between Monument Draw and underlying strata would not be relevant to impacts from the proposed NEF because of the distance along Monument Draw to the West Platform Fault Zone.*

### **Comment: M-40**

Several commenters asked whether penetrating the Chinle Formation and possibly creating fractures in the formation could change the estimate of vertical groundwater velocity through the clay.

*Response: Although there is a possibility that the clay layer could be penetrated, LES does not plan to penetrate this layer under the site (as presented in section 4.2.5.1 of the Draft EIS). Penetration of this plastic clay would not be expected to result in the introduction of new pathways of water or contaminant transmission. As described in section 3.8.1 of the EIS, this clay layer is thick (over 305 meters [1,000 feet]) and continuous, with few fracture planes. Vertical travel times through the formation would not be significantly altered if the very top of the Chinle Formation were to be penetrated for facility foundations.*

### **Comment: 029-5**

A commenter stated that because the water table is 244 meters (800 feet) below the proposed NEF site and has a thick layer of impervious red clay, the groundwater would be adequately protected.

*Response: As stated in the Draft EIS, the NRC staff concludes that the proposed NEF impacts to water resources would be SMALL.*

### **Comment: 034-3; 041-1; 316-23; 355-2; 355-4; 356-7**

Several commenters stated that the hydrogeologic assessment considers the potential impacts of the site in the immediate area, but does not look at cumulative, regional hydrogeologic impacts on the New Mexico and Texas areas in which the site and other industries are located, including oil and gas operations, Waste

Control Specialists (WCS), and other industries. Another commenter requested that the NRC specifically assess whether the proposed NEF basins would have an effect on regional hydrogeology with respect to impacts from neighboring activities. Additionally, a commenter stated the Draft EIS does not adequately explore contamination of the Ogallala Aquifer to the east or the impacts of the proposed NEF on the fresh water sources of Texas. The commenters suggested that the EIS include a discussion of the potential pathways for transmission of contaminants to deeper groundwater.

*Response: The NRC staff performed a thorough analysis of the impacts of the proposed NEF on hydrogeology, as described in section 4.2.6 of the Draft EIS and in the cumulative impacts discussion (section 4.4.3). Sections 3.8.1 and 3.8.3 of the Draft EIS state that groundwater on adjacent properties are either localized or is transported to the southeast, away from the proposed NEF. However, the NRC staff revised sections 3.2 and 3.8.3 to provide the following additional information: There is no evidence of either oil exploration or exploration wells at the site. The operations at Wallach Concrete, Inc., have not affected the conditions at the proposed NEF site, nor have they affected the geohydrology downgradient from the site. The WCS site is east of the proposed NEF site, and WCS impacts are not expected to accumulate with any hydrogeologic impacts from the proposed NEF. Any potential leakage from ponds at WCS would be transported to the southeast, away from the proposed NEF site. The Wallach Concrete, Inc., site to the north is partially upgradient. This is a sand and gravel operation with no potential for groundwater contamination. Sundance Services, Inc., is located between Wallach Concrete, Inc., and the proposed NEF site. Sundance Services, Inc., is using ponds to recover oil. There are over 100 monitoring wells around the Sundance Services, Inc., site. Contamination from these ponds has not been detected in the outer monitoring wells, which are located on the Sundance Services, Inc., property. If any contamination is detected in the future, mitigating actions would be taken by Sundance Services, Inc. Neither DD Landfarm nor the Lea County Landfill are expected to impact the proposed NEF site because they are downgradient from the proposed NEF site.*

*The Ogallala Aquifer diminishes at Red Bed Ridge, north and upgradient of the proposed NEF site. The alluvial gradient from the proposed NEF site is to the southwest, away from the Ogallala Aquifer. Therefore, site groundwater would not be expected to impact the Ogallala Aquifer. No groundwater pathways have been identified that could hydraulically connect the proposed NEF site to other sources of fresh water in New Mexico or Texas.*

**Comment: 034-4**

A commenter stated that the Draft EIS fails to discuss exceedances of groundwater contaminant limits or impacts to human health and the environment in the event of offsite transport of contaminants.

*Response: As discussed in section 4.2.6.2 of the Draft EIS, impacts to groundwater quality from the proposed NEF would be expected to be SMALL. In addition, LES would abide by any requirements imposed by the groundwater discharge permit issued by the State of New Mexico. If exceedances are found, the New Mexico Environment Department could require abatement programs.*

**Comment: 042-4; 042-5; 042-12; 042-21**

A commenter stated that because groundwaters in the area of the proposed NEF site have total dissolved solids less than 10,000 milligrams per liter, these waters are subject to protection under New Mexico Water Quality Act and Water Quality Commission Regulations (20.6.2 NMAC), which address permitting prior to construction, during operation, closure, postclosure, and abatement. The commenter noted that shallow groundwater occurrences or perched zones on adjacent properties are considered groundwater if there are usable quantities of water regardless of whether the aquifer is of limited horizontal or vertical extent. Also, some shallow groundwater zones may recharge other aquifers or

discharge to ephemeral drainages. Finally, the commenter noted that it is not a certainty that groundwater downgradient of the proposed NEF would not be used in the future.

*Response: The NRC staff revised Table 1-2 of the EIS to indicate that groundwater would be subject to the New Mexico Water Quality Act and regulations. Sections 3.8.1 and 3.8.3 of the Draft EIS stated that groundwater on adjacent properties would not impact (or be impacted by) operations associated with the proposed NEF. Concerning the potential for future uses of downgradient groundwater, it is not expected that proposed NEF groundwater discharges would affect the quality of groundwater downgradient of the site. LES is in the process of obtaining a groundwater discharge permit to ensure that its discharges are in compliance with State regulations.*

**Comment: 042-8; 042-10**

Referring to Figure 3-16 of the Draft EIS, a commenter asked whether the dune sands recharge areas are located to the north and south of the proposed site. The commenter stated that the EIS should address whether the dunes and alluvial deposits are part of a recharge area for shallow or deep aquifers south of the site. The commenter also wanted to know the distance of the cut and fill area from the Ogallala Formation.

*Response: The dune sands recharge areas are associated with the Ogallala Aquifer, which exists only north of Red Bed Ridge, north of the site. As stated in section 3.7.1 of the Draft EIS, the area downgradient (southwest in the alluvium) of the proposed site to Monument Draw is an intermittent stream, typically dry, and does not constitute a recharge area for the Ogallala Aquifer. Likewise, the dune sands shown in Figure 3-16 of the Draft EIS (Figure 3-17 of this EIS) south of the site are not associated with the Ogallala. Because the Ogallala Aquifer is located approximately 1.6 to 3.2 kilometers (1 to 2 miles) miles north and east of the site, onsite cut and fill operations would not affect the Ogallala Aquifer.*

**Comment: 042-13**

A commenter noted that a discussion in section 3.8.1 of the Draft EIS, which states that field investigations and computer modeling show that no precipitation recharge occurs in desert vadose zones, may conflict with subsequent paragraphs in that section.

*Response: The NRC staff revised section 3.8.1 of the EIS to specify that localized, shallow groundwater can occur only under certain circumstances. The Draft EIS discussed the conditions under which such groundwater would be present, and that these conditions are not present on the proposed NEF site.*

**Comment: 042-14**

A commenter requested that the EIS state indicate the distance from the proposed site of the nearest domestic and livestock wells.

*Response: The NRC staff revised section 3.8.2 of the EIS to discuss the purpose and status of wells downgradient of the proposed NEF.*

**Comment: 042-15**

A commenter stated that according to the Draft EIS, chemical analyses of groundwater in the area of the proposed NEF incorrectly indicate that the concentration of total dissolved solids is less than the sum of the combined concentrations for chloride and sulfate.

*Response: The NRC staff verified with LES that the value for total dissolved solids provided earlier and presented in Table 3-11 of the Draft EIS is likely inaccurate (LES, 2005b). The staff revised the table to indicate that total dissolved solids are present in concentrations of 6,000-6,400 milligrams per liter.*

**Comment: 042-16**

A commenter requested that field pH and laboratory results for sodium, potassium, magnesium, calcium, alkalinity (bicarbonate and carbonate) be included in future analyses.

*Response: The NRC staff determined that information in Table 3-11 of the EIS is adequate to describe the environment of the proposed NEF.*

**Comment: 042-17**

A commenter stated that the existing regulatory standard for uranium in New Mexico groundwater is 0.030 milligram per liter, not 0.005 milligram per liter. The existing regulatory standard for copper in New Mexico groundwater is 1.0 milligram per liter, not NS (no standard).

*Response: The NRC staff revised Table 3-11 in the EIS to reflect the information in the comment.*

**Comment: 042-19**

A commenter noted that the Site Stormwater Detention Basin is predicted to infiltrate and form a perched aquifer in the alluvium above the Chinle Formation. The resultant episodic recharge events may cause some groundwater to migrate downgradient and discharge at Custer Mountain or southeast of Monument Draw. The commenter stated that LES must monitor the alluvium both for groundwater quality and water levels to determine if the water is present or may move offsite. The commenter also stated that a system of alluvial dry wells would be necessary to serve as an early detection system.

*Response: Section 4.2.6 of the Draft EIS describes the potential for offsite migration of stormwater. The detention basin water would consist of site runoff from non-process areas similar to any other industrial facility stormwater runoff. If perched water accumulates in the shallow alluvium, this water could travel downgradient to the south-southwest. As it travels, it would be subject to evapotranspiration and soil adsorption. Based on information on groundwater use in the region, the NRC staff determined there are no groundwater users downgradient in the alluvium. As discussed in section 1.5.4 of the Draft EIS, LES has submitted a groundwater discharge permit application to the New Mexico Environment Department Water Quality Bureau. If granted a permit, LES would implement requirements regarding alluvial monitoring as specified by the State of New Mexico.*

**Comment: 042-22**

A commenter noted that the term “nonrenewable water source” may not be appropriate for an aquifer that has the potential to receive recharge or recover from reduced demand.

*Response: The NRC staff revised section 3.8.2.1 of the EIS to clarify that the Ogallala aquifer is being “depleted.”*

**Comment: 048-44; 048-47**

A commenter stated that the EIS should include a qualifier that explains the conservative nature of the hypothetical groundwater plume analysis and that the volume of the assumed groundwater plume is overestimated.

*Response: The NRC staff revised section 4.2.6 of the EIS to note the conservative nature of the plume analyses. Discussions of the conservative assumptions of not accounting for evapotranspiration, soil storage capacity, and evaporation from the ponds are also included.*

**Comment: 072-3**

A commenter stated that, based on a water study performed by Texas Tech University, the commenter is confident that the proposed NEF would not adversely impact groundwater.

*Response: The NRC staff reviewed the water study performed by Texas Tech University and found it to be generally supportive of the conclusions reached in the EIS (Rainwater, et al., 2000).*

**Comment: 316-22**

A commenter asked whether transpiration of water by native vegetation (section 3.8.1 of the Draft EIS) would be compromised if the existing vegetation is removed to construct the proposed NEF. The commenter asked what would be done to restore disturbed vegetation by the construction of the proposed NEF. The commenter stated that the effectiveness of transpiration at the site appears to be questionable, and cited examples of moist and slightly moist conditions found in well borings. The commenter stated well MW-2, which showed recharge throughout the monitoring period, appears to be very near the proposed site of the uranium byproduct cylinder (UBC) Storage Pad. The commenter further noted that section 3.8.1 of the Draft EIS reports site groundwater at a depth of 67 meters (220 feet) within the Chinle Formation and a water-bearing sandstone layer at 183 meters (600 feet) below the surface.

*Response: As discussed in sections 2.1.4 and 4.2.5 of the Draft EIS, most of the site surface soils would not be disturbed. The developed portion of the site would undergo soil disturbance. LES has committed to revegetating disturbed areas that would not be developed. The Site Stormwater Detention Basin and the UBC Storage Pad Stormwater Retention Basin would collect precipitation runoff from the developed areas of the site, including the UBC Storage Pad, minimizing infiltration. The soil both above and below the slightly moist boring at 2 to 4 meters (6 to 14 feet) is very dry, consistent with the mechanism of an upward gradient due to evapotranspiration. If precipitation recharge were present at the proposed site, moisture would be present at various locations and depths. The single moist boring (note that moistness does not represent available groundwater) among the more than 70 strata logged does not indicate precipitation recharge. The water within the Chinle Formation present at 67 meters (220 feet) and 183 meters (600 feet) is not indicative of infiltration at the site. In addition, well MW-2 ends in the 67-meter (220-foot) zone; therefore, the water in this well is expected.*

**Comment: 316-25**

A commenter noted that the NRC staff concluded that the proposed NEF's impact on water resources would be small and that groundwater resources under the proposed NEF site are not considered potable (Draft EIS, Table 2-8). The commenter stated that this conflicts with a description of the Santa Rosa aquifer as the principal source of groundwater for domestic and livestock uses in the southwestern portion of Lea County. The commenter further stated that section 3.11.3 of the Draft EIS observes that people in the area of the proposed NEF site depend on groundwater supplied from personal wells. The commenter requested that the EIS address or resolve this apparent contradiction.

*Response: The determination of small impacts on water resources was not dependent on the potability of the Santa Rosa Aquifer, but on the existence of the thick (over 305 meters [1,000 feet]) and impervious Chinle Formation, which forms a barrier between the surface alluvium and the Santa Rosa. In addition, the groundwater found in the Chinle Formation beneath the proposed NEF site is not potable due to its high total dissolved solids (see Table 3-11 of the EIS), nor would it be available in sufficient amounts for*



general use. There are no domestic groundwater wells in the vicinity of and downgradient from the proposed NEF site that could be impacted by any site releases.

### **I.12.3 Detention/Retention Basins**

#### **Comment: M-17**

Several commenters asked whether the State of New Mexico has authority over permitting and/or regulating the waste treatment systems, treatment basins, or lagoons associated with the proposed NEF.

*Response: As discussed in section 1.5.3 of the Draft EIS, the State of New Mexico regulates water-discharge sources under the New Mexico Water Quality Act regarding the management and operation of waste treatment system, basins, and lagoons. The State is currently obtaining authorization to issue wastewater and stormwater permits from Region 6 of the EPA. Stormwater and wastewater permits would be issued either by the EPA or the State, depending on whether this transfer of authority is complete when construction of the proposed NEF begins.*

#### **Comment: M-41**

Several commenters noted that section 3.7.1 of the Draft EIS states that net evaporation/transpiration associated with the onsite basins is estimated to be 165 centimeters (65 inches) per year, but section 4.2.6.2 shows an evaporation rate of 17 centimeters (6.7 inches) per month. The commenters stated that the latter figure is incorrect and that evaporation would be 13.7 centimeters (5.4 inches) per year, assuming that the NRC estimated the inches per month by dividing 165 centimeters (65 inches) per year by 12 months. The commenters also stated that rainfall is not evenly distributed throughout the year. The commenters requested that the EIS state the expected quantity of cooling tower blowdown water to be discharged to the UBC Storage Pad Stormwater Retention Basin. The commenters requested that monthly averages for cooling tower blowdown be compared to anticipated monthly evaporation, taking into consideration low evaporation rates during wetter months.

*Response: The 165 centimeters (65 inches) per year of evaporation noted in section 3.7.1 of the Draft EIS is based on rates at Red Bluff Dam, approximately 97 kilometers (60 miles) southwest of the proposed NEF site, and is a net evaporation rate. LES chose to use a gross evaporation rate of 80 inches per year for basin water-balance calculations. Once the annual rainfall of 43 centimeters (17 inches) is subtracted from the gross evaporation rate, the net site evaporation rate would be 160 centimeters (63 inches), which is equivalent to the value noted in the Draft EIS. The monthly evaporation rate of 17 centimeters (6.7 inches) is based on the gross rate of 203 centimeters (80 inches) per year. The water-balance calculations were performed on a month-to-month basis and included monthly variations in both evaporation and precipitation rates. The fraction of the inflow to the UBC Storage Pad Stormwater Retention Basin that is from the cooling tower blowdown varies from 7 percent for the maximum precipitation scenario in late summer to 65 percent for the minimum precipitation scenario in winter.*

#### **Comment: M-42**

Several commenters stated that the NRC should require a shielding structure around each evaporative basin and basin to ensure that dry solids remaining in those basins and basins on the proposed NEF site are not vulnerable to scattering by winds.

*Response: Due to the low concentrations of dry solids expected in the proposed NEF basins, little or no scattering would be expected. The proposed NEF basins would also be monitored over the life of the facility to ensure any buildup of dry solids would not result in adverse health effects.*

**Comment: 031-2**

A commenter asked what design requirements, precautions, and procedures the NRC would require to guarantee that contaminated water would not overflow from the basins due to frequent flash flooding in Lea County.

*Response: As discussed in section 4.2.6.2 of the Draft EIS, the proposed NEF would have three surface basins. Each basin would be designed with sufficient extra capacity to retain potentially contaminated waters from a 100-year rainfall.*

- *The Treated Effluent Evaporative Basin would collect and contain wastewater discharges from the Liquid Effluent Collection and Treatment System. The total annual discharge to that basin would be approximately 2,540 cubic meters per year (670,000 gallons per year). Evaporation would provide the only means of liquid disposal from this basin. Because New Mexico's climate is normally arid, the basin would be dry and empty most of the time. In the unlikely event that heavy rainfall occurs for several consecutive years, site operators may be required to develop strategies to prevent basin overflow.*
- *The Site Stormwater Detention Basin would be designed to contain site runoff for a volume equal to that for the 24-hour, 100-year return frequency storm (a 15.2-centimeter or 6.0-inch rainfall). The basin would have approximately 123,350 cubic meters (100 acre-feet) of storage capacity.*
- *The UBC Storage Pad Stormwater Retention Basin would be designed to contain runoff for a volume equal to twice that for the 24-hour, 100-year return frequency storm. This basin would be designed to contain approximately 77,700 cubic meters (63 acre-feet). The NRC staff concluded there would be no potential for the basins to overflow and no mitigation measures are required.*

*The NRC staff revised Chapter 5 of this EIS to indicate that LES plans to conduct regular visual inspections of the basins to verify proper functioning.*

**Comment: 033-3**

A commenter stated that the use of liners in the basins is inadequate for safety reasons, and if the water table becomes contaminated, the State and Federal governments should be financially liable.

*Response: As stated in the comment, both the Treated Effluent Evaporative Basin and the UBC Storage Pad Stormwater Retention Basin would be lined (and designed in accordance with State of New Mexico guidelines). If any leakage were to occur from either of these basins, any contaminants in that leakage would tend to adsorb on the clay underlining the basin liners, and the leaked water would go into storage in the alluvium. If any leakage were to travel in the shallow alluvium to the south-southwest, it would be subject to evapotranspiration and any contaminants would tend to adsorb on the soil. Under 10 CFR § 140.13b, a uranium enrichment facility licensee is required to carry liability insurance to cover public claims arising from any occurrence within the United States that results from the radioactive, toxic, explosive, or other hazardous properties of chemicals containing licensed material, and causes, within or outside the United States, the losses and injuries enumerated in the regulation. The SER discusses how LES would fulfill the liability insurance requirements listed in section 140.13b.*

**Comment: 034-5**

A commenter expressed concern that stormwater from the proposed NEF that would contain the highest concentration of radionuclides would be discharged to a single-lined retention basin. The commenter stated that a discharge of radioactive stormwater to a single-lined basin could increase any risks associated with offsite migration of wastewater and stormwater. The commenter stated that the EIS should quantify these risks and provide further discussion of the threats to groundwater and surface water.

*Response: The NRC staff described the impacts of the proposed NEF on water resources in section 4.2.6 of the Draft EIS. Radionuclides are not expected to be present in site stormwater. The single-lined UBC Storage Pad Stormwater Retention Basin drains the UBC Storage Pad. The UBCs would be surveyed and external contamination would be removed prior to cylinder placement on the UBCs Storage Pad.*

**Comment: 034-22**

A commenter stated that the Draft EIS assumes that water buildup in the evaporative basin would be gradual. The commenter stated that the EIS should discuss how overflows would be prevented in instances of rapid buildup, such as a valve failure or burst pipe, or how a rapid water buildup would be prevented under such circumstances.

*Response: As discussed in section 4.2.6.2 of the Draft EIS, based on a water balance of the basin, the probability of an overflow of the Treated Effluent Evaporative Basin would be SMALL. The basin is designed with a capacity of 2,540 cubic meters (670,000 gallons). The maximum flow through a 20-centimeter (8-inch) diameter water line is approximately 7.5 cubic meters (2,000 gallons) per minute. In the unlikely event of a complete rupture of a 20-centimeter (8-inch) diameter water line, and assuming all of the water drains directly into the basin, it would take over 5½ hours to fill the basin. This is sufficient time for the plant operators to isolate the burst pipe and take suitable overflow preventive measures.*

**Comment: 034-23**

A commenter stated that the EIS should consider whether seepage from the Site Stormwater Detention Basin has the potential to contaminate groundwater. The commenter noted that there is no legal constraint, other than State Engineer permitting, that would prevent the construction of a shallow groundwater well adjacent to the proposed NEF property line.

*Response: As discussed in section 4.2.6.2 of the Draft EIS, water in the Site Stormwater Detention Basin would consist of typical site runoff. The contaminants in this water would be no different from those found at any industrial facility of similar size to the proposed NEF. Any leakage from this basin would be reduced by evapotranspiration, soil-water capacity, and adsorption of contaminants. There is no shallow groundwater underneath or downgradient of the site. Therefore, it is unlikely that a shallow groundwater well would be constructed adjacent to the site.*

**Comment: 034-24; 034-25; 042-3**

Commenters stated that the Draft EIS conclusion that Site Stormwater Detention Basin seepage and the septic systems would have a small impact on water resources of the area are contradicted by statements in the Draft EIS that there is a potential for migration of seepage to a location 3.2 kilometers (2 miles) from the site.

*Response: Section 4.2.6.2 of the Draft EIS describes the potential impacts from the Site Stormwater Detention Basin and septic systems. The detention basin water would be normal site runoff from non-process areas similar to any industrial facility site runoff. The septic system water would receive only sanitary wastewaters and would not be impacted by site operations. Both of these systems would have the potential to form perched water in the shallow alluvium. This water could travel downgradient in the shallow alluvium to the south-southwest. As it travels, it would be subject to evapotranspiration and any*

*contaminants would tend to adsorb on the soil. Based on information on groundwater use in the region, the NRC staff determined there are no groundwater users downgradient in the alluvium.*

**Comment: 042-11**

A commenter noted that net evaporation is cited as 165 centimeters (65 inches) per year and stated that the EIS should address whether design measures considered the concentration of salts and other contaminants in the proposed NEF basins.

*Response: The NRC staff revised the calculations reflected in section 4.2.6 of the EIS to include consideration of the effect of buildup of salts on evaporation rates.*

**Comment: 042-18**

A commenter recommended the use of “synthetic liner” to avoid confusion with the term “geosynthetic liner,” and included specific liner specifications and requirements.

*Response: The NRC staff determined the term “geosynthetic liner” is commonly used and appropriate in this EIS. As discussed in section 2.1.7 of the Draft EIS, the liner would meet New Mexico Environment Department specifications.*

**Comment: 042-24**

A commenter stated that effluent concentrations for the Treated Effluent Evaporative Basin would be 0.225 milligram per liter for uranium. The uranium concentration would rise as a result of evaporation of the water. The commenter stated that the EIS should evaluate the concentration as affected by evaporation.

*Response: As discussed in section 4.2.6.2 of the Draft EIS, the levels of uranium in the Treated Effluent Evaporative Basin would be SMALL and would not impact area water resources. In addition, because of uranium's strong affinity to clay, when the Treated Effluent Evaporative Basin water evaporates, the concentrated uranium remaining would tend to be bound to the clay soil layer lying above the upper synthetic liner.*

**Comment: 042-28**

A commenter recommended the use of precipitation measurements from the meteorological station to verify in a timely fashion the adequacy of stormwater basin design and management. For example, rainfall events above 0.6 centimeter (0.25 inch) would trigger a visual inspection for the proper functioning of the site stormwater systems and evaporation basin.

*Response: The NRC staff revised Chapter 5 of the EIS to indicate that LES plans to conduct regular visual inspections of the basins to verify proper functioning.*

**Comment: 042-41**

A commenter stated that the EIS should address what measures would be in place to prevent windborne transport of concentrated salts and other contaminants from the Treated Effluent Evaporative Basin and the stormwater detention/retention basins.

*Response: As discussed in section 4.2.12.2 of the EIS, windborne contaminants from the Treated Effluent Evaporative Basin would have SMALL impacts on the surrounding population. This is in part due to uranium's strong affinity to clay, when the Treated Effluent Evaporative Basin water evaporates, the concentrated uranium remaining would tend to be bound to the clay soil layer lying above the upper*

*synthetic liner. LES would monitor the water levels and accumulation of solids in the stormwater detention/retention basins as presented in Chapter 6 of the EIS.*

**Comment: 048-5; 048-42; 048-86**

A commenter noted that sections 2.1.4, 4.2.6.2, and 6.1.1 of the Draft EIS should be revised to reflect that the UBC Storage Pad Stormwater Retention Basin also receives heating boiler blowdown.

*Response: The NRC staff revised sections 2.1.4, 4.2.6.2, and 6.1.1 and other relevant sections of the EIS to include heating boiler blowdown discharges.*

**Comment: 048-14**

A commenter stated that runoff and stormwater from the UBC Storage Pad would be routed to a lined basin for evaporation. The commenter suggested that the EIS be revised to specify that the UBC Storage Pad Stormwater Retention Basin would receive this runoff and stormwater.

*Response: The NRC staff revised section 2.1.7 of the Draft EIS to provide the requested clarification.*

**Comment: 048-43**

A commenter recommended revising section 4.2.6.2 of the Draft EIS to indicate that the basin would be dry for 12 months of the year for the minimum scenario and would have on average 0.3 meter (1 foot) or less of standing water for 10 months of the year for the maximum scenario.

*Response: The NRC staff revised section 4.2.6.2 of the EIS to reflect the most recent information provided.*

**Comment: 048-46; 048-48**

A commenter requested clarification of the word “portions” in section 4.2.6.2 of the Draft EIS. Since little, if any, basin waters would be expected to recharge the shallow groundwater system, any water originating at the proposed NEF that discharges at these locations would be negligible.

*Response: The text in section 4.2.6.2 of the Draft EIS describes these potential discharges as “minor seeps.”*

**Comment: 048-65**

A commenter stated that section 4.5 of the Draft EIS, which discusses water releases from the two lined basins, is not correct. The commenter suggested that the NRC clarify the pathways for water releases from the stormwater and effluent basins and from the septic systems.

*Response: The NRC staff revised section 4.5 of the EIS to more accurately reflect water release pathways.*

**Comment: 316-22; 343-5; 356-5**

Commenters stated that the Draft EIS contains no estimate of the likelihood of liner corruption and subsequent leakage. The commenters asked how long the liners for wastewater basins would retain their integrity and on what basis this assumption is made.

*Response: Estimates of the probability and frequency of leakage through a liner depend on the specific liner material used, the type of the basin so lined, the techniques employed when installing the liner, and additional site-specific conditions; as a result, such estimates are highly uncertain. As discussed in section 2.1.7 of the Draft EIS, the Treated Effluent Evaporative Basin and UBC Storage Pad Stormwater Retention Basin would be equipped with synthetic liners above a layer of highly impermeable clay. The*

*Treated Effluent Evaporative Basin would be double-lined and equipped with a leak-detection system. LES would select and install the liners for both basins in accordance with New Mexico Environment Department specifications and guidelines.*

**Comment: 355-3**

A commenter expressed concern that the clay layer relied upon to prevent substantial movement of material could be undermined both by the onsite water retention facilities as well as by the possible disposal of mixed waste at the WCS facility. The commenter stated that the Draft EIS fails to identify these potentials.

*Response: Onsite water detention/retention basins would not disturb the red clay soil (Chinle red beds) beneath the proposed site. The disposal of waste at the WCS facility is considered in the context of cumulative impacts to the soil. As discussed in section 4.4.2 of the Draft EIS, WCS activities do not impact the Chinle red beds at the proposed LES site.*

#### **I.12.4 Septic Systems**

**Comment: 042-2**

A commenter noted that wastewaters from the septic systems could result in contamination of groundwater associated with an ephemeral drainage or an aquifer recharge area. The commenter stated that if any groundwater contamination occurred under this or another scenario, abatement would be required under the New Mexico Water Quality Act.

*Response: The NRC staff revised Table 1-2 in the EIS to reflect that the New Mexico Water Quality Act also applies to abatement of groundwater contamination.*

**Comment: 042-26; 042-27**

A commenter noted that the New Mexico Environment Department Groundwater Quality Bureau discharge permit would likely require annual sampling of the septic system for total Kjeldahl nitrogen, nitrate, total dissolved solids, and chloride. The permit would also include major ions (e.g., chloride, sulfate, total dissolved solids, fluoride, sodium, calcium, magnesium, and potassium) and field parameters of electrical conductance, temperature, and pH.

*Response: The NRC staff recognizes that LES would be required to comply with the groundwater discharge permit for the proposed NEF.*

**Comment: 042-20; 042-21; 042-26; 042-27**

The commenter stated that the septic system should be designed consistent with New Mexico Environment Department Groundwater Quality Bureau Guidelines for Design Criteria, Operation and Maintenance. The commenter stated that it may be necessary to consider an alternate design to reduce the potential for the formation of perched groundwater body and contaminant transport offsite. The commenter noted further that the discharge permit issued by the New Mexico Environment Department Groundwater Quality Bureau would likely require annual sampling of the septic system for total Kjeldahl nitrogen, nitrate, total dissolved solids, and chloride. The permit would also include major ions (e.g., chlorine, total dissolved solids, sulfate, fluorine, sodium, calcium, magnesium, and potassium) and field parameters of electrical conductance, temperature, and pH.

*Response: As discussed in section 4.2.6.2 of the Draft EIS, the proposed septic systems are included in the LES groundwater discharge permit application filed with the New Mexico Environment Department Groundwater Quality Bureau. The NRC staff expects that offsite impacts from the septic system would be reduced by evapotranspiration of any perched water that may form as well as by adsorption to soil of the contaminants. The NRC staff recognizes that LES would be required to comply with the groundwater discharge permit for the proposed NEF.*

#### **I.12.5 Water Supply and Use**

**Comment: L-9; Q-2; 032-4; 032-10; 032-15; 032-34; 032-39; 151-7; 316-20; 343-4; 356-8; 365-4**  
Many commenters stated that the Draft EIS neglects the severe long-term water shortage problem of Lea County, as documented in the Lea County Regional Water Plan. According to the water plan, groundwater in the county is being withdrawn at a greater rate than it is being recharged. The report projects a doubling of water usage by 2040 and warns that “there is physically not enough water in the Basin to maintain an annual diversion of this magnitude.” One of the commenters also stated that the Draft EIS does not compare the proposed NEF's lifetime water usage to capacities in the Lea County Underground Water Basin, which is part of the Ogallala Aquifer. The commenter asked how the NRC can justify the conclusion that impacts to water resources would be small, considering that projected water shortages may force LES to comply with a drought management plan. The commenter asked that the NRC consider the long-term effects of further depleting the Ogallala Aquifer by diverting water for use by the proposed NEF.

Several commenters asked if the source of the municipal water system is groundwater. The commenters asked whether studies have been conducted that assure that underground water sources would not be depleted.

*Response: The municipalities of Hobbs and Eunice, which would supply the water to the proposed NEF, withdraw their water from the Ogallala Aquifer, north of the city of Hobbs. As described in section 4.2.6.3 of the EIS, the water that would be used for the proposed NEF would constitute a very small portion of the water rights and capacity of the municipal systems. The amount of water used is also a very small fraction of the water available from the Ogallala Aquifer reserves in the State of New Mexico. The NRC staff revised section 4.2.6.3 of the EIS to include an additional analysis of water usage on the withdrawal wells used by the municipalities. The additional analysis confirms the small impact of the proposed NEF on water usage. In addition, constructing, operating and decommissioning the proposed NEF would not change the manner in which the drought management plan is implemented by Lea County, since the water that would be used by the proposed NEF would be a small percentage of the capacity of the municipal systems.*

*While the Lea County Regional Water Plan projects a doubling of water usage by 2040 if growth is unrestrained, the rate of water use by the city of Hobbs has been level over the past 10 years (LCWUA, 2000). The proposed NEF would not be a water-intensive project. Section 4.2.6.4 of the EIS discusses mitigative measures to further minimize water consumption such as use of a closed cycle cooling tower; low-water-consumption landscaping techniques; low-flow toilets, sinks, and showers; and other efficient water-use techniques. The proposed NEF would use approximately one-quarter of the water used by the Hobbs Country Club and one-third of the water used by the Eunice Golf Course.*

**Comment: M-15; M-45; 358-20; 358-21; 358-22; 358-24**

Several commenters asked how much water from the Ogallala Aquifer the proposed NEF would use over its lifetime. One commenter stated that annual water use estimates provided in the Draft EIS are not limits, and that the NRC should analyze the maximum amount of water the proposed NEF could use. The

commenter estimates that since LES must operate continuously, peak use for a year would be about four times the lifetime usage provided in the Draft EIS. The commenter also stated that the EIS should analyze the impacts of peak NEF water use on the Eunice system since there is no current requirement that LES receive its water from both Hobbs and Eunice. The commenter also requested that the EIS state what measures would be taken to ensure a redundant water supply as well as any regulatory requirements and impacts. A commenter stated that the EIS must include a detailed, yearly water usage plan that incorporates the impacts of the proposed NEF according to its actual usage and future water demand and availability.

*Response: Section 4.2.6 of the Draft EIS provides detailed information concerning water use by the proposed NEF. The proposed NEF would use approximately 2.63 million cubic meters (695 million gallons) of water over its lifetime. The NRC staff revised section 4.2.9.3 of the Draft EIS to reflect this more precise estimate provided in section 4.2.6.3. Section 4.2.6.3 presents the impacts to the Eunice and Hobbs, New Mexico, water supply systems separately. The Draft EIS water use impacts are based on the average proposed NEF water use rate. The peak rates describe only the operation of filling the water tanks used to fight fires. The peak rates would occur only while the tanks are being filled. The average water use rate more accurately describes the annual site usage. Section 4.2.6.3 of the Draft EIS notes that over its lifetime, the proposed NEF would use 0.0004 percent of the Ogallala Aquifer reserves. A redundant water supply would not be required for the proposed facility because plant safety is not dependent on external water supplies.*

**Comment: 034-21; 316-19**

Two commenters questioned the basis for using the Claiborne Enrichment Center design estimates to estimate proposed NEF annual water usage for dust suppression during construction (section 4.2.6.1 of the Draft EIS). One of the commenters noted that the proposed Claiborne Enrichment Center was designed to be half the size of the proposed NEF. The second commenter noted that estimates of water usage for dust suppression at Claiborne are only applicable to the extent that climate and soil conditions are similar, unless adjustments to account for differences have been made.

*Response: Although the Claiborne Enrichment Center was designed to be smaller than the proposed NEF, the techniques used in constructing either facility would be similar. The NRC staff's estimate of water use during construction for the proposed NEF was increased from the Claiborne Enrichment Center quantity by a factor of 3.3 to account for the larger size of the proposed NEF and the need for additional water for dust suppression for the Lea County location.*

**Comment: 034-55**

A commenter suggested that the EIS either explain why it is appropriate to analyze only the WCS site for cumulative impacts to water resources or include analyses of impacts from other nearby sites.

*Response: The water needs of other nearby facilities such as Wallach Concrete, Inc., Sundance Services, Inc., and the Lea County landfill are already accounted for in water use estimates of the region as provided in section 4.2.6.3 of the Draft EIS. Therefore, cumulative impacts in section 4.4.3 additionally consider only proposed or new activities such as construction of the WCS disposal cells and the casino/hotel/racetrack. The NRC staff revised section 4.4.3 of the EIS to state that the impacts of nearby facilities on water resources is accounted for through consideration of the Eunice and Hobbs municipal water-supply systems.*

**Comment: 042-6**



A commenter suggested that LES provide a comprehensive water balance to illustrate projected water supply, demand, and losses. The commenter noted that it would be easiest to evaluate a single figure each for the construction phase and the operations phase.

*Response: In its Environmental Report, LES supplied the normal and peak water consumption and liquid flows expected from the proposed NEF. This information was used to perform the analyses contained in section 4.2.6 of the Draft EIS.*

**Comment: 075-1; 083-1**

One commenter stated that the Lea County Regional Water Plan not only addresses supply and demand but also alternatives such as conservation, water rate structure, development of deep aquifers, treatment and use of lower-quality water, imported water, aquifer recharge, weather modification, interstate alternatives, groundwater flow modeling, and the water monitoring program. Another commenter stated that the aquifer can easily meet the water requirements of the proposed NEF.

*Response: Chapter 8 of the Lea County Regional Water Plan describes water-supply alternatives including water conservation, development of additional water supplies, and improvement of water management. Alternative supplies could include development of deep aquifers, treatment of lower quality water, importing water, aquifer recharge, and cloud seeding. None of these possible alternatives would be negatively impacted by proposed NEF operations. Section 4.2.6.3 of the Draft EIS describes the SMALL impacts that the proposed action would have on water supply. Should any of the alternative water supplies be implemented, these SMALL impacts would decrease.*

**I.13 Ecological Resources**

**I.13.1 General**

**Comment: 034-26**

A commenter stated that section 4.2.7.1 of the EIS fails to discuss the impacts on ecological resources from the use of pesticides, the use of which is indicated in Table 4-15.

*Response: Section 4.2.7.1 of the Draft EIS provided a general description of the proposed actions that could occur during site preparation and construction. The specific quantity of pesticides used during construction could vary from none to a maximum of 380 liters (100 gallons) as identified in Table 4-15 of the Draft EIS. The pesticides would be applied on the proposed NEF site according to State and Federal requirements, and the impacts would be SMALL. The NRC staff revised section 4.2.7.1 of the EIS to include the use of pesticides.*

**Comment: 034-27**

A commenter stated that the EIS should explain why the level of safety required for the protection of humans is adequate for animals and plants, since different species use natural resources and react to environmental toxins in very different ways.

*Response: The NRC established standards for radiological exposures to humans on the basis that limits established for the exposed members of the public would provide adequate protection for other species. No standards were established for radiological exposure to biota other than humans. The validity of the assumption that radiation guidelines, which are protective of the public, would also provide adequate protection to plants and animals has been upheld by national and international bodies that have examined the issue, including the National Council on Radiation Protection and Measurement (NCRP, 1992) and the International Atomic Energy Agency (IAEA, 1992). Both of these studies were conducted*

*in part to evaluate the original assumption presented in 1977 by the International Commission on Radiological Protection (ICRP, 1997). In all of these cases, it has been emphasized that such radiation levels may adversely affect non-human species, but effects at the population level are not detectable.*

**Comment: 043-5; 043-7**

A commenter stated that the NRC staff is not taking seriously the mandate to promulgate conservation plans for listed species, as required in Section 7(a)(1) of the Endangered Species Act. The commenter expressed concern about proposed NEF impacts on threatened and endangered species, and incorporated by reference the commenter's EIS scoping comments, dated March 18, 2004.

*Response: The NRC staff carefully reviewed all scoping comments in preparing the Draft EIS. As stated in section 1.5.6.1, no threatened or endangered species were identified at the proposed NEF site. The NRC staff fulfilled its obligations under Section 7 of the Endangered Species Act to consult with the FWS and other appropriate agencies, and has concluded that the proposed NEF would have no effect on such species. The New Mexico Department of Game and Fish has concurred with this conclusion. The proposed NEF would be required to follow all Federal and State laws and regulations regarding emissions, and would implement mitigation measures that would minimize impacts to wildlife from construction, operations, and decontamination and decommissioning as stated in section 4.2.7.3 of the EIS.*

**Comment: 048-32**

A commenter stated that the EIS should be updated to reflect the ecological field surveys conducted in October 2003 and July 2004.

*Response: The NRC staff revised section 3.9 of the EIS to update the listing of ecological studies to include surveys conducted in October 2003 (Sias, 2003) and June 2004 (Sias, 2004).*

### **I.13.2 Endangered Species Act**

**Comment: M-31; M-32; 316-50**

Several commenters stated that the EIS did not appear to address a February 23, 2004, comment by the New Mexico Department of Game and Fish that questioned the adequacy of field surveys. The commenters stated that the Draft EIS does not indicate that further surveys were conducted to address the comment.

*Response: An additional survey was performed in the spring of 2004, as stated in section 3.9.1.2 of the Draft EIS. In a letter dated November 1, 2004, the New Mexico Department of Game and Fish commented to the NRC that it is now "satisfied that surveys [for the lesser prairie chicken and the sand dune lizard] have been adequate to document absence of both species from the site, and support the conclusion of no significant adverse impact."*

**Comment: 038-3**

A commenter requested that the use of "nearest known breeding area" in the Draft EIS be changed to "nearest known lek site."

*Response: The NRC staff revised section 3.9.1.2 of the EIS to reflect the suggestion in the comment.*

**Comment: 038-10**

A commenter stated that the New Mexico Department of Game and Fish had previously expressed concern about the sufficiency of LES's survey efforts for the sand dune lizard and the lesser prairie

chicken. The commenter stated that the New Mexico Department of Game and Fish is now satisfied that surveys have been adequate to document absence of both species from the site, and support the conclusion of no significant adverse impact.

*Response: The NRC staff revised sections 1.5.6.1 and of the EIS to reflect the conclusion of the New Mexico Department of Game and Fish.*

### **I.13.3 Habitat Loss and Flora**

#### **Comment: 038-7**

A commenter stated that the Draft EIS implies that the kit fox is less susceptible to habitat loss. The kit fox population is susceptible to effects of cumulative habitat loss.

*Response: The NRC staff revised section 3.9.1.3 of the EIS to reflect the information provided in the comment.*

#### **Comment: 040-6**

A commenter suggested that the proposed NEF site be monitored for weeds.

*Response: The NRC staff revised Chapter 5 of the EIS to state that LES would use native vegetation in restored landscaped areas and has committed to implementing weed control measures if a significant intrusion of non-native plants were to develop.*

#### **Comment: 043-1**

A commenter stated that the sand shinnery communities should be safeguarded, given that they are finite and host a highly specialized suite of wildlife. The commenter listed several threats to the sand shinnery ecosystem, including habitat destruction associated with the proposed NEF, and stated that the repercussions of habitat destruction would impact associated wildlife. The commenter stated that the destruction of shinoak causes virtually permanent reduction of the sand shinnery community.

*Response: Section 4.2.7.1 of the Draft EIS evaluated the impacts of the proposed NEF on plants (including the sand shinnery community) and animals and concluded the impacts would be SMALL. Shinnery oak (or shinoak) covers tens of thousands of acres in southeast New Mexico, parts of western Texas and the Texas Panhandle, and western Oklahoma. The total site area of the proposed NEF is 220 hectares (543 acres), of which only 81 hectares (200 acres) would be disturbed by construction. The site has been disturbed already by a highway, cattle grazing and nearby industrial operations that include a railroad and an access road. The undisturbed portion of the site would remain covered with native vegetation such as the shinnery oak. The proposed NEF would also be located in an area where there is significant industrial development and agricultural uses, so the proposed NEF would not significantly increase the cumulative ecological impacts already occurring from these other facilities. There would be no cumulative impacts because the proposed NEF site would be a small fraction of the total acreage encompassed by the shinoak habitat, and the incremental ecological impact in comparison to impacts from other nearby industrial/agricultural operations would be SMALL. To some extent, the ecological conditions could improve on undeveloped portions of the proposed site as a result of proposed active management of onsite native species, which includes planting of native vegetation, reduction in non-native vegetation that may be present, and routine ecological surveys.*

#### **Comment: 043-3; 043-7**

A commenter stated that despite the proposed NEF site not being occupied by certain species, potential habitats are becoming harder to find and any loss of habitat would reduce the ability of these species to return.

*Response: Impacts to ecological resources were found to be SMALL as stated in sections 4.2.7.1 and 4.2.7.2 of the Draft EIS. The proposed site is located in an area where there already is extensive industrial development, and the overall size of the site as compared to the tens of thousands of acres of similar habitat is small.*

**Comment: 316-50**

A commenter indicated that the conclusion in section 3.9.3 of the Draft EIS concerning a lack of habitat stresses for various species of concern appears to contradict a statement in section 4.2.7 that the habitats of the swift fox and the western burrowing owl may be threatened by the construction and operation of the proposed NEF.

*Response: The NRC staff disagrees that the Draft EIS is contradictory on the discussion of ecological resources. As stated in section 4.2.7 of the Draft EIS, the swift fox requires 518 to 1,296 hectares (1,280 to 3,200 acres) of appropriate habitat to support a pair. The proposed NEF site alone does not have enough acreage to provide a habitat for a swift fox pair and the presence of other facilities surrounding the proposed NEF site and their operations would discourage extensive use of their land. Given the availability of neighboring open land in the immediate area of the proposed NEF site and the low population density of the swift fox, the proposed NEF site is marginally attractive to the swift fox, as stated in section 3.9.1.3 of the Draft EIS. In addition, the swift fox is highly mobile and can adjust to human activities. Thus, while there may be some habitat loss that could be used by the swift fox, its mobility and low population density, the availability of more open land, and the presence of other industry facilities would mean there would be a SMALL impact to any swift fox that may be in the area.*

*The statement in section 4.2.7 of the Draft EIS that the western burrowing owl is generally vulnerable to construction activities is not specific to the proposed NEF site. The western burrowing owl requires burrows and the presence of prairie dogs for prey. As stated in section 4.2.7, burrows are not currently present at the proposed NEF site. Further, no prairie dog towns were identified at the site to attract the burrowing owl. Therefore, the NRC staff concludes that the burrowing owl would not be impacted by proposed construction and operation of the proposed NEF.*

**Comment: 316-51**

A commenter referred to the discussion in section 4.2.7.1 of the Draft EIS indicating that highly mobile resident wildlife currently located within planned disturbed areas of the proposed NEF site would be able to relocate to undisturbed areas of the site. The commenter asked that these species be identified. The commenter stated that the proposed NEF site would be unsuitable as habitat if species that could not subsist solely within the site boundaries were not provided access to pass through, under, or over the perimeter fence.

*Response: Table 3-12 in the Draft EIS summarizes the mammals, birds, and amphibians/reptiles that could be inhabiting the proposed NEF site. Two surveys were conducted in 2004 to determine if any of these animals were present on the proposed NEF site. The only animals detected during these surveys were birds, which are highly mobile and would not be hindered by the presence of a fence. Should any non-avian animals be identified at the proposed site, animal-friendly fencing would help mitigate any impact to their ability to migrate off the site. Small reptiles and mammals could be impacted due to their more limited range, but, as stated in section 4.2.7.1 of the Draft EIS, these impacts would be SMALL because of the limited diversity and limited amount of disturbed land.*

**Comment: 316-52**

A commenter questioned why section 4.3.7 of the Draft EIS considered the permanent elimination of 73 hectares (180 acres) of wildlife habitat a small impact.

*Response: The definition of small impact, as provided in section 4.1 of the Draft EIS, is that “the environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.” The context in which the impact is analyzed is the relationship between the amount of land permanently removed to the amount of land with similar habitat remaining. Because 73 hectares (180 acres) is a small portion of the thousands of hectares/acres of similar habitat available to the wildlife in the area, the impact of permanently altering the 73 hectares (180 acres) would not destabilize nor noticeably alter the ecological resources in the area.*

**I.13.4 Mitigation Measures**

**Comment: 034-28; 040-1; 048-13; 048-49; 048-50**

A commenter requested that the EIS explain why netting would not be installed over the UBC Storage Pad Stormwater Retention Basin. Another commenter stated that the EIS should be revised to state that “surface netting or other similar material” would be used for the Treated Effluent Evaporative Basin. A commenter expressed concern that the ponded wastewater may attract wildlife. This commenter stated that migratory birds often do not distinguish between wastewater lagoons and natural water bodies, and that migratory birds are protected under the Migratory Bird Treaty Act.

*Response: The stormwater retention/detention basins are not anticipated to pose a risk for birds, and currently would not include netting or other material, as discussed in section 4.2.7.3 of the Draft EIS. As stated in sections 2.1.7, 4.2.7.3, and 5.1, surface netting would be installed over the Treated Effluent Evaporative Basin. The NRC staff revised these sections to indicate that other suitable material could be used. The NRC staff also revised section 4.2.7.3 of the EIS to state that LES would consult with the New Mexico Department of Game and Fish and incorporate appropriate measures to limit or prevent wildlife access to onsite basins, as discussed in sections 4.5.12, 4.5.13, and 5.2.5 of the Environmental Report. LES would also monitor the basin waters during plant operations to ensure the risk to birds and wildlife would be minimized.*

**Comment: 034-59**

A commenter stated that Table 5-1 of the Draft EIS makes conflicting statements concerning mitigation measures for impacts to ecological resources (e.g., trenches would not be left open overnight; animals would be removed from trenches left open overnight).

*Response: Table 5-1 of the Draft EIS indicates that during construction LES would work to avoid leaving trenches open overnight. While it is desirable to minimize the number of trenches left open overnight, construction operations may that require some trenches be left open; those that are would be checked for trapped animals prior to backfilling.*

**Comment: 038-1; 040-3**

A commenter (New Mexico Department of Game and Fish) suggested that mitigation actions planned for onsite construction also be implemented during the construction of new water and natural gas supply pipelines. The commenter also provided its guidelines for minimizing harm to perching birds, recommending the guidelines for use during the construction of a new overhead power line. Another commenter noted that overhead power lines pose a threat to birds of prey. The commenter provided a reference to guidance published by the Avian Power Line Interaction Committee to mitigate impacts.

*Response: The State of New Mexico has regulations for trenching and installation of buried pipelines. Compliance with these regulations would be the responsibility of the contractor installing the buried pipelines. LES would consult with the water supply utility responsible for the new water line to address as applicable New Mexico Department of Game and Fish guidance for the protection of wildlife during trenching operations. LES would direct that all trenching work on-site follow the mitigation measures discussed in the Environmental Report. The NRC staff revised Chapter 5 of the EIS to reflect these actions.*

*The State of New Mexico has regulations for the installation of overhead power lines. Compliance with these regulations would be the responsibility of the electrical energy supplier (Xcel Energy). The NRC staff revised section 4.2.7.3 and Chapter 5 of the EIS to state that LES has committed to working with the electric utility and the State of New Mexico to incorporate mitigative measures that could include those suggested by the guidance referred to in the comment.*

**Comment: 038-2**

A commenter recommended that LES install down-shielding on security lights to minimize interference with avian navigation.

*Response: Chapter 5 of the EIS has been revised to state that the down-shielding of security lights would be considered by LES consistent with security plan requirements.*

**Comment: 038-8**

A commenter suggested that fencing should limit access by reptiles, amphibians, and small mammals, since large animals would likely not be present in developed areas of the proposed NEF. The commenter provided specific design criteria for the fencing.

*Response: The NRC staff revised section 4.2.7.3 of the EIS to state that LES has committed to consulting with the New Mexico Department of Game and Fish during detailed design of mitigating features, such as fencing.*

**Comment: 040-2**

A commenter noted that ponds may be stagnant, allowing mosquitoes to thrive. The commenter proposed mitigation measures (e.g., integrated pest management and predators) and engineering solutions to keep water moving (e.g., aerators or aerating fountains).

*Response: The NRC staff revised Chapter 5 of the EIS to reflect that LES would take mitigative actions if a significant mosquito population develops.*

**I.14 Socioeconomics**

**I.14.1 Employment**

**Comment: L-7; M-34; 316-15**

Many commenters stated that the job benefits described by the EIS contradict other information in the document. For example, the percentage of people in the region currently in professions similar to those that would be created by the proposed NEF (scientific, management, administration, and waste management fields, as listed in Table 3-15 of the Draft EIS) is less than half the averages for New Mexico and Texas. Another commenter stated that the EIS should indicate that most of the higher-wage jobs

created by the proposed NEF would go to people outside the region, and possibly outside the United States.

Several commenters stated that the U.S. Census of 2000 states that, on average, 65.4 percent of the populations of Hobbs, Eunice, and Jal have completed high school and 10.4 percent have obtained at least a Bachelor's degree. The commenters noted that this is lower than the respective statewide averages. The commenters suggested that the EIS include a discussion of the level of education required for each job type expected to be created by the proposed NEF (e.g., construction, management, professional, skilled, and administrative).

*Response: Approximately 70 percent of jobs at the proposed NEF would require only a high school diploma in addition to basic knowledge of the operation of the NEF. The remaining 30 percent are in the professional category (engineering, scientific, and technical) and would require undergraduate and graduate degrees in addition to advanced knowledge of the operation of the proposed NEF. It is likely that during startup and initial production many of the positions requiring advanced understanding of operations would be held by people outside the region. However, LES has stated that it expects most, if not all, of the 210 operations positions to be filled by people living within the region once the facility is fully operational. LES has stated that it intends to provide basic and advanced training for employees, with much of this training to be provided in partnership with local educational institutions. The NRC staff revised sections 4.2.8.2 and 4.2.8.3 of the EIS to reflect this information.*

**Comment: M-34; M-43; U-1; 036-4**

Several commenters stated that 60 percent of the workforce would be expected to come from outside the area of influence, and this would influence the 1 percent figure cited in section 4.2.8.2 of the Draft EIS. The commenters asked how many NEF jobs would be filled by people from surrounding communities, and how this would affect the overall socioeconomic impacts of the proposed NEF. One commenter noted that a 120-kilometer (75-mile) radius around the site would include Eddy and Chavez Counties in New Mexico and Cochran, Culberson, Davison, Ecktor, Hockley, Loving, Lynne, Martin, Midland, Reeves, Terry, Yoakum, and Winkler Counties in Texas. The commenter stated that these counties could provide the majority of the workforce and must be included in the analysis of socioeconomic impacts.

*Response: Section 4.2.8.2 of the Draft EIS states that the impact on local employment during operations would be moderate (approximately 1 percent of the jobs in Lea, Andrews, and Gaines Counties). This impact is associated with the total labor force in the 8-county area, regardless of whether any new jobs created by operations of the proposed NEF are occupied by local workers or new workers moving into the area surrounding the proposed facility. During construction, LES estimates that 15 percent of the workforce would move into the surrounding community as new residents. There are no estimates for the percentage of the operations workforce who may move into the region of influence. As stated in section 4.2.8.2 of the Draft EIS, approximately 60 percent of the employment positions are described as skilled positions, but the number of skilled positions that would be filled by workers moving into the area from outside the region of influence is undetermined. However, with appropriate training all operations positions could eventually be filled with workers from the 8-county area. The NRC staff revised section 4.2.8.2 to further clarify this information.*

**Comment: 032-26**

A commenter stated that Table 2-3 of the Draft EIS reflects projected earnings for the temporary construction workers, but the Draft EIS does not provide information concerning pay and description of the proposed NEF workers.

*Response: Section 4.2.8.2 of the Draft EIS provides some information regarding plant worker salaries (average salary of approximately \$50,100). The NRC staff also revised section 2.1.7 of the EIS to include a table containing more detailed salary information.*

**Comment: 034-51**

A commenter stated that if the NEF were to become the major employer in the Eunice, New Mexico, area, then the EIS conclusion that closure of the proposed NEF would have a small to moderate socioeconomic impact is not justifiable. The commenter stated that the impact should be characterized as moderate to large.

*Response: Section 4.2.8.2 of the Draft EIS concludes that the impact would be SMALL to MODERATE because employment during operations at the NEF would represent approximately 1 percent or less of the jobs in Lea, Andrews, and Gaines Counties.*

**I.14.2 Community Outreach and Training**

**Comment: M-44; U-2; 026-3; 036-5; 041-4**

A Commenter noted that LES has met with officials from New Mexico Junior College to discuss training issues. The commenter stated that training concerns could be mitigated if Lea County provides training and support services through infrastructure and emergency response. Other commenters asked whether LES has communicated or initiated partnerships with local colleges or high schools. The commenters asked whether local colleges have the capacity to train students in sensitive nuclear materials handling.

*Response: LES plans to provide extensive training for employees by working in partnership with local educational institutions. Discussions and planning with leaders of the public and higher education institutions in Eunice and Hobbs are ongoing. LES has partnered with the New Mexico Junior College to develop technical and other programs at the college and to sponsor scholarships for the students. Additionally, the Eunice public school system is implementing a science curriculum, and a similar curriculum is being considered by the Hobbs public school superintendent. The courses developed from the combination of partnerships could provide the basic technical training for a skilled position at the proposed NEF or for any other nuclear facility. LES would need to provide position-specific technical training appropriate for each position. The NRC staff revised section 4.2.8.3 of the EIS to add this information.*

**I.14.3 Local and Regional Resources**

**Comment: M-33**

Several commenters stated that Figure 3-29 of the Draft EIS appears to indicate that there is a population density of 110,000 to 120,000 people in a small area in the North-Northwest sector around the proposed NEF site. The commenters stated that this is incorrect and requested that the figure be corrected.

*Response: The NRC staff revised Figure 3-29 of the Draft EIS (Figure 3-30 of this EIS) to clarify the graphics used in the legend.*

**Comment: 032-35**

A commenter noted that section 3.10.3 of the Draft EIS refers to Prime Care Health Clinic, which has been abandoned by its parent hospital. The commenter stated that there currently is no clinic open for business in Eunice.



*Response: The NRC staff verified that the Eunice Health Clinic is closed. However, a new clinic has recently opened in Eunice—the Eunice Medical Clinic. The NRC staff updated section 3.10.3 of the EIS to include this new facility.*

**Comment: 032-36**

A resident of Eunice expressed concern about the ability of the Eunice Fire and Rescue Service to sufficiently respond to an emergency at the proposed NEF.

*Response: Section 3.10.3 of the Draft EIS provides a description of community services and infrastructure for local emergency services. Issues relating to emergency response are not directly related to the environmental review in the EIS, but are related to the NRC staff's safety evaluation for the proposed facility. The SER assesses the safety review of LES' emergency management plan, including onsite and offsite emergency facilities. The NRC would not issue a license to the proposed NEF without assurance of sufficient emergency preparedness.*

**I.14.4 Economic Impacts**

**Comment: L-6; 316-14; 358-10; 358-34**

Many commenters noted that, per the terms of the agreement between LES and Lea County on the industrial revenue bonds, LES would not pay property taxes during the operational life of the proposed NEF and it may be exempt from other taxes. The commenters asked what the NRC expects to be the total property tax exemption for the proposed NEF. The commenters indicated that this figure should be compared with the \$177 million the county is expected to earn from taxes on the proposed NEF, also considering that construction of the proposed NEF would cost \$1.2 billion (Draft EIS, Table 2-8). A commenter stated that such a calculation should be integral to any assessment of socioeconomic benefits of the proposed NEF. Another commenter stated that the proposed NEF should not be constructed because it would not be economically viable without the Industrial Revenue Bond, and that the EIS should discuss how the proposed NEF is a financially viable alternative.

*Response: The industrial revenue bond is not a vehicle for financing the construction, operation, and decommissioning of the proposed NEF. It is a procedural mechanism under New Mexico law required for tax abatement purposes. LES would be fully responsible for financing of the proposed facility. The industrial revenue bond provides LES with a number of tax incentives, including exemption from property taxes in exchange for locating in Lea County and making payments in lieu of taxes. LES estimates payments in lieu of taxes to be about 20 percent of what it would normally pay in property taxes to Lea County, ranging between \$10 and \$14 million over the life of the facility. Assuming payments in lieu of taxes represent 20 percent of property taxes, the NRC expects the total property tax exemption to range between \$40 and \$56 million over the operational life of the facility. The NRC staff revised section 7.2 of the EIS for clarification. The issue of financial viability is not within the scope of the EIS.*

**Comment: 343-7; 365-5**

A commenter stated that the proposed NEF would be tax exempt and would create few jobs. Another commenter stated that since the proposed NEF would be tax exempt, the main benefit to the community would be from salaries. The commenter noted that the number of jobs generated appears to be half of what other types of businesses would create. The commenter expressed concern about potential health effects and stated that locating the proposed NEF in Lea County would amount to an undesirable cost to the community rather than an economic benefit.

*Response: A cost-benefit analysis was performed and is summarized in Chapter 7 of the EIS. Table 7-2 summarizes the socioeconomic benefits, concluding there would be moderate benefits to*

*employment/economic activity. The environmental and health impacts were determined to be SMALL, or SMALL to MODERATE, as summarized in Chapter 4. Taking into consideration the costs and benefits, the NRC staff concludes that the benefits outweigh the costs.*

## **I.15 Environmental Justice**

### **Comment: L-8; M-35; Y-1; 034-57; 036-3; 316-16**

Many commenters stated that, although the NRC staff concludes that environmental justice impacts would be small, the data are skewed by comparing the minority and low-income population percentages of the area to State averages rather than to national averages. The commenters stated that Hispanics are 42.1 percent of the population of New Mexico and 39.6 percent of the population of Lea County, but only 12.5 percent of the US. population at large.

Additionally, a commenter referenced a discussion in section 4.2.9.5 of the Draft EIS concerning the impacts of an accident involving the release of UF<sub>6</sub>. The commenter disagreed with the conclusion in the Draft EIS that minority and low-income populations would not be more obviously at risk from such an accident. The commenter further stated that the proposed NEF would be located in an area with a disproportionately large minority population.

*Response: The NRC staff used both demographic data and scoping to identify minority and low-income populations. The analysis used to identify the location of minority and low-income persons clearly found concentrations of low income and minority individuals in the area surrounding the proposed NEF site. The environmental justice guidance provided by the Executive Order 12898, the NRC, or the Council on Environmental Quality does not require that regions with high minority populations be avoided; rather, that any disproportionate risks to minority and low-income populations near the site be identified and addressed. The NRC staff also examined environmental pathways to determine if any minority or low-income populations appear to be disproportionately at risk. None of the impacts that were greater than SMALL were found to disproportionately affect minority or low income populations.*

*In the case of the hypothetical UF<sub>6</sub> accident referenced in the comment, estimated latent cancer fatalities apply to the entire population, which would include both Environmental Justice populations and non-Environmental Justice populations. Since it is highly unlikely that such an accident would occur, the risk to any population, including low-income and minority communities, is considered to be low. The EIS also discusses mitigation actions. At a distance of 32 kilometers (20 miles), it did not appear that the minority community in Hobbs—while slightly closer to the proposed NEF site—was any more at risk than higher income majority neighborhoods nearby, and mitigation actions to prevent such an accident were discussed.*

### **Comment: 032-37; 316-17**

Two commenters requested more information concerning NRC's efforts to consider the impacts to minority groups in greater detail (such as holding additional meetings). One of the commenters asked who the meeting participants were and wanted to know where the meetings were held. The commenter was not contacted about these meetings, and expressed concern that other African-American or Hispanic residents of the Eunice area were not contacted. The second commenter asked if the meetings were recorded and requested that the EIS describe in detail the content of the meetings, as well as other methods by which the NRC staff considered environmental justice in greater detail.

*Response: The NRC staff revised section 3.11.1 of the EIS to discuss the efforts that were made to meet with representatives of the African-American and Hispanic groups and to describe the issues raised. The NRC staff held a meeting in Hobbs with a group of residents considered knowledgeable about the*

concerns of the Hispanic Community in Lea County. This meeting took place on the morning of March 4, 2004, and was attended by seven representatives of the Hispanic community. During the afternoon of the same day, also in Hobbs, the NRC staff met with two Lea County residents acquainted with issues in the African-American community. To assemble these meetings, the NRC staff contacted elected and appointed public officials in Lea County and requested the names of authoritative contacts on the concerns of the minority community. The NRC staff then called many of these contacts and, working with some of the contacts, assembled the meetings to which both they and the NRC staff invited participants. The meetings were not transcribed.

**Comment: 034-31**

A commenter referenced section 4.2.9.5 of the Draft EIS, stating that the EIS should include a discussion of relevant infant mortality rates, if available, and that these rates should be broken down by race and ethnicity.

*Response: The referenced paragraph in section 4.2.9.5 of the Draft EIS refers the reader to Chapter 3. Infant mortality rates are provided in Table 3-19 of the EIS.*

**Comment: 034-32**

A commenter stated that potential impacts to socioeconomic and community resources for recreation is identified in Table 4-3 but not discussed in the text. The commenter stated that text should include a discussion of this impact.

*Response: Section 4.2.9.2 of the Draft EIS includes impacts to recreational resources, and states that the proposed NEF site is currently used for cattle grazing, is zoned for industrial purposes, and has very little other productive economic, cultural, or recreational uses. Impacts on recreation resources would, therefore, be SMALL.*

**Comment: 034-52**

A commenter suggested that the statement regarding the proposed NEF's environmental justice impacts during decommissioning is a conclusion. The EIS should explain how this conclusion was reached.

*Response: The NRC staff revised section 4.3.9 of the EIS to provide a basis for the conclusion.*

**Comment: 048-35**

A commenter requested further explanation of the rationale for expanding the area for the environmental justice impact assessment.

*Response: As stated in Appendix C of NUREG 1748, the geographic scale should be commensurate with the potential impact area and should include a sample of the surrounding population (e.g., at least several block groups). Because of the rural nature of the area and the scope of the potential impacts, the environmental justice impact assessment area was expanded to an 80-kilometer (50-mile) radius. The NRC staff revised section 3.11 of the EIS to clarify the area used for the environmental justice impact assessment.*

**Comment: 048-99**

A commenter pointed out that for both New Mexico and Texas, the State summaries of the percent of minorities in many cases do not match with the values given in Table DP-1, the referenced US. Census Bureau Table. The commenter specified that an explanation of the basis for the differences should be provided.

*Response: The NRC staff revised Table G-1 of the EIS to correct the reference. The correct reference should be Table DP-3 from the 2000 U.S. Census of population, dataset SF-1.*

**Comment: 284-4**

A commenter stated that it is difficult in the Draft EIS to discern disparate impacts on geographic regions with relatively high ratios of disadvantaged populations from the benefits that accrue to already privileged groups in national and international contexts.

*Response: NEPA does not require that the geographic distribution of the benefits and costs of a proposed action be identical. The EIS clearly states that the benefits of the project are national while the environmental costs are primarily local (see Chapter 7 of the EIS). However, the local costs are SMALL and there are some SMALL to MODERATE socioeconomic benefits.*

**I.16 Noise**

**Comment: 034-33; 034-35**

A commenter stated that the discussion in section 4.2.10.1 of the Draft EIS of noise impacts during construction should define the term “normal daytime working hours” listing hours of the day and days of the week, and explaining how holidays are applicable. The commenter asked whether any exceptions to these hours would apply, since the Draft EIS states that short-term noise impacts may be limited to workday mornings and afternoons.

*Response: As shown in Table 2-2 of the Draft EIS, construction activities are expected to occur over a 10-hour workday. The 10-hour workday was used in section 4.2.10.1 as a basis for estimating noise impacts. The NRC staff expects that, under normal construction work schedules, Saturdays, Sundays, and holidays would be non-working days. It may be necessary to perform some construction work on Saturdays, Sundays, or holidays to complete specific activities within schedule, but these activities would be kept to a minimum.*

**Comment: 034-34**

A commenter referred to the statement in section 4.2.10.1 of the Draft EIS that some noise levels during construction would be within the U.S. Department of Housing and Urban Development unacceptable sound pressure level guidelines. The commenter stated that the Draft EIS concludes that the impact of noise levels from site preparation and construction would be small, but that these levels would continue for several years. The commenter stated that the EIS conclusion that impacts would be small is erroneous if hearing loss were likely to occur to the maximally exposed individual. The commenter requested that the EIS provide additional discussion of noise impacts.

*Response: As discussed in section 4.2.10.1 of the Draft EIS, the highest noise levels are predicted to be in the range of 84 to 98 decibels A-weighted at the south fence line during construction of the Site Stormwater Detention Basin. These noise levels are expected to be intermittent and would attenuate dramatically with distance from the site boundary. Additionally, the highest noise levels would not last for years. The noise would be generated by the use of specialized equipment, such as pile drivers and earth compactors, during certain construction activities lasting a few weeks. The maximally exposed individuals would be the construction workers operating the equipment. These workers would be provided with suitable hearing protection.*

**Comment: 034-53**

A commenter referred to the discussion of noise impacts during decommissioning in section 4.3.10 of the Draft EIS. The commenter expressed confusion by the statement that impacts from decommissioning would last for a few months, stating this appears to conflict with statements elsewhere in the EIS that the decommissioning process would take nine years.

*Response: As discussed in section 4.3.10 of the Draft EIS, the majority of the decommissioning work would generate approximately the same noise levels as would be expected for normal operation of the proposed NEF. The operation of heavy construction equipment would generate the higher noise levels, which would only occur on an intermittent basis during decommissioning activities. The total estimated duration of the higher noise levels would be a few months out of the multi-year decommissioning program. The NRC staff revised section 4.3.10 of the EIS to clarify that the duration of higher noise levels would be intermittent during decommissioning.*

**I.17 Transportation**

**I.17.1 Traffic and Traffic Volume**

**Comment: 034-29**

A commenter stated that impacts from increased traffic would span at least 30 years and that section 4.2.9.1 of the EIS should not describe as short the period of impacts from increased traffic.

*Response: The phrase “short period of inconvenience” being questioned by the commenter refers only to the 3-year peak construction period when traffic on New Mexico Highway 234 would approximately double. The impact on traffic from construction activities is described in section 4.2.11.1 of the Draft EIS as SMALL to MODERATE. Although road traffic would be increased during operations (see section 4.2.11.2) compared with current circumstances, it is anticipated that the extra traffic would have a SMALL impact.*

**Comment: 034-36; 034-43; 082-3**

A commenter referred to the discussions of construction transportation impacts in sections 4.2.11.1 and 4.2.11.3 of the Draft EIS. The commenter stated that a 188-percent increase in vehicular traffic on New Mexico Highway 234 should not be characterized as a small to moderate impact, but as moderate to large. The commenter stated the EIS should further analyze this traffic increase (e.g., quantifying the additional expense to the State of New Mexico for increased road maintenance and discussing mitigation measures). The commenter asked whether LES could contribute funds to the State to assist in the maintenance of Highway 234. Another commenter stated that the New Mexico Department of Transportation (NMDOT) is evaluating when to perform maintenance on New Mexico Highway 234. The commenter stated that NMDOT could wait until after construction is completed or improve roads first to address traffic safety during construction.

*Responses: A SMALL to MODERATE impact to New Mexico Highway 234 was determined for the increase in traffic because the increased traffic volume is only 40 to 50 percent of the design capacity of a two-lane road, which is an average of 6,000 to 8,000 vehicles throughout each day or 1,500 to 2,000 vehicles per hour (NMDOT, 2005a). The NRC staff conducted further analyses to determine impacts on Highway 18, and revised section 4.2.11.1 of the EIS to summarize these impacts (which would be SMALL).*

*It is not standard practice for an industry to compensate the State for maintenance of State roads (NMDOT, 2004; and NMDOT, 2005b). However, NMDOT does sometimes work with industrial facilities*

*to determine how best to fund specific road improvements that would apply to that facility (e.g., traffic lights and associated electric wiring, turning lanes, and signage). Currently, highway funds have not been obtained for road improvements to New Mexico Highway 234. Highway 234 was originally included in Governor Richardson's Investment Partnership, but was removed by the State legislature. Funding for maintenance activities on Highway 234 would have to be obtained from the Statewide Transportation Improvement Plan. These maintenance activities would be necessary regardless of whether the proposed NEF is approved.*

*If the license application for the proposed NEF is approved, then the NMDOT would work with the local communities and LES to determine what upgrades specific to the proposed NEF would be required (based primarily on the amount of truck traffic stated in section 4.2.11.1 of the Draft EIS) and how funding for these improvements would be obtained (NMDOT, 2005b). This work would be performed in compliance with New Mexico Administrative Code Chapter 18, Title 31, Part 6. This regulation requires a traffic study to be performed and submitted to the NMDOT with an access permit application. An access permit would likely stipulate any safety enhancements necessary to state highways before access roads to the proposed NEF site could be constructed (NMDOT, 2005a). Funding for any safety enhancements could be a combination of local, State, or Federal funding and/or private funding as negotiated and coordinated among these parties. The NRC staff revised Tables 1-2 and 1-3, and sections 4.2.11.3 and 4.2.11.4 to discuss the access permit requirements in the New Mexico Administrative Code.*

**Comment: 034-37; 034-39**

A commenter suggested that sections 4.2.11.1 and 4.2.11.2 of the Draft EIS explain the basis for the assumption that a truck would have an average round-trip distance of 64 kilometers (40 miles) during construction and operation, respectively.

*Response: The NRC staff assumed that the average round-trip distance for a truck delivering supplies during construction and operation would be twice the distance from Hobbs, New Mexico, to the proposed NEF. This is assumed during construction because Hobbs, New Mexico, is the closest principal business center to the proposed NEF site. This is also assumed during operations because primarily janitorial and laboratory chemical supplies would be delivered by truck, which would probably originate from businesses in and around Hobbs, New Mexico. Sections 4.2.11.1 and 4.2.11.2 of the EIS have been revised to state the assumptions associated with the round-trip distance estimate.*

**Comment: 034-38**

A commenter stated that the EIS needs to explain the conclusion of small impacts from construction access roads (section 4.2.11.1 of the Draft EIS). The commenter noted that the temporary construction access roads would be converted to permanent access roads, and that conversion of the roads would not cause a decrease in the amount of vehicular traffic on New Mexico Highway 234. The commenter further noted that the access roads essentially would be constructed twice, and this does not decrease other human health and environmental impacts.

*Response: Activities associated with construction of the access roads include clearing, grading, and converting to permanent roads. The phased construction of these roads would have a SMALL impact; the construction of the roads was included in the NRC staff's analysis of overall construction impacts, which were determined to be SMALL.*

**Comment: 034-45**

A commenter stated that the EIS should discuss whether LES would be required to install dedicated turning lanes (section 4.2.11.4 of the Draft EIS). The commenter suggested that construction of dedicated turning lanes may be inadequate to mitigate the impacts of increased traffic on New Mexico Highway 234.

*Response: The NRC staff revised Tables 1-2 and 1-3, and sections 4.2.11.3 and 4.2.11.4 of the EIS to discuss the consultation process among the State of New Mexico, local governments, and private landowners for assessing traffic safety needs. According to New Mexico Administrative Code Chapter 18, Title 31, Part 6, NMDOT could require LES and/or Lea County government to perform a traffic study and coordinate with NMDOT to determine the specific safety improvements to be taken if approved by NMDOT. The construction of turning lanes is an example of possible safety enhancements that could be implemented through this process.*

**Comment: 103-18**

A commenter noted that Table 3-21 of the Draft EIS lists traffic volume per day. The commenter stated that average volume per day includes evening, nighttime, and weekend traffic. The commenter stated that a more meaningful measure would be the average volume per hour for the peak load traffic period (6 a.m. to 6 p.m. Monday through Friday), because the reported traffic volume would not be diluted by off-hours and low weekend traffic. The commenter stated that the EIS should use this measure, which would reflect traffic volume during the time construction-related traffic and school busses are on the road.

*Response: The NRC staff reviewed hourly traffic volume data for New Mexico Highway 18 near south Hobbs, which has a higher traffic volume than New Mexico Highway 234. The hourly traffic volume during peak periods is considered well within the capabilities of the highway without causing noticeable delays. Additionally, the South Bypass, which is currently lightly used, provides another route around Hobbs (Hobbs, 2005). The NRC staff revised section 4.2.11.1 of the EIS to discuss construction traffic impacts during peak traffic volume periods during the day.*

**Comment: 103-20**

Referring to the discussion in section 4.2.8.1 of the Draft EIS on employment rates during construction, a commenter stated that the EIS should provide an analysis indicating the local roads can handle increased vehicle traffic (construction workers, deliveries to the site) during normal work hours (6 a.m. to 6 p.m., Monday through Friday) in the fourth year of construction, which is the year of highest construction employment.

*Response: A transportation analysis that shows the peak traffic volume during the construction period is provided in section 4.2.11.1 of the Draft EIS. The peak volume would be 3,423 vehicle trips per day. The NMDOT would review the need to expand New Mexico Highway 234 to four lanes once the daily volume exceeds 6,000 to 8,000 vehicles per day, or 1,500 to 2,000 vehicles per hour (NMDOT, 2005a). In addition, the NRC staff reviewed traffic volume on New Mexico Highway 18 between Eunice and Hobbs. The NRC staff revised section 4.2.11.1 to add the analysis of traffic impacts on New Mexico Highway 18 and the design basis of New Mexico Highway 234. The NRC staff also revised Tables 1-2 and 1-3, and section 4.2.11.3 to discuss the potential need for an access permit that could require a traffic study. The NMDOT would likely stipulate any safety enhancements to state highways in the area if a traffic study supports such enhancements.*

## **I.17.2 Transportation Impacts**

**Comment: M-46**

Several commenters stated a paragraph discussing DUF<sub>6</sub> conversion in section 4.2.11.2 of the Draft EIS is not well written. The commenters stated that this illustrates that the proposed NEF is not timely or well planned, and that LES has no plans for disposal of the waste to be generated by the proposed NEF. Although options are outlined in the Draft EIS, not a single option has been identified as a realistic solution to the thousands of tons of waste to be generated by the facility.

*Response: The paragraph cited provides an overview of transportation by rail options. The NRC staff revised section 4.2.11.2 in the EIS to separate the shipments for each option for greater clarification. As presented in the Draft EIS, there are several options for the waste management of the DUF<sub>6</sub>. These issues are addressed in the main body of the EIS and in section I.20 of this appendix.*

**Comment: 034-41**

A commenter stated that the last paragraph on page 4-37 in section 4.2.11.2 of the Draft EIS is not written well.

*Response: The NRC staff revised this paragraph for clarification in the EIS.*

**Comment: 151-1**

A commenter expressed concern that the NRC staff relied on dated references that are not readily available to members of the public. As an example, the commenter stated that within the transportation analysis sections, the need for additional analysis of several potentially relevant issues was dismissed based on existing NRC EIS documents prepared in 1977 and 1980.

*Response: The NRC staff applied such analyses in support of the regulatory action being taken at that time. The specific issue cited by the commenter refers to the elimination from detailed study of existing transportation routes between other nuclear fuel cycle facilities that were previously analyzed in a prior EIS. The NRC staff considers this a valid use of previous EISs, especially when regulatory actions were based on those studies. While not directly available from the NRC's web site, past studies, such as NUREG-0170, Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes, are available to members of the public through the NRC's Public Document Room.*

### **I.17.3 Routes and Shipping Requirements**

**Comment: 048-90**

A commenter stated that transportation regulations in 49 CFR § 173.420 have been modified and the following statement in Appendix D is no longer correct: "With the exception of the product material, all shipments can be transported in Type A shipping containers without additional requirements."

*Response: The transportation regulations changed just prior to issuance of the Draft EIS, as noted in the comment, but too late to be incorporated into the Draft EIS. The NRC staff revised Appendix D, section D.2 of the EIS to reflect the revised NRC (10 CFR Part 71) and DOT (49 CFR Parts 171-173) shipping regulations. New tests include 173.420(a)(3)(I), which requires a hydraulic test without leakage; 173.420(a)(3)(ii), which requires a 173.465(c) free drop test without loss or dispersal of UF<sub>6</sub>; and 173.420(a)(3)(iii), which requires a 10 CFR § 71.73(c)(4) fire test without rupture of the containment system. Shipments of the enriched uranium are required to have fissile controls per 49 CFR §173.417 and 10 CFR § 71.55. Although the regulations may require overpacks for thermal and/or fissile protection of feed, product, or waste material, the EIS assessment of radiological impacts was conservative in that no credit was taken for any reduction in exposures due to the presence of a thermal and/or fissile overpack.*

**Comment: 102-3**

A commenter stated that many trucks currently use New Mexico Highway 234 to transport wastes to the WCS plant and the local landfill. The commenter stated that additional shipments of radioactive materials and wastes to sites around the country would increase local traffic and significantly impact the commenter's life.



*Response: The transportation analysis in section 4.2.11 of the Draft EIS took into account the current amount of traffic. After analyzing the additional traffic that would be created due to construction and operation of the proposed NEF, the NRC staff determined the impacts would be SMALL to MODERATE. The projected total traffic would be within the design capacity of New Mexico Highway 234 (NMDOT, 2005a).*

**Comment: 104-2**

A commenter expressed concern that supply and waste transport routes for the proposed NEF remain to be determined. The commenter stated that, as a resident of a state outside the State of New Mexico, it is the commenter's opinion that LES be required to disclose definitive plans for regional nuclear transportation.

*Response: The routes analyzed in the EIS were chosen to be representative of the impacts associated with transportation of feed, product, and waste materials to and from the proposed NEF. Selection of specific routes is not needed to provide a reasonable estimate of these impacts.*

**Comment: 105-1**

A commenter stated if the proposed NEF is constructed, about three shipments per day of raw, enriched, and waste depleted uranium and other wastes would be shipped via truck and train along Interstate-25 through Denver, Colorado. The commenter expressed concern that, in light of the potential for dirty bombs, three truckloads per day of this material could be permitted for transport through a major metropolitan area.

*Response: Specific routes for UF<sub>6</sub> shipments have not been determined, nor are there specific routing constraints imposed on such shipments by either NRC or DOT regulations (as there are for higher risk radiological or chemical hazardous sources). The representative routes used in this analysis were chosen to provide estimates of the risks associated with transport of feed, product, and waste materials to and from the proposed facility (as discussed in Appendix D, section D.6.1 of the Draft EIS). With regard to concerns about terrorism, the Commission has held that the NRC staff is not required to address terrorism in its EISs. The NRC staff provided a discussion on terrorism in section I.25 of this appendix.*

**Comment: 105-2**

A commenter asked if the trucks transporting waste would travel with a military escort.

*Response: There are no specific NRC regulations that would require armed or unarmed escorts for feed, product, and waste materials from the proposed NEF facility. Additional security measures are only required for higher-risk materials, including certain quantities of special nuclear material and spent nuclear fuel. For information about the types of radioactive material that would require additional security measures, please visit the NRC's web site at [www.nrc.gov](http://www.nrc.gov).*

## **I.17.4 Accidents**

**Comment: 032-42**

A commenter referred to the summary in section 4.2.11.3 of the Draft EIS of transportation accident impacts. The commenter requested that the calculation of latent cancer fatalities be explained in more detail and in a layperson's terms.

*Response: A text box explaining the use of "latent cancer fatalities" is provided in section 4.2.11 of the Draft EIS. A population dose, also known as a collective dose, can be estimated for incident-free and*

accident scenarios. The collective dose is calculated as the sum of the products of individual doses and the number of people receiving those doses. For example, using units of rem, if one person receives 1 rem and 10 people receive 0.1 rem, the population or collective dose to the eleven people is calculated as:

$$1 \text{ person} * 1 \text{ rem (or 1 person-rem)} + 10 \text{ people} * 0.1 \text{ rem (or 1 person-rem)} = 2 \text{ person-rem.}$$

For a given unit collective-dose (e.g. person-rem), there could be an effect on the population in the form of radiologically-induced Latent cancer fatalities. The EPA has suggested a conversion factor that for every 100 person-Sievert (10,000 person-rem) of collective dose, approximately 6 individuals would ultimately develop a radiologically induced cancer (Eckerman et al., 1999). For this analysis, the computer code RADTRAN developed by Sandia National Laboratories was used to estimate the risk of latent cancer fatalities based on the expected doses to individuals (e.g. crew, passengers, members of the public along transportation routes) during incident-free transportation, due to external radiation exposure, and from internal (inhalation from plume passage and resuspension) and external (cloudshine and groundshine) radiation exposure during potential accident scenarios. Individual and collective doses were calculated and the expected number of latent cancer fatalities were estimated for the exposed population using the EPA risk factor referenced above.

**Comment: 034-40**

A commenter stated that the EIS should explain why an assumption of stable meteorological conditions during a transportation accident is appropriate for the proposed NEF as stated in section 4.2.11.2 of the Draft EIS.

*Response: Stable meteorological conditions would tend to minimize the dispersion of contaminants in the atmosphere and thereby provide for higher downwind concentrations; thus, all other parameters being equal, stable meteorological conditions are expected to produce higher impacts than would be produced by neutral or unstable atmospheric conditions. Although site-specific meteorological data were not utilized in the study, the results of the analysis reported in the Draft EIS are expected to provide a conservative estimate of the potential human health impacts associated with this accident scenario.*

**Comment: 034-42; 358-30**

A commenter stated that section 4.2.11.2 of the Draft EIS fails to explain how the probability of occurrence of a transportation accident factors into the conclusion that the impacts could be small to moderate. The commenter stated potential impacts to as many as 28,000 people should not be considered small to moderate, unless the chances of such an accident are small. Another commenter stated that the estimate of 28,000 people potentially affected by a severe railroad accident is generic, too low, and not specific to proposed NEF waste or to railway and meteorological conditions in New Mexico.

*Response: The NRC staff agrees that both consequence and probability information are important in assessing risk. U.S. regulations are compatible with international transportation regulations and provide performance requirements on a wide range of potential accident scenarios. These performance requirements necessitate radioactive material package designs that are able to withstand severe accident conditions to prevent criticality events and/or the inadvertent release of radioactivity into the environment. To date there have been millions of radioactive material transports in the United States without a significant release of radioactive material to the environment or radiological exposure. As the EIS states in section 4.2.11.2, the chance of occurrence of this accident scenario is "very remote" and is provided in the EIS to provide a conservative estimate of the potential chemical risks associated with UF<sub>6</sub> shipments. It is also important to note that the nature of the potential adverse health effects*

*(consequences) to the larger portion of the population (e.g. respiratory irritation or skin rashes), are much less severe than the irreversible adverse health effects also reported.*

*The estimates for the consequences were calculated using industry-accepted computer codes, methods, and assumptions for weather conditions to obtain a conservative estimate, measuring the highest potential consequences. The urban population density used in the calculations would be considered representative of most urban areas. The transportation routes selected for analysis are representative routes and may not be the actual routes used. Finally, the frequency of such a transportation accident would be very unlikely. Therefore, the likely public health effects presented in the transportation analysis would overestimate the impacts. Small, moderate, and large impacts are defined in a text box in section 4.1 of the Draft EIS. Adverse health effects are temporary and would not be expected to result in permanent injury. After considering both the range of potential number of people affected by transportation accidents (i.e., 0 to 28,000 people) and the temporary nature of potential health effects (which would noticeably alter but not destabilize public health), the NRC staff concluded that the range of potential impacts would be SMALL to MODERATE.*

**Comment: 034-44**

A commenter stated that it is misleading to discuss only cancer fatalities in connection with summarizing the potential impacts to human health for transportation accidents (section 4.2.11.3 of the Draft EIS). The commenter stated that other impacts could be significant and should also be mentioned in the summary.

*Response: The NRC staff revised the summary of transportation impacts in section 4.2.11.3 of the EIS to include other impacts from sections 4.2.11.1 and 4.2.11.2, such as chemical impacts.*

**Comment: 103-23; 105-4**

A commenter stated that the EIS should evaluate transportation scenarios that include a range of countermeasures and times after the accident when the countermeasures are initiated. The commenter stated that the EIS should require the applicant to provide annual training to first responders along the routes. Another commenter asked what training or information/disclosures have been made to notify first responders of the problems associated with accidents or attack.

*Response: States are responsible for providing emergency response for transportation accidents involving hazardous materials. Although OSHA has requirements in 29 CFR § 1910.120(q) for emergency response personnel (first responder) training that is applicable to transportation events for UF<sub>6</sub>-related shipments, there are no requirements for prenotifications or NRC or State approval of routes. The DOT has published an emergency response guidebook that summarizes potential health, fire, or explosion hazards, public safety, and emergency response actions for hazardous materials such as UF<sub>6</sub>. In the United States, OSHA (29 CFR § 1910.120) and EPA (40 CFR Part 311) require that first responders be trained regarding the use of this guidebook. Additionally, vehicle placards, package labels, and shipping papers communicate information about the hazardous material to first responders arriving on an accident scene. Shippers are required to provide an emergency response number with the shipping papers that accompany the shipment. Emergency notification requirements are found in 49 CFR Part 172, subpart G. For example, 49 CFR § 172.602 requires information about the hazardous materials and immediate precautions to be taken in the event of an accident, and 49 CFR § 172.604 requires a 24-hour emergency response telephone number. Although the NRC recognizes that states are primarily responsible for protecting the public against health and safety hazards (such as a transportation accident involving radioactive materials), the NRC and other Federal agency assistance is available to states upon request. The NRC is prepared to assist any state or local government responding to such an event.*

*The Draft EIS presents accident scenarios that assume countermeasures are not employed, so that the results of the accident analyses would be conservative. The chemical hazard associated with a transportation accident involving UF<sub>6</sub> greatly exceeds the radiation hazard.*

## **I.18 Public and Occupational Health—Normal Operations**

### **I.18.1 Source Term**

#### **Comment: M-49**

Several commenters stated that Table 4-12 of the Draft EIS indicates that empty used UF<sub>6</sub> shipping cylinders would release less radioactivity than full UF<sub>6</sub> shipping containers. The commenter stated that this is counter-intuitive and asked the NRC to explain in the EIS why this is the case.

*Response: The NRC staff believes the commenter meant to use the word “more.” Table 4-12 indicates that empty used UF<sub>6</sub> shipping cylinders would release more radioactivity than full UF<sub>6</sub> shipping containers. This occurs for two reasons. First, after UF<sub>6</sub> is vaporized and removed from a cylinder, the radioactive uranium daughter products that build up due to the radioactive decay of uranium collect at the bottom and form a “heel.” The radiation emitted from the uranium daughter products consists of a greater quantity of gamma radiation than that produced by only uranium. Second, uranium is a good shield material for gamma radiation. When the cylinder is full of UF<sub>6</sub>, the uranium daughters are distributed throughout the cylinder and must pass through a significant amount of uranium (thus can be stopped or absorbed by the uranium). It is only the uranium daughters near the inner surface of the cylinder that can readily escape from the cylinder and contribute to a nearby person's radiation exposure. Because the empty cylinder no longer has the high shielding capability of the UF<sub>6</sub> and the heel concentrates the more highly radioactive uranium daughters near the inner cylinder surface, the radiation levels of the empty UF<sub>6</sub> cylinders are higher than the levels of full cylinders. The NRC staff revised Appendix C to include this explanation and has added a footnote to Table 4-12 referencing the new discussion in Appendix C.*

#### **Comment: M-66**

Several commenters noted that Table C-2 of the Draft EIS seems to be inaccurate in the same way as Figure 3-29 of the Draft EIS (discussed in section I.14.3). That is, the table appears to indicate a greater than expected population density in the north-northwest sector.

*Response: Figure C-2 is consistent with Figure 3-29 of the Draft EIS (Figure 3-30 of this EIS), which indicates that the population in the north-northwest sector between approximately 20 and 30 miles from the proposed NEF site is about 3,000 to 4,000 people. The NRC staff revised the legend for Figure 3-29 (Figure 3-30 of this EIS) for clarification.*

#### **Comment: 033-1**

A commenter stated that the proposed NEF should not be licensed because the emissions would expose over 30,000 people to radioactive substances (such as uranium isotopes and decay products, gross alpha radiation, DUF<sub>6</sub>, triuraniumoctaoxide [U<sub>3</sub>O<sub>8</sub>], and uranyl fluoride [UO<sub>2</sub>F<sub>2</sub>]) and nonradioactive substances (such as volatile organic compounds, carbon monoxide, nitrogen dioxide, and particulates). The commenter stated that the NRC is ignoring this fact and that licensing the plant would put many people at risk.

*Response: As discussed in the Draft EIS, no significant adverse impacts are expected to occur from normal operation of the proposed facility. Emissions of the radioactive substances the commenter listed would occur in amounts that are well below regulatory limits for radiation protection. Emissions of*

*nonradioactive substances would be regulated by the EPA or the State of New Mexico, and would also be within regulatory limits.*

**Comment: 034-46**

A commenter noted that section 4.2.6.2 on the UBC Storage Pad Stormwater Retention Basin states that the basin would likely remain dry 11 to 12 months per year, but does not discuss impacts from resuspension of contaminated soil in the basin. The commenter noted that, because the UBC Storage Pad Stormwater Retention Basin would not be covered with netting, the resuspension factor for soils could be higher than for the Treated Effluent Evaporative Basin. The commenter further noted that Chapter 6 does not discuss whether either of the basins would be monitored for impacts to air quality. The commenter suggested that the EIS address these issues and discuss how the liner might be affected by remaining dry most of the year.

*Response: The UBC Storage Pad Stormwater Retention Basin would not be expected to contain radioactive material and would contain only trace nonradiological contaminants, (principally oily discharges from the cooling tower and heating boiler blowdown). As presented in Chapter 6 of the Draft EIS, the basin would be sampled to monitor any chemicals in the basin soil and LES would have three continuous airborne particulate samplers, with two located adjacent to receptors of concern (nearby workers to the north of the proposed NEF and the nearest residential area). Any resuspension of soil during periods when the basin is dry would not be expected to result in human health impacts. The liner would not be expected to degrade as a result of remaining dry for most of the year. Soil would be present above the liner, and the drying of this soil also would not be expected to affect the liner's performance.*

**Comment: 048-36**

A commenter noted that the text on page 3-68 of the Draft EIS states that Figure 3-31 of the Draft EIS depicts major sources and levels of background radiation near the proposed NEF site. The commenter suggested that the text be clarified to indicate that the figure actually depicts major sources and average levels of background radiation for the United States.

*Response: The NRC staff revised section 3.14.1 of the EIS to clarify that Figure 3-31 of the Draft EIS (Figure 3-32 of this EIS) depicts the major sources and levels of background radiation in the United States, and that this reflects the conditions near the proposed NEF. The NRC staff also changed the title of the figure for clarification.*

**Comment: 048-85**

A commenter noted that section 6.1.1.1 of the Draft EIS requires clarification that the actual expected gaseous release source term would be less than 10 grams (0.4 ounces) of uranium or approximately 35 times less radioactivity than the 8,886 kilobecquerels per year (240 microcuries per year) value used in the bounding routine dose impact assessment for demonstrating expected compliance with regulatory limits.

*Response: The NRC staff revised section 6.1.1.1 of the EIS to clarify the conservative nature of the value used in the bounding routine dose impact assessment.*

## **I.18.2 Impacts**

**Comment: M-6**

Several commenters stated that the text box in the executive summary of the Draft EIS (“Determination of the Significance of Potential Environmental Impacts”) should indicate the number of latent cancer fatalities associated with small, moderate, or large impacts. The Draft EIS indicates there would be two

latent cancer fatalities over the lifetime of the proposed NEF as a result of vehicle emissions during shipment of materials. The commenter stated that some may disagree with the EIS conclusion that two latent cancer fatalities from vehicle emissions over the lifetime of the proposed NEF represents a small impact. The commenter requested that the NRC explain how this determination is made, providing methodology used.

*Response: The text box in section 4.2.11 of the Draft EIS provides an explanation of Latent cancer fatalities. Two latent cancer fatalities over the lifetime of the facility would result in an annual risk of less than 0.5, which means the potential for cancer fatalities from the proposed NEF would not be distinguishable from cancer fatalities expected to occur in the general population. Thus, as defined in the text box in the executive summary (and section 4.1), such impacts would be SMALL.*

**Comment: M-12**

Several commenters noted that section 2.1.3 of the Draft EIS indicates that the proposed NEF would include a Visitor Center near the boundary of the facility. The commenters requested that the NRC either specify more clearly which exposure estimates are associated with patrons of the Visitor Center or include dose estimates related to the Visitor Center.

*Response: As provided in Table 4-11 of the EIS, the radiological impacts are presented for an individual expected to receive the maximum exposure (highest boundary). Exposures to all other members of the public or workers at the Visitor Center would be less than exposures to this individual.*

**Comment: M-67**

Several commenters requested clarification of the heading of the fourth column (“Holdup Time”) in Table C-3 in Appendix C of the Draft EIS.

*Response: “Holdup Time” is a term that defines the time between harvest and consumption of the food. This time includes processing, transportation, and storage of the food. The NRC staff added a clarifying footnote to the table.*

**Comment: 032-12**

A commenter expressed concern about cancer rates in the area and stated that the Draft EIS has many references to Latent cancer fatalities. The commenter asked why the community of Eunice should be subjected to negative health effects from the proposed NEF.

*Response: Section 4.2.12.2 of the Draft EIS states that public exposure to radiological emissions from the proposed NEF are estimated to result in  $8.4 \times 10^{-6}$  latent cancer fatalities per year from normal operations. (See the response to comment M-6 below and the text box in section 4.2.11 for further explanation of the use of Latent cancer fatalities.) All of the population within 80 kilometers (50 miles) of the proposed NEF would receive a total dose of 0.00014 person-sievert (0.014 person-rem). This total dose to all of the population in that area is less than 5 percent of the dose each U.S. citizen typically receives just from naturally occurring radioactivity (about 3 millisieverts [300 millirem]). Additionally, the radiation dose to the nearest resident (Table 4-11) would be about 0.000013 millisievert (0.0013 millirem) per year from normal operations. This is about 0.0004 percent of the dose that the average U.S. citizen receives per year from naturally occurring radioactivity. Latent cancer fatalities are also mentioned in relation to accidents. Tables 4-5 and 4-14 indicate that associated latent cancer fatalities are small, particularly after mitigation measures are taken (such as that described in footnote e of Table 4-14). Therefore, the NRC staff concluded from the analysis that public health impact from the normal operation of the proposed NEF would be SMALL.*

**Comment: 032-43; 032-47**

A commenter referred to the discussion in section 4.2.12.2 of the Draft EIS on public exposure to the radioactive material released to the atmosphere and the expected exposure of radioactive materials to people through livestock and locally grown vegetables. The commenter stated that such exposures are unacceptable, citing “zero emissions” as the only acceptable option. The commenter suggested that high efficiency particulate air emissions be recirculated into the proposed NEF rather than released outside the facility.

*Response: The analysis in section 4.2.12.2 of the Draft EIS demonstrates that at the bounding levels of airborne emissions, the exposure to humans and animals through all food pathways would be a tiny fraction of natural background radiation levels. Any food grown in the region of the proposed NEF would not have detectable levels of radioactivity, and the purpose of the proposed NEF monitoring program would be to ensure that remains true. Emissions, whether radioactive or chemical, are regulated according to limits established by appropriate regulatory agencies. The NRC’s regulations for protection against radiation have been determined to be protective of public health and the environment. The limits for radiological emissions are also protective of workers and account for the possibility that a facility’s airborne emissions could also be inhaled by the workers.*

**Comment: 033-7**

A commenter stated that Valley Fever (coccidioidomycosis), which is caused by the inhalation of a fungus known as *C. immitis*, is commonly found in the soil of the southwestern United States and other areas. The commenter stated that radioactive emissions from the LES plant could sterilize the soil, eliminating competition from other organisms and potentially allowing this fungus to thrive. The commenter stated that seasonal high winds blowing towards the north can be over 80 kilometers per hour (50 miles per hour). The commenter further noted that over 30,000 people live within 40 kilometers (25 miles) to the north of the proposed NEF site. The commenter expressed concern that allowing the proposed NEF to operate would increase the public risk of contracting this disease.

*Response: The small quantities of radioactive material that would be released during normal operations or as a result of accidental discharges from the proposed NEF site would not be sufficient to sterilize soil (LES, 2005a). Soil sterilization would require millions of Rad per hour, which is many orders of magnitude greater than would be released by the proposed NEF (Labeda, et al., 1975).*

**Comment: 034-30**

A commenter stated that EIS discussions of the nearest existing residence (4.3 kilometers or 2.6 miles from the proposed NEF) divert attention from the potential for new residences to be established closer to the proposed NEF. The commenter stated that the EIS should analyze the potential human health and environmental impacts to the general public with respect to the maximally exposed individual. The commenter stated that references to the existing nearest residence could create confusion regarding an appropriate benchmark.

*Response: Section 4.2.12 of the Draft EIS presents the impacts to a maximally exposed individual located at the proposed NEF site boundary during normal working hours.*

**Comment: 102-2**

A commenter stated that if the proposed NEF is constructed, toxic emissions and radioactive materials would be associated with the site for at least 30 years, and that contaminated detention/retention basins would be subject to overflow or flooding as a result of rains. The commenter stated that this environment would not be acceptable for raising children and asked what impacts would occur to children.

*Response: Based on the low effluent releases from all sources to the atmosphere or from the onsite basins, there would be no long-term health effects to children from normal operations. The estimates for releases from the proposed NEF are within NRC regulatory limits and conform with internationally accepted research by the International Committee on Radiation Protection.*

**Comment: 103-22**

A commenter stated that the EIS should specifically define the maximally exposed individual. The commenter stated that if the maximally exposed individual is an adult male, the consequences of the analyzed accidents (potential health effects and irreversible adverse health effects) should reflect a representative population that includes females, the embryo-fetus, children, infants, the elderly, and the infirm. The commenter also stated that occupational exposure levels should not be used for assessing exposure of the public to hydrogen fluoride, because many segments of the public do not have the characteristics of Reference Man.

*Response: The maximally exposed individual for chemical impacts can be any individual. As presented in Appendix F of the Final Environmental Impact Statement for Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility (DOE, 2004a), the computer codes that were used to calculate the risks of adverse and irreversible effects referenced the Emergency Response Planning Guidelines published by the American Industrial Hygiene Association. These Guidelines were developed to be inclusive of nearly all types of individuals. For this EIS, the overall risks from transportation were estimated by summing over all shipments and routes. Section D.5 of Appendix D presents consequences of chemical exposures from transportation accidents, not occupational exposure levels.*

**Comment: 284-12**

A commenter stated that the Draft EIS identifies several facts about area geology that should be explored further, but that the EIS assumes that chemical and radiological pollutants in airborne emissions and leachate would not affect the regional environment. The commenter noted that pollutants from the facility could travel long distances in the air and that fast flow paths for water could undermine reliance on root system uptake and evapotranspiration as mitigation for water contaminants. The commenter suggested that if disposal of depleted uranium near the site is a possibility, longer term geologic characteristics of the area could take on new significance.

*Response: The conclusion concerning the impacts on public health were determined based on the radiological analysis presented in section 4.2.12 of the EIS. The quantities being released are low and would not result in a build up of uranium or other hazardous chemicals, either over the surrounding land or in any groundwater due to infiltration from the Site Stormwater Retention Basin or septic systems.*

## **I.19 Public and Occupational Health—Accidents**

### **I.19.1 Scope of Analysis and Source Term**

**Comment: L-14; 316-53; 343-6**

Many commenters expressed concern about releases of UF<sub>6</sub> gas during an accident. The commenters stated that the Draft EIS identifies an accidental release of UF<sub>6</sub> as the most significant accident scenario, and that the exposure risk of such a release would increase if winds were from the south at the time of the accident. The commenters noted that local wind patterns documented in section 3.5.2.4 and represented in Figures 3-8 and 3-10 show that southerly winds prevail in the area, increasing the likelihood of this scenario.



*Response: The accident analysis included meteorological data and the surrounding population distribution for calculating the potential consequences. The accident analysis assumed that the wind direction would be from the south in order to maximize the impact of the accident. The seven latent cancer fatalities would occur assuming the probability of the accident is 100 percent. However, as noted in Table 4-14, footnote (e) of the Draft EIS, LES has incorporated design features to make the likelihood of such an accident highly unlikely and the risks, therefore, would be low.*

**Comment: M-26**

Several commenters requested that the NRC expand the meteorology discussion in section 3.5.2.5 to an 80-kilometer (50-mile) radius surrounding the proposed NEF site, stating that storm events and their effects are not limited to their immediate vicinity. The commenters noted that flash flooding and high winds resulting from tornadoes could adversely affect the proposed site.

*Response: Section 3.5 of the Draft EIS provides both site and regional information regarding climatology, meteorology, and air quality. The regional information extends up to 161 kilometers (100 miles) from the site. Section 3.5.2.5 (“Severe Weather Conditions”) includes data from Midland-Odessa, Texas, which is 103 km (64 miles) from the site. Tornado data are taken from all of Lea County as well as the entire State of New Mexico. Data on wind speed and direction are taken from Roswell, Hobbs and Eunice, New Mexico, which are located 161 kilometers (100 miles), 32 kilometers (20 miles), and 8 kilometers (5 miles), respectively, from the site as well as from Midland-Odessa, Texas.*

**Comment: M-68; 316-54**

Several commenters stated that Appendix C, section C.4.1.1 of the Draft EIS should evaluate effects of tornadoes within the vicinity of the proposed NEF, given that there have been 120 tornadoes in Lea and Andrew Counties since 1954. Another commenter asked whether the effects of a class F5 tornado had been evaluated.

*Response: To address the environmental impacts of potential accidents in this EIS, the NRC staff selected a representative sample from the range of accident scenarios. An earthquake was selected as one of a subset of accidents chosen to represent both natural phenomena hazards and man-made hazards of high and low consequence. Although a tornado-related accident was specifically identified in the Draft EIS as a credible event (section 4.2.13.1 and Appendix C, section C.4), the NRC staff chose an earthquake as a representative natural hazard.*

*As noted in 3.5.2.5 of the Draft EIS, tornadoes are classified as F0 through F5 severity levels, with F5 being the most severe. Over the past 50 or more years, 87 tornadoes have been reported in Lea County with severity levels of F0 to F2 and one tornado with a severity level of F3. No tornadoes of severity levels of F4 or F5 were reported during this time. The worse-case tornado reported during this time is the single F3 tornado that occurred about 50 years ago. NEPA does not require the assessment of worst case scenarios when evaluating adverse environmental impacts. Scenarios that exceed the worst case, such as a potential F5 severity tornado, are not deemed credible. The NRC staff revised section 3.5.2.5 to enhance the discussion of tornadoes. Additional information (i.e., the consideration of tornado hazards in the design of the proposed facility), is provided in the NRC staff’s SER.*

**Comment: M-70**

Several commenters referred to the discussion in Appendix C, section C.4.2.1 of the Draft EIS concerning releases from an inadvertent nuclear criticality. Specifically, the discussion indicates that the west sector of Eunice would be most affected because it is closest to the facility, and short-lived radionuclides would not have completely decayed before reaching the west sector. The commenters requested that the NRC provide more information on the types and decay rates of radionuclides that

would be released during this event. The commenters noted that uranium 234, 235, and 238 have half-lives of 4.46 billion, 704 million, and 245,000 years, respectively and that uranium decay product half-lives can range in the tens of thousands of years. The commenter requested that the NRC revise its estimate regarding the short-lived radionuclides.

*Response: For an inadvertent nuclear criticality event, the material at risk is estimated using a computer code to evaluate the fission products that would be generated by a specific fissile material. The radionuclides of concern for this event are the fission products themselves, not uranium or uranium decay products. The types and decay rates of the important isotopes that would be released during an inadvertent nuclear criticality, which the NRC staff used in its evaluation of this event, are as follows:*

<u>Isotope</u>	<u>Half-life</u>	<u>Isotope</u>	<u>Half-life</u>	<u>Isotope</u>	<u>Half-life</u>
Kr-83m	1.8 hr	Ba-139	82.7 min	I-131	8.0 days
Kr-85m	4.5 hr	Ba-140	12.7 days	I-132	2.3 hr
Kr-85	10.7 hr	Ce-143	33.0 hr	I-133	20.8 hr
Kr-87	76.3 min	Xe-133	5.2 days	I-134	52.6 min
Kr-88	2.8 hr	Xe-133m	2.2 days	I-135	6.6 hr
Kr-89	3.2 min	Xe-135	9.1 hr		
Sr-91	9.5 hr	Xe-135m	15.3 min		
Sr-92	2.7 hr	Xe-137	3.8 min		
Ru-106	368 days	Xe-138	14.2 min		
Cs-137	30.0 yr				

*A population located near the proposed NEF would be affected to a greater degree than would a population located farther away, because a nearby population would be exposed to both long-lived and some short-lived radionuclides. All population areas (near and far) would be affected by long-lived radionuclides because the time to reach all areas would be relatively short compared to the very long decay times. No population areas would be affected by radionuclides with very short decay times (minutes, as opposed to hours or days). This is because virtually all of the radionuclides would decay into harmless constituents before reaching the closest population center. However, certain short-lived radionuclides would not have decayed substantially upon reaching the nearest population, but would have decayed substantially before reaching populations farther away. Such radionuclides would, therefore, increase radiological impacts to closer populations, such as the west sector of Eunice. Based on this discussion, there is no need for the NRC to revise its estimate regarding the short-lived radionuclides.*

**Comment: 034-47; 042-37**

A commenter stated that the probabilities of occurrences should be calculated and indicated for each of the accident scenarios discussed in Appendix C, section C.4.2 of the Draft EIS to communicate the likelihood of such occurrences. Another commenter asserted that EIS discussions of the severity of accidents and their consequences appear inconsistent. Specifically, the commenter noted that section 4.2.13.1 of the Draft EIS identifies selected accident sequences as high to intermediate in severity, yet section 4.2.13.2 concludes that these accident scenarios pose acceptably low risks and would result in small-to-moderate impacts. The commenter stated that the EIS does not clearly indicate whether accident sequence probabilities were factored into the assessment of impacts resulting from those sequences. The commenter stated that the decisionmaker and the public cannot make an informed decision regarding the acceptability of these risks without a full discussion of probabilities of occurrence and how these probabilities factor into a conclusion regarding the magnitude of impacts.

*Response: The accident analyses (Appendix C, section C.4.2 of the EIS) evaluates the consequences of various accidents, assuming the accident would, in fact, occur. Because the accident is assumed to occur*

*(that is, the probability of occurrence is 100 percent), the environmental consequences are maximized. However, the results of these analyses is that the respective environmental consequences would be low due to various preventive and mitigating measures to be employed by the applicant. Further, as it is not likely an accident would occur, the risk or expected value of an accident actually would be lower than described in Appendix C, section C.4.2 of the Draft EIS.*

*The NRC staff revised section 4.2.13.1 of the EIS to state that results of the impact analyses assume that the accidents occur (i.e., the probability is 100 percent) to maximize the possible environmental consequences. The staff also revised section 4.2.13.2 to state that the probability of occurrence (or impacts after occurrence) would be low for each accident because certain features would be employed to prevent or mitigate the impacts of accidents.*

**Comment: 042-46**

A commenter stated that LES should indicate a specific magnitude of earthquake used for the design basis.

*Response: The proposed NEF would be designed to a specific ground acceleration. The magnitude of an earthquake epicenter would not indicate the distance of the epicenter to the proposed NEF site. The value for peak horizontal and vertical accelerations is 0.15g, as stated in the Integrated Safety Analysis Summary provided in the license application. The NRC staff revised Appendix C, section C.4.2.3 of the EIS to indicate this design basis.*

**Comment: 048-89**

The commenter stated that it (LES) would provide a bounding evaluation for worker exposure limits and eliminate the use of time scaling of acute exposure guideline levels (and as a result, worker 5-minute exposure limits) to define consequence categories. The commenter stated that this change would potentially impact Tables C-13 and C-15 through C-19 of the Draft EIS.

*Response: The accident analyses in section 4.2.13 and Appendix C of the EIS were revised to reflect the use of acute exposure guideline levels and the change in worker exposure time from 5 minutes to 10 minutes.*

**Comment: 093-5**

A commenter stated that the Draft EIS does not address the accident scenarios that concerned the commenter, while the application does address them.

*Response: As noted in section 4.2.13 and Appendix C, section C.4.1, of the Draft EIS, the staff selected a subset of potential accident scenarios for detailed evaluation to encompass the range of possible accidents. The five accidents evaluated are a representative selection of the types of accidents that are possible at the proposed NEF. The accident scenarios selected vary in severity from high to low consequence events and include accidents initiated by natural phenomena, operator error and equipment failure.*

**Comment: 103-24**

A commenter stated that Table 5A-6 from EPA's General Factors Exposure Factors Handbook (EPA, 1997) provides a summary of reasonable assumptions regarding breathing rates for various activities. The commenter stated that, based on this table, the NRC should use a greater breathing rate for the analysis in Appendix C to reflect the rate expected for a worker involved in an accident and not a worker involved in light activity.

*Response: The breathing rate used by the staff is 20 liters per minute, which is the Reference Man value cited in 10 CFR Part 20, Appendix B, for light work. This value is the same value as that recommended by EPA in Federal Guidance Report No. 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion." Regarding the report cited by the commenter, the breathing rate used by the staff is actually greater than the value cited in EPA/600/P-95/002Fa, Table 5-2, for a healthy adult performing medium activity, and only 10 percent smaller than the 50<sup>th</sup> percentile values for laborers, which is shown in Table 5-8. Therefore, the NRC staff believes a breathing rate of 20 liters per minute is a reasonably conservative value for estimating health effects during the early phase of a postulated emergency at the proposed NEF.*

**Comment: 358-32**

A commenter stated that the actual effect of accidents (such as a hydraulic rupture of a UF<sub>6</sub> cylinder) would be a strong public outcry to shut down the facility. The commenter suggested that the EIS consider the economic impacts of a hydraulic rupture and compare them with other accidents that have occurred at licensed NRC facilities (including Three Mile Island-II).

*Response: Generally, the EIS discusses costs and benefits and various socioeconomic issues related to facility construction and operation. Additionally, the Emergency Plan contains memoranda of understanding that address cost recovery related to the provision of services by state and local governments. Further, under 10 CFR § 140.13b, a uranium enrichment facility licensee is required to carry liability insurance to cover public claims arising from any occurrence within the United States that results from the radioactive, toxic, explosive or other hazardous properties of chemicals containing licensed material, and causes, within or outside the United States, the losses and injuries listed in the regulation. A comparison of the proposed NEF to facilities such as Three Mile Island-II is inappropriate because of the significant differences between enrichment facilities and nuclear power reactors.*

## **I.19.2 Impacts**

**Comment: M-69**

Several commenters referred to Appendix C, section C.4.2.1 of Draft EIS and asked what the probability would be of the occurrence of an inadvertent nuclear criticality. The commenters asked whether such an accident has ever occurred in similar existing facilities.

*Response: The probability assumed for an inadvertent nuclear criticality in this EIS is 100 percent, to maximize the potential impacts that could occur. However, as discussed in Appendix C, section C.4.2.1 of the Draft EIS, LES has incorporated certain design features to make the likelihood of such an accident highly unlikely. The NRC staff also assesses inadvertent nuclear criticality as part of the development of the SER.*

**Comment: M-72**

Several commenters noted that Appendix D of the Draft EIS states that acute effects evaluated were assumed to estimate a threshold nonlinear relationship, or quadratic approximation, with exposures (i.e., some low level of exposure can be tolerated without inducing a health effect).

The commenters noted that although the theory of a nonlinear relationship between exposure and health effects has been validated by some studies, it has yet to be proven accurate for human subjects. According to the Committee Examining Radiation Risks of Internal Emitters, the United Nations Scientific Committee on the Effects of Atomic Radiation reported in 2000 that some animal data show linear dose-response relationships for cancer induction by alpha-emitting radionuclides over the dose ranges studied (Cerrie, 2004). The commenters stated that, given this disagreement among experts, the

NRC should not assume that the threshold theory is applicable when considering radiation exposures to members of the public during transportation of materials to and from the proposed NEF.

*Response: This section of the Draft EIS concerns chemical impacts, not radiological impacts. Thus, the comment which states that the "NRC not assume that the threshold theory is applicable when considering radiation exposures to members of the public during transportation of materials to and from the NEF" is not applicable. Furthermore, the findings of scientific organizations discussed in the comment are for stochastic effects, not deterministic (acute or immediate) effects referred to in this section of the EIS. For radiological, deterministic effects, it is widely accepted by the scientific community that there is a threshold, although the exact value of the population threshold doses is disputed.*

**Comment: 032-1; 365-7**

Commenters expressed concern about the dangers associated with a release of UF<sub>6</sub> gas.

*Response: The risks from the release of UF<sub>6</sub> are addressed in the Draft EIS. The NRC staff will assess in the SER the safety issues associated with accidents, including facility safety controls to address the release of UF<sub>6</sub>.*

**Comment: 032-21**

A commenter referenced the discussion of public and occupational health and safety in the executive summary of the Draft EIS. The commenter stated that the expected impacts are unacceptable, that presently there are no radiation sources or accidents involving radioactive materials, and that the most severe accident would be caused by ruptured and overfilled or overheated cylinders. The commenter stated that regular, low doses of radiation over time could be associated with carcinogenic effects.

*Response: As discussed in sections 4.2.12 and 4.2.13 of the Draft EIS, the NRC staff considered potential human health impacts of ionizing radiation from the proposed NEF. The NRC staff concluded that the EIS adequately addressed the human health impacts of the proposed NEF. Studies by international agencies and organizations such as the International Committee on Radiation Protection and the International Atomic Energy Agency have concluded that risks from the exposure to low-levels of radiation are low and that such exposures represent a tiny fraction of any single person's natural background radiation exposure.*

**Comment: 032-40**

A commenter referenced a discussion in section 4.2.11.2 of the Draft EIS on the latent cancer fatality values from accidents as compared with the values associated with incident-free transportation. The accident values are expected to be approximately 2 orders of magnitude greater than the incident-free values due to inhalation of radiation during accidents. The commenter requested more details on the symptoms and other effects of an accident.

*Response: While the risks of latent cancer fatalities due to radiation from postulated accidents is about 2 orders of magnitude greater than the risks from incident-free transportation, the total latent cancer fatality values are nevertheless low, at 0.5 latent cancer fatalities or less. As described in the text box in section 4.2.11.2 of the EIS, with latent cancer fatality values this low, no latent cancer fatalities would be expected to occur to members of the public. The NRC staff revised section 4.2.11 to state that, as a result of the low total latent cancer fatalities values from transportation accidents (less than 0.5), the NRC staff does not expect any radiation-induced latent cancer fatalities for members of the public. Symptoms of radiation exposure are described on the NRC's web page (<https://www.nrc.gov>) for radiation protection.*

**Comment: 032-41**

A commenter referenced the discussion in section 4.2.11.2 of the Draft EIS of potential chemical impacts to the public from an accident by rail or truck. The commenter requested more information regarding the consequences of such an accident. The commenter stated that all governors and officials of involved states should be notified that LES assumes that wastes or enriched uranium could be shipped anywhere.

*Response: Table 4-7 of the EIS provides the potential consequences to the population from severe transportation accidents, in addition to the discussion in section 4.2.11.2. Section 4.2.12.2 of the EIS also discusses other chemical impacts from operations. The assumptions used in the assessment of the transportation impacts are provided in Appendix D, section D.5 of the EIS. To provide more detail regarding transportation related chemical accidents, the EIS also lists references DOE, 2004a and DOE, 2004b. These references are DOE EISs that address similar potential accidents at the DOE DUF<sub>6</sub> conversion facilities located at Paducah, Kentucky, and Portsmouth, Ohio, respectively. These EISs address the results of chemical impact analyses from transportation accidents.*

*Shipments of uranium product, wastes, or feed material would be subject to NRC regulations for packaging and to DOT regulations for shipments. No routing restrictions or notification requirements apply for shipments in the United States of the materials associated with the proposed NEF. Section I.17 of this appendix addresses comments relating to the transportation of radioactive materials.*

**Comment: 032-45**

The commenter referenced section 4.2.13.2 of the Draft EIS and asked how the NRC determined that an accident resulting in injuries or fatalities could represent a small to moderate impact. The commenter noted that families of the injured or deceased would likely disagree with the NRC's conclusion. The commenter asked whether victims' families would receive monetary compensation.

*Response: The accident analysis in section 4.2.13.2 of the EIS evaluates the consequences of various accidents, assuming the accident would, in fact, occur. Because the accident is assumed to occur (that is, the probability of occurrence is 100 percent), the environmental consequences are maximized. However, the results of these analyses is that the environmental consequences would be low due to various preventive and mitigating measures to be employed by the applicant.*

*Under 10 CFR § 140.13b, a uranium enrichment facility licensee is required to carry liability insurance to cover public claims arising from any occurrence within the United States that results from the radioactive, toxic, explosive, or other hazardous properties of chemicals containing licensed material, and causes, within or outside the United States, the losses and injuries listed in the regulation. The SER discusses how LES would fulfill the liability insurance requirements listed in section 140.13b.*

**Comment: 042-38**

A commenter requested that the NRC provide details of remediation measures to include recommended actions, anticipated costs, funding sources, and efforts to minimize adverse biotic effects and public radiation dose in the event of a cylinder rupture.

*Response: The accident analyses in Appendix C, section C.4.2 of the Draft EIS evaluates the consequences to the public and the fact that certain design features have been incorporated to reduce the risks of accidents. Section C.4.3 of the Draft EIS evaluates consequences to biota. Section 4.2.13 of the EIS also discusses representative accident scenarios, consequences and mitigation measures. Other relevant information, including costs, is addressed in the NRC staff's SER and are not within the scope of the EIS.*

**Comment: 102-1**

A commenter expressed opposition to the construction of the proposed facility and concern about the potential for an accident or release of emissions during daily operation. The commenter's home is in close proximity to the site (4.3 kilometers or 2.6 miles).

*Response: As discussed in section 4.2.12 of the Draft EIS, airborne effluent emissions from normal operations, even at levels 35 times greater than estimated by LES, would not result in radiation exposures that could affect the long-term health of any nearby residents. The impacts from accidents at the proposed NEF would be that no member of the public would receive a radiation dose in excess of the performance requirements in 10 CFR Part 70 Subpart H, and that no chemical exposures from the site boundary and beyond would be expected to result in permanent injury. Additionally, LES would identify certain structures, systems, and components to reduce the risks to the proposed NEF workers, the public, and the environment. LES has also committed to an Emergency Plan that includes certain mitigation actions to reduce the consequences of the accident. These design features and the Emergency Plan would be evaluated in the NRC staff's SER.*

**Comment: 358-31**

A commenter referred to Table 4-14 of the Draft EIS, which indicates that a hydraulic rupture of a UF<sub>6</sub> cylinder would result in a 120 person-sievert (12,000 person-rem) collective dose. The commenter stated that a release of this size would be one of the largest in the history of New Mexico. The commenter noted that the public and State of New Mexico would consider it a major impact, in contrast to the EIS conclusion in section 4.2.13.2 that such a release would represent small to moderate impacts. The commenter suggested that the EIS compare a release of this size with releases from other nuclear facilities within the State to assess relative impacts and provide context.

*Response: Table 4-14 of the Draft EIS indicates that the effects from a hydraulic rupture would result in 120 person-sievert (12,000 person-rem) and seven Latent cancer fatalities, assuming such an accident were to occur (probability = 100 percent). However, as noted in footnote (e), LES has incorporated into the design redundant heater controller trips to make the likelihood of such an accident highly unlikely. Therefore, the impacts are characterized as SMALL to MODERATE.*

**I.19.3 Mitigation Measures****Comment: M-71**

Several commenters noted that Appendix C of the Draft EIS states that LES would rely on administrative controls to reduce the magnitude of fires resulting from the presence of transient combustible material. The commenters stated that the information provided in the Draft EIS is vague and requested more information concerning the administrative controls.

*Response: Details regarding fire (or combustible loading) controls are evaluated in the Integrated Safety Analysis Summary for the proposed NEF. Generally, the combustible loading controls consist of an approval or permitting system and routine inspections to verify that no unapproved combustibles would be present. Lists of approved/unapproved combustibles and surveillance intervals would be refined as needed based on operational experience.*

**Comment: 032-44**

A commenter referred to the discussion in section 4.2.12.2 of the Draft EIS on high-consequence and intermediate-consequence events. The commenter requested that the NRC provide details on the dangers of such events and response actions that would be required. The commenter also asked whether and how

the public would be notified in the event of an emergency. The commenter asked who would notify the public and how quickly notifications would be provided.

*Response: The potential radiological and chemical effects from accident releases of UF<sub>6</sub> are presented in section 4.2.11.2 for transportation impacts and section 4.2.13 for other accidents. LES would incorporate into the facility certain design features that would significantly reduce the likelihood or effects of intermediate- and high-consequence accidents. LES's Emergency Plan addresses the coordination of Federal, State, and local officials to respond to a number of radiological and nonradiological accidents (including and in addition to the accident scenarios described in the EIS). Emergency notifications after an accident are also discussed in the NRC staff's SER. Further information about the NRC's emergency response programs is available on the NRC's web page (<https://www.nrc.gov>) on emergency preparedness and response.*

## **I.20 Waste Management**

### **I.20.1 General**

#### **Comment: 032-23**

A commenter stated that the New Mexico Governor may not agree with issues relating to the proposed NEF. As an example, the commenter stated that the Governor had decided to withhold the groundwater discharge permit.

*Response: The NRC staff revised section 1.5.4 of the EIS to indicate that the New Mexico Environment Department Water Quality Bureau has deemed the LES groundwater discharge permit application complete and assigned it a number identification of 1481.*

#### **Comment: 032-48; 042-1; 355-5**

A commenter requested the NRC deny the license for the proposed NEF due to the inadequate analysis of the waste disposition alternatives and the growing public opposition to the proposed NEF. Another commenter stated that the uncertainty of depleted uranium disposition presents an unacceptable risk to the citizens of New Mexico and to the environment. Another commenter stated that the Draft EIS is setting a low standard of environmental protection by assuming that shallow land burial of depleted uranium byproduct would have no significant impact upon the environment.

*Response: Reasonable alternatives for the disposition of waste that would be produced by the proposed NEF are evaluated in the EIS. It is likely that LES would pursue one of the options discussed in the EIS. The NRC staff believes its conclusions regarding the impacts of shallow land disposal are correctly reflected in the EIS. Any land disposal facility chosen for disposing of the depleted uranium wastes from the proposed NEF would need to meet NRC or Agreement State requirements for such disposal. Responses to comments on waste disposition below provide additional information.*

#### **Comment: 034-6**

A commenter stated that the EIS should analyze the impacts to human health and the environment associated with a failure to implement the disposal options discussed in the EIS. The commenter stated that, under NEPA, a potential effect may be analyzed if it is reasonably foreseeable.

*Response: If LES is unable to develop a disposition pathway through a private company, disposition through a DOE facility in accordance with the USEC Privatization Act is a plausible strategy (NRC, 2005a). Therefore, if LES were to default prior to the completion of a private company disposition*



pathway, the NRC could direct the use of decommissioning funds to implement the USEC Privatization Act options for DOE disposition of the DUF<sub>6</sub>.

**Comment: 104-2**

The commenter stated that, as a resident of a state outside the State of New Mexico, it is the commenter's opinion that LES be required to disclose comprehensive waste management plans.

*Response: The NRC staff has provided additional information concerning the management of wastes associated with the proposed NEF in section 4.2.14 of the EIS.*

**I.20.2 Waste Disposal Strategy**

**Comment: M-19; P-1; 036-7**

Several commenters stated that shipping converted waste to Envirocare and U.S. Ecology are not viable options because no negotiations between LES and these facilities are being pursued.

*Response: As discussed in section 2.1.9 of the Draft EIS, both the Envirocare of Utah and U.S. Ecology in Richland, Washington can dispose of Class A low-level radioactive waste. Because the NRC determined that depleted uranium would be low-level radioactive waste (see LES vs. NIRS and Public Citizen Memorandum and Order, [NRC, 2005a]), these two sites would be potential disposal sites for depleted U<sub>3</sub>O<sub>8</sub>.*

**Comment: M-25; M-47; R-1; 032-30; 032-33; 032-46; 103-8; 358-15; 358-17**

Several commenters stated that no viable private sector alternatives exist for handling depleted uranium wastes from the proposed NEF. The commenters stated that no basis exists for the discussion in the EIS of a conversion facility and that the discussion should be removed. One commenter stated that the EIS should discuss plans for any facilities and explain why there would be comparable impacts to DOE conversion facilities.

*Response: The proposed NEF must be decommissioned and all DUF<sub>6</sub> properly disposed of prior to license termination. As discussed in section 2.1.9 of the Draft EIS, two options are available for converting the depleted uranium wastes. These include conversion at planned DOE conversion plants at its facilities in Portsmouth, Ohio, and Paducah, Kentucky, or at a private conversion facility. Regarding the latter, the NRC staff has revised section 2.1.9 of the EIS to indicate that LES has signed a memorandum of understanding with AREVA, Inc. to construct and operate a conversion plant near the proposed NEF. The disposal options presented in the Draft EIS satisfy the Commission rulings concerning a disposal strategy and the classification of DUF<sub>6</sub>.*

**Comment: 032-28; 032-29; 032-31; 103-15; 104-1**

Commenters noted that section 2.1.9 of the Draft EIS discusses disposal options that do not meet the criteria for a viable waste disposal option. The commenters specifically noted that none of the existing waste disposal facilities identified in the EIS can accept proposed NEF waste.

*Response: The discussion on disposal options in section 2.1.9 of the EIS provides the status of existing low-level radioactive waste disposal facilities and their potential for the disposal of depleted U<sub>3</sub>O<sub>8</sub>. The disposition of the depleted U<sub>3</sub>O<sub>8</sub> generated from the DOE conversion facilities at Paducah and Portsmouth would be either at the Envirocare site (DOE's proposed disposition site) or at the Nevada Test Site (DOE's optional disposal site). Depleted U<sub>3</sub>O<sub>8</sub> generated from the adjacent or offsite private conversion process would be disposed at a site licensed to accept this material. For example, under its Radioactive Materials License issued by the State of Utah, Envirocare is authorized to accept for disposal*

*the quantities of depleted uranium oxides expected to be generated by the conversion of the proposed NEF's DUF<sub>6</sub>. The NRC staff updated sections 2.1.9 and 4.2.14.4 of the EIS to reflect this information. Further action by LES would be required in coordination with either AREVA, Inc. (as summarized in the recent memorandum of understanding) or DOE in accordance with the USEC Privatization Act.*

### **I.20.3 Storage of DUF<sub>6</sub>**

#### **Comment: M-48; Q-1; 358-6; 358-9; 358-11; 358-12; 358-16**

Several commenters noted that the Draft EIS does not state the maximum amount of time that UBCs would be stored onsite. Several other commenters noted that UBCs could be left at the proposed NEF site beyond the end of the 30-year license term, and that the EIS should describe associated impacts and the actions that would be taken to avoid this possibility. Another commenter stated that the EIS should consider the alternative of limiting the amount of UBC storage to one year of production (627 cylinders) to ensure that waste does not remain onsite indefinitely. This commenter stated that New Mexicans are concerned about the potential for long-term storage or disposal sites in the State, based on New Mexico's history.

*Response: Section 4.2.14.3 of the Draft EIS states that storage of UBCs at the proposed NEF could occur for up to 30 years. The EIS analyzes storage impacts for a 30-year storage period, which bounds the impacts for shorter storage periods. As discussed in section 4.2.14.3 of the Draft EIS, storage of UBCs at the proposed NEF could occur for up to 30 years during operations and before removal of DUF<sub>6</sub> from the site through one of the disposition options. However, LES has committed to a disposal path outside of the State of New Mexico which would be utilized as soon as possible and would aggressively pursue economically viable paths for UBCs as soon as they become available (LES, 2005a).*

#### **Comment: 029-3; 029-6**

The commenter requested assurance that only a minimum quantity of DUF<sub>6</sub> cylinders would be stored onsite, and that the majority would be shipped for disposition off site.

*Response: LES has committed to dispose of the UBCs in a timely manner, as stated in its Environmental Report. The company also announced that it has signed a memorandum of understanding (LES, 2005d) with AREVA, Inc., concerning the development of a DUF<sub>6</sub> conversion facility. The NRC staff's SER and the license, if issued, would specify possession limits for radioactive materials at the proposed NEF. The NRC staff updated section 2.1.9 of the EIS to include additional information with regard to depleted uranium disposition.*

#### **Comment: 042-43**

A commenter stated that the EIS should address whether the cylinder management program considers climatic differences at Eunice, New Mexico (e.g., evaporation that may concentrate corrosive salts, heat that may increase reaction rates).

*Response: While the active cylinder management program described in the EIS is similar to the current programs at Portsmouth, Ohio and Paducah, Kentucky, it is not identical. A cylinder management program developed for the proposed NEF would address local climate and conditions in the Lea County area.*

#### **Comment: 047-2**

A commenter noted that the onsite storage of depleted uranium hexafluoride since the mid-1940s (as a result of diffusion plant enrichment processes) has posed no hazard, and the risk of harm to people or the

environment is small. The commenter expressed doubt that any radiation could be detected through the steel containers.

*Response: As provided in Table D-7 of the Draft EIS, the dose rate at 1 meter (3.3 feet) from a Type 48Y cylinder containing DUF<sub>6</sub> would be approximately 0.0028 millisieverts per hour (0.28 millirem per hour), which is within the detectable range of some dose rate meters.*

**Comment: 048-4; 048-19; 048-58**

The commenter suggested the following changes in the EIS:

- Table 1-3 of the Draft EIS should be revised to reflect that the proposed NEF would need its waste activity EPA ID number for the storage and use of hazardous chemicals other than DUF<sub>6</sub>.
- For consistency with Safety Analysis Report Table 10.1-10, Draft EIS Table 2-6 should include 83 cubic meters (2,930 cubic feet) of miscellaneous, low-level radioactive waste resulting from other NEF buildings.
- The statement in section 4.3.6 that spent citric acid would be sent to the Treated Effluent Evaporative Basin during the operation phase is incorrect and should be revised. The Liquid Effluent Collection and Treatment System would remove citric acid from the waste stream before discharge to the basin.

*Response: The NRC staff revised the EIS to reflect the suggested changes.*

**Comment: 093-3**

A commenter stated that the rate of inspection of the UBCs identified in Table 5-2 of the Draft EIS is more frequent than annual.

*Response: Table 5-2 states that cylinders would be inspected prior to being placed on the UBC storage pad and re-inspected annually for damage or surface coating defects. This statement is correct.*

**Comment: 316-30**

A commenter suggested housing the UBCs to decrease the chances of corrosion from exposure to the elements and reduce public exposure to direct and scatter radiation. The commenter also asked whether Table 5-2 of the EIS could include this housing as a mitigative measure to isolate the cylinders from wildlife.

*Response: As discussed in section 4.2.14.3 of the Draft EIS, proper and active cylinder management, which includes routine inspections and maintaining the anti-corrosion layer on the cylinder surface, has been shown to limit exterior corrosion or mechanical damage necessary for the safe storage of DUF<sub>6</sub>. As discussed in Section 4.2.7.2 of the Draft EIS, periodic surveys of the UBCs would prevent nesting and lengthy stay times for wildlife on the UBC Storage Pads. While small animals occupying the storage pad could be exposed to radiation, radiation levels would be low and would not adversely affect small animals. No additional mitigation measures other than those proposed by LES in Chapter 5 of the EIS are required.*

**Comment: 316-55**

A commenter asked whether LES could engage in cleaning and decontamination of empty UF<sub>6</sub> cylinders at the proposed NEF. The commenter stated that the EIS should consider the environmental effects of cleaning and decontaminating Type 48X or Type 48Y cylinders that have contained UF<sub>6</sub>.

*Response: The NRC staff revised section 2.1.7 to state that LES would not conduct internal cleaning or decontamination of the UF<sub>6</sub> cylinders at the proposed NEF site. Cylinders containing DUF<sub>6</sub> would be shipped to a conversion facility, where empty cylinders would be shipped to the feed material suppliers. Any empty cylinders stored at the proposed NEF would be eventually returned to the feed material supplier or properly disposed of at a licensed disposal facility.*

#### **I.20.4 Disposal Site**

##### **Comment: M-20**

Several commenters asked whether the NRC considered Senator Domenici's initiative that would require DOE to take ownership of the proposed NEF depleted uranium waste. If so, the commenters requested that the NRC discuss the initiative and analyze its environmental impacts.

*Response: Senator Domenici's initiative is beyond the scope of this EIS. However, for DOE to assume control of the proposed NEF wastes, LES would be required to make a request for DUF<sub>6</sub> conversion and disposition under the USEC Privatization Act. Section 4.2.14.3 of the Draft EIS discusses the environmental impacts of this option.*

##### **Comment: M-20; 316-35; 358-18**

Several commenters asked whether the proposed NEF could ship depleted uranium indirectly to Barnwell, the Nevada Test Site, or WCS. For example, the commenters wanted to know whether the waste could be shipped to the Nevada Test Site if DOE were to assume ownership of the waste. Other commenters stated that disposition of NEF depleted uranium wastes by DOE, Barnwell and WCS cannot be considered plausible and should be eliminated from the EIS. One commenter also stated that Envirocare or Hanford could not take the waste if no viable private conversion facility exists.

*Response: For DOE to assume control of the proposed NEF wastes, LES would be required to make a request for DUF<sub>6</sub> conversion and disposition under the USEC Privatization Act. If LES were to make this request, DOE would be required to take the proposed NEF wastes. The disposition of the depleted U<sub>3</sub>O<sub>8</sub> generated from the DOE conversion facilities would be either at the Envirocare site (DOE's proposed disposition site) or at the Nevada Test Site (DOE's optional disposal site). The Nevada Test Site could only receive depleted uranium from the proposed NEF if ownership of the depleted uranium was first transferred to DOE.*

*With respect to Compact organizations, wastes from the proposed NEF could not be shipped directly to Barnwell unless other regulatory arrangements were made. WCS has applied for a license from the State of Texas to dispose of low-level radioactive waste at its Andrews, Texas facility. A separate licensing process could be required to obtain approval from the State of Texas and agreements must be obtained from the relevant Compact organizations if disposal at WCS is pursued by either DOE or LES. The proposed NEF waste could also be shipped to Hanford if it meets the facility's waste acceptance criteria.*

*Under its Radioactive Materials License issued by the State of Utah, Envirocare is authorized to accept for disposal the quantities of depleted uranium oxides expected to be generated by the conversion of the proposed NEF's DUF<sub>6</sub>. Section 2.1.9 of the Draft EIS has been revised to clarify the conditions under which waste could be shipped to the various disposal sites.*

##### **Comment: 031-3**

A commenter asked whether Governor Richardson would withdraw his support for the proposed NEF if the NRC refused to allow representatives from the State of New Mexico to participate in the hearings on waste disposal and other issues.

*Response: On July 19, 2004, the NRC's ASLB issued a Memorandum and Order that allowed participation in the hearing process by two State of Mexico entities—the New Mexico Environment Department and the Attorney General of New Mexico.*

**Comment: 032-3; 032-7; 032-9; 032-16; 036-6; 067-2; 105-7**

Several commenters asked about the disposition of the waste and demanded assurance that the waste would be removed from the State of New Mexico. The commenters referred to the responsibility of state and local officials to protect citizens who could be affected by the proposed NEF.

*Response: As stated in section 4.2.14 of the Draft EIS, hazardous wastes would be shipped offsite to licensed facilities for processing and disposal in accordance with Federal and State regulations. LES has publicly committed to the removal of DUF<sub>6</sub> from the proposed NEF as soon as practicable. To this end, LES and AREVA, Inc., signed a memorandum of understanding (LES, 2005d) to pursue the licensing, design, and construction of a private DUF<sub>6</sub> conversion facility specifically for the proposed NEF. The depleted uranium would be converted at this private facility and then disposed of at a licensed facility for radioactive waste outside of the State of New Mexico. The location of the private conversion facility would not affect plans for final disposition outside New Mexico. Further, no disposal facilities currently exist within the State.*

*Should a licensee violate the terms of its license, which includes compliance with all applicable laws and regulations pertaining to uranium enrichment operations and environmental protection, then the NRC, as the Federal oversight agency, may impose penalties, including financial and civil penalties and license revocation. Other Federal and State agencies can also impose requirements and penalties for violations of laws and regulations under their purview.*

**Comment: 032-31; 103-13; 103-14; 103-15**

Commenters noted that no abandoned mines are available and that mines should be eliminated as a disposal option. One commenter stated that the EIS should clarify that costs are the reason underground mines were not considered viable and state why costs are high for this low technology alternative. Another commenter stated that disposal in mines seems to be inconsistent with DOE's preferred alternative discussed in the Depleted Uranium Programmatic Environmental Impact Statement (DOE, 1999).

*Response: As discussed in sections 2.1.9 and 4.2.14.4 of the Draft EIS, one of the options proposed by LES is to dispose of the converted wastes as U<sub>3</sub>O<sub>8</sub> in an abandoned mine. The NRC staff believes this is a viable option and evaluated the environmental impacts associated with this option. Therefore, the NRC staff did not eliminate mine disposal from further consideration. Section 4.2.14.4 of the EIS contains a discussion of the impacts of disposal in an abandoned mine. DOE's preferred alternative in the Programmatic EIS for depleted uranium is beneficial use. However, the site-specific conversion facility EISs, using more recent information and data, concluded that there is not a significant market for beneficial use of depleted uranium, and that disposal in a licensed disposal facility is the preferred alternative. The NRC staff agrees with the disposition assessment of the conversion facility EISs.*

**Comment: 034-13**

A commenter noted that the last sentence in the first paragraph of Table 2-8 states that there would be enough existing national capacity to accept low-level radioactive waste generated at the proposed NEF. The commenter stated that the EIS should clarify whether the statement is inclusive of DUF<sub>6</sub> disposal and should address the national capacity for converting and disposing of DUF<sub>6</sub>.

*Response: As presented in section 4.2.14.4 of the Draft EIS regarding existing disposal capacity, DUF<sub>6</sub> cannot be disposed of without first being converted into an acceptable form (such as U<sub>3</sub>O<sub>8</sub>). DUF<sub>6</sub> would be disposed of in a form processed to meet Class A low-level radioactive waste requirements, and for which there is sufficient national capacity. Section 4.2.14.3 of the Draft EIS discusses options for private or DOE conversion of DUF<sub>6</sub>.*

**Comment: 103-13**

The commenter stated that the NRC acknowledges LES proposals for DUF<sub>6</sub> disposition beyond U.S. borders, but does not indicate that such options are not viable.

*Response: The NRC staff revised section 2.2.2.4 of the EIS to clarify that overseas locations were eliminated from further consideration due to high costs.*

**Comment: 104-1**

A commenter asked whether states other than the State of New Mexico would have any authority with regard to the disposition of proposed NEF wastes.

*Response: The authority for waste disposition rests with the relevant Compact organizations, as described in section 2.1.9 of the EIS.*

**Comment: 284-8; 316-36; 355-5; 356-4; 358-19**

Several commenters stated concerns about disposing of depleted uranium waste at the WCS facility. One commenter stated that there is no basis for including WCS as an option in the EIS. Other commenters stated that the EIS does not evaluate the potential that proposed NEF wastes could be processed, stored and disposed of in the vicinity of the proposed NEF site. Some commenters asked about the regulatory process and whether an intermediary could take possession of the proposed NEF's waste for ultimate transfer to the WCS site. One commenter asked whether LES would transfer possession of its waste to DOE, which would qualify it for disposal at the WCS facility if the facility receives a license for Federal waste.

*Response: All wastes to be disposed of at a licensed low-level radioactive waste disposal facility would be required to meet all of the facility's operating license requirements. WCS applied for a license from the State of Texas to dispose of low-level radioactive waste at its Andrews, Texas facility. A separate licensing process could be required to obtain approval from the State of Texas and agreements must be obtained from the relevant Compact organizations if disposal at WCS is pursued by either DOE or LES.*

**Comment: 316-27; 316-37**

A commenter asked why the Draft EIS assumes disposal of depleted uranium may occur at a near-surface site and does not account for the NRC's historical position on this issue. The commenter listed examples of previous NRC statements indicating that near-surface disposal may not be appropriate for depleted uranium disposition. The commenter also asked whether it would be necessary to amend the operating licenses of the facilities so they may legally accept depleted uranium for disposal. The commenter asked whether an EIS would be necessary to evaluate the impacts associated with a license amendment.

*Response: As discussed in section 4.2.14.4 of the EIS, the environmental impacts at shallow disposal sites considered for disposition of low-level radioactive wastes would have been assessed at the time of the initial license approvals of these disposal facilities or as a part of any subsequent amendments to the license. For example, under its Radioactive Materials License issued by the State of Utah, the Envirocare disposal facility is authorized to accept depleted uranium for disposal with no volume restrictions. Therefore, the State of Utah considers the disposal of depleted uranium at the Envirocare site to be*

*acceptable. Several site-specific factors contribute to the acceptability of depleted uranium disposal at the Envirocare site, including a lack of potable groundwater, extremely low annual precipitation, and land use controls by Tooele County.*

**Comment: 316-28**

A commenter stated that Table 4-19 of the Draft EIS fails to disclose the models or parameter values used in its modeling of releases expected from a disposal site. The commenter noted that the text in the Draft EIS suggests that models developed for the Claiborne Enrichment Center were used, but that Table 4-19 results are unlike results for the Claiborne facility. The commenter stated that the performance of a disposal site is highly site-specific; the model addresses two hypothetical sites but no actual disposal sites.

*Response: The models and the analysis that are the basis for the values in Table 4-19 are presented in Appendix A of the Claiborne Enrichment Center EIS. The NRC staff added a footnote to Table 4-19 to indicate this. To demonstrate the potential environmental effects of disposal, the NRC staff conducted a generic analysis of potential impacts from disposal in a geologic disposal site. If geologic disposal is pursued, site selection and site-specific environmental analyses also would be conducted by appropriate regulatory authorities.*

**Comment: 358-18**

A commenter stated that the EIS does not recognize that the States of Utah and Nevada have previously prohibited 11e.(2) waste (uranium mill tailings) from Fernald from being shipped to Envirocare and the Nevada Test Site, respectively, and that the proposed NEF waste may not be accepted.

*Response: Depleted uranium from an enrichment facility is not classified as 11e.(2) byproduct material. The 11e.(2) byproduct material from Fernald was not disposed of in Utah or Nevada for reasons that are not applicable in this case. As discussed in section 4.2.14.4 of the EIS, under its Radioactive Materials License issued by the State of Utah, Envirocare is authorized to accept for disposal the quantities of depleted uranium oxides expected to be generated by the conversion of the proposed NEF's DUF<sub>6</sub>.*

## **I.20.5 Conversion Facility**

**Comment: M-18; O-1**

Several commenters stated that the option of constructing an adjacent conversion facility is too speculative to be considered viable. The commenters stated that this option would not address concerns that the waste be removed from the State of New Mexico.

*Response: As stated in Section 2.1.9 of the Draft EIS, the NRC staff recognizes the possibility that the private conversion facility could be located close to the proposed NEF. Section I.20.2 responds to comments on a strategy for the proposed NEF waste management.*

*Section 2.1.9 of the Draft EIS has been revised to describe the regulatory actions needed before the proposed NEF could ship its DUF<sub>6</sub> to a private conversion facility that could be located in Texas. A series of legal procedures and approval processes would need to be successfully addressed before the depleted uranium generated by the proposed NEF could be disposed at the proposed WCS Compact Facility. These procedures and processes include:*

- *Approval by the State of Texas of WCS's application, including State authorization for the WCS Compact Facility to accept for disposal depleted uranium oxides of the type and quantities expected to be generated as a result of the proposed NEF's operations.*

- *Approval by the Rocky Mountain Compact (in which the proposed NEF would be located) for the export of the depleted uranium oxides from the Compact.*
- *Approval by the Texas Compact for the import and disposal of the depleted uranium oxides generated as a result of the proposed NEF's operations.*

**Comment: 067-3**

A commenter stated that LES's option to convert depleted uranium wastes using a commercial facility is preferable to using DOE facilities, because it would allow flexibility without relying on the Federal Government. The commenter encouraged LES to meet with DOE to discuss their lessons learned in designing and building such a plant.

*Response: The comment is not applicable to the environmental review conducted for the proposed NEF.*

**Comment: 103-6; 316-32; 358-16**

Several commenters stated that deconversion of  $DUF_6$  at DOE conversion facilities cannot be considered a plausible strategy; the magnitude of DOE's  $DUF_6$  stockpile is such that the queue for conversion would preclude acceptance of the proposed NEF waste. One commenter stated the EIS should justify its implication that DOE conversion would be available for the proposed NEF wastes. Commenters also stated that section 4.2.14.3 of the Draft EIS does not account for processing waste from the American Centrifuge Plant. (Section 4.2.14.3 states that processing NEF waste could extend the operational life of the Portsmouth conversion facility by 15 years.)

*Response: Under the USEC Privatization Act, DOE must accept the waste. DOE would have options for the management of  $DUF_6$  conversion from outside sources. If pursued by LES under the USEC Privatization Act, DOE could apply both the Paducah and Portsmouth conversion facilities to process the  $DUF_6$  from the proposed NEF. The Portsmouth conversion facility could process 129,600 metric tons (142,860 tons) of  $DUF_6$  waste from 2024 to 2036 at its planned capacity of 10,800 metric tons (11,800 tons) per year. The Paducah conversion facility could process 71,500 metric tons (78,815 tons) of  $DUF_6$  from 2031 to 2036 at its planned capacity of 14,300 metric tons (15,800 tons) per year. Combined, both DOE conversion facilities could process over 200,000 metric tons (220,500 tons), which exceeds the 197,000 metric tons (217,000 tons) from the proposed NEF. Therefore, DOE could process the  $DUF_6$  prior to the end of the proposed NEF license of 2036 if DOE processed only the proposed NEF wastes. If DOE must also process USEC-generated  $DUF_6$ , then DOE would have to install additional conversion lines at either or both the Paducah and Portsmouth conversion facilities.*

**I.20.6 Conversion Technology**

**Comment: 316-33**

A commenter stated that the Draft EIS reliance on EISs for conversion plants at Paducah, Kentucky, and Portsmouth, Ohio, is erroneous because the DOE plants are unlike the private conversion facility contemplated by LES. The commenter stated that the EISs for DOE plants do not consider the environmental impacts of the distillation process chosen by LES to generate anhydrous hydrogen fluoride. The commenter stated that this distillation process is not commercially established and projection of its impact would be speculative.

*Response: The Draft EIS presents environmental impacts of the construction and operation of a conversion plant for the depleted uranium wastes based on information provided in DOE's Programmatic EIS on management of depleted uranium, as well as the EISs for the Paducah and Portsmouth conversion facilities. The impacts associated with these facilities would be very similar to those expected from the*



*private conversion facilities analyzed in the EIS, because the operations involve the same chemical process (though the steps within the process could vary). These processes result in  $U_3O_8$  and aqueous hydrofluoric acid. As discussed in the new section 2.2.2.5 of the EIS, LES has committed to not pursuing a private conversion process that employs a process that results in the production of anhydrous hydrofluoric acid.*

**Comment: 358-14; 358-16**

A commenter stated an adequate basis does not exist for the NRC to assume that the proposed conversion facility would use the same technology adapted for use by DOE in its conversion facilities. The commenter stated that the EIS must consider the possibility that a conversion facility for NEF wastes would use a different technology, describe the conversion technology for the proposed NEF waste, and compare such technology to the existing U.S. enrichment plants. The commenter stated that the EIS must discuss any changes to conversion technology that would be required for DOE conversion facilities to process the proposed NEF wastes.

*Response: The operating nuclear fuel fabrication facilities in the United States, the operating Cogema  $DUF_6$  to  $U_3O_8$  conversion facility in France, and the two DOE conversion facilities under construction all apply very similar processes based on a dry conversion process. While some of the steps within the process may vary (e.g., hydrolysis of  $DUF_6$  by steam followed by defluorination with hydrogen and oxygen gases), the chemical reactions are the same, resulting in  $U_3O_8$  and aqueous hydrofluoric acid. A conversion process for the proposed NEF wastes would be similar to these processes. LES has already committed to using a conversion process that does not produce anhydrous HF and has also signed a memorandum of understanding with Areva, which operates the Cogema facility in France. The dry conversion process used at the Cogema facility in France would be applied for converting  $DUF_6$  to  $U_3O_8$  and to neutralize aqueous HF to  $CaF_2$  for potential disposal in a solid waste landfill. DOE conversion facilities would not need to significantly change their processes to accommodate wastes from the proposed NEF.*

**I.20.7 Classification of  $DUF_6$**

**Comment: L-11; L-12; 034-8; 284-7; 316-26; 316-29; 316-31; 343-5; 355-5; 356-4; 358-13**

Many commenters stated that the depleted uranium wastes have not been classified by the NRC as a Class A low-level radioactive waste as defined in 10 CFR § 61.55(a)(6) and that this should not be assumed in the EIS. Some commenters noted that shipping the depleted uranium to DOE for conversion cannot be considered a plausible strategy until the waste is classified.

*Response: On January 18, 2005, the Commission issued a Memorandum and Order, CLI-05-05, concluding that depleted uranium is a low-level radioactive waste (NRC, 2005a). Accordingly, pursuant to Section 3113 of the USEC Privatization Act, disposal of the LES depleted uranium tails at a DOE facility represents a “plausible strategy” for the disposition of the tails. The NRC staff revised section 2.1.9 of the EIS to reference the Commission’s ruling.*

**Comment: 343-5**

The commenter stated that  $DUF_6$  is considered a radioactive waste and must be disposed of in a manner consistent with regulations for other radioactive waste.

*Response: The NRC agrees with the commenter that depleted uranium must be disposed of in a manner consistent with regulations.*

## **I.20.8 Beneficial Use of DUF<sub>6</sub>**

### **Comment: 047-8; 343-5**

A commenter asked whether DUF<sub>6</sub> is being considered a resource and requested that this be clarified. Another commenter stated that depleted uranium will be used in fast neutron reactors and, therefore, should be referred to as a resource.

*Response: Sections 2.1.9 and 2.2.2.4 of the Draft EIS discuss the consideration of depleted uranium as a resource or a waste. As stated in section 2.1.9 of the Draft EIS, the NRC considered depleted uranium from the proposed NEF to be low-level waste for the purpose of developing the EIS.*

### **Comment: 316-35**

A commenter stated that the U.S. inventory of depleted uranium cannot be assumed to have a potential beneficial use since, as stated in section 2.2.2.4 of the Draft EIS, it “far exceeds the existing and projected demand for the material.”

*Response: Section 2.2.2.4 of the Draft EIS indicates that while some depleted uranium may be used for commercial purposes, most of this material would require conversion and disposal by either a commercial facility or DOE conversion facilities.*

### **Comment: 316-38**

A commenter referred to the text box in section 2.2.2.4 of the Draft EIS, which discusses the potential beneficial uses of depleted uranium. The commenter asked whether the NRC considers this a viable use of depleted uranium and whether the EIS would assess the impacts of the military application of the uranium tails from the proposed NEF, if LES also identifies such uses as viable. The commenter stated that the text box should be removed if the NRC does not consider beneficial uses of DUF<sub>6</sub> as an option.

*Response: The NRC issues licenses to the military for peace-time use of depleted uranium for research and development. Further information concerning the impacts of military applications of depleted uranium is provided in a U.S. Army document entitled “Health and Environmental Consequences of Depleted Uranium Use in the U.S. Army: Technical Report” (AEPI, 1995). The text box in section 2.2.2.4 of the Draft EIS regarding beneficial uses of DUF<sub>6</sub> is for informational purposes to support the discussion regarding DUF<sub>6</sub> disposition alternatives.*

## **I.20.9 Non-DUF<sub>6</sub> Wastes**

### **Comment: 034-49**

A commenter requested clarification of the statement in section 4.2.14.2 of the Draft EIS regarding the generation of radiological and mixed wastes.

*Response: As presented in section 4.2.14.2 of the Draft EIS, approximately 87,000 kilograms (191,800 pounds) of radiological and mixed waste would be expected to be generated. This figure includes 50 kilograms (110 pounds) of mixed waste. The NRC staff revised this section to clarify that approximately 87,000 kilograms (191,800 pounds) of radiological and mixed waste would be generated annually, of which approximately 50 kilograms (110 pounds) would be mixed waste.*

### **Comment: 316-39**

A commenter asked whether LES has a specific plan to recycle its nonradioactive wastes, such as paper and scrap metal. The commenter noted that section 2.1.7 of the Draft EIS states that nonradioactive materials would be disposed of in a commercial landfill. However, Table 5-2 lists as a mitigation measure the development of a “waste recycling plan” and Figure 2-11 identifies one of the waste disposal pathways as “recycle.”

*Response: While LES has not yet developed its waste recycling plan, the EIS presents some of the possible materials that could be included in the plan. Waste recycling would be limited by what is cost effective and the presence or availability of community waste recycling programs and recycling industries.*

## **I.21 Decontamination and Decommissioning**

### **Comment: M-57; T-2; 036-10; 048-59**

Many commenters stated that the EIS should identify the party responsible for long-term stewardship of the proposed NEF site. One commenter referred to a statement in section 4.3.6 indicating that certain structures and components would revert to State ownership at the end of facility operations. The commenter stated that LES does not plan to turn structures and components over to the State at the end of facility operation. Another commenter asked whether environmental monitoring at the proposed NEF site would continue beyond decontamination and decommissioning activities.

*Response: LES would be responsible for properly decommissioning the proposed NEF and has proposed to decommission to levels suitable for unrestricted release. Once any licensed site has been verified to be properly decontaminated and decommissioned in accordance with applicable NRC regulations, the license would be terminated and the site could be released. After release for unrestricted use, the NRC would not impose further requirements (such as monitoring). That is, no long-term stewardship would be necessary. The NRC revised section 4.3.6 of the EIS to remove the statement that structures and components would be turned over to the State of New Mexico after decommissioning.*

### **Comment: 042-23**

A commenter stated that during the decommissioning plan development and implementation, LES must involve the New Mexico Environment Department to ensure that closure activities meet State regulations in addition to the NRC’s requirements.

*Response: As stated in 10 CFR § 70.38(I)(5) (addressing the expiration and termination of licenses and decommissioning of sites), the NRC should factor into the decommissioning schedule other regulatory requirements of other government agencies. The NRC staff revised section 4.3 of the EIS to state that LES would comply with regulatory requirements of the NRC and other government agencies.*

### **Comment: 103-7**

A commenter requested that the EIS identify who would own the waste and cylinders.

*Response: The depleted uranium wastes and UBCs would be owned by LES, as a general rule.*

### **Comment: 316-49**

A commenter asked how the NRC would monitor the decommissioning process to assure that all radioactive wastes are disposed of properly and not shipped to unlicensed landfills or recycling facilities.

*Response: The NRC implements an inspection program to help ensure that licensees are fulfilling commitments and meeting the terms and conditions of their license. This program is described in the*

*NRC's Inspection Manual, Chapter 2602, for decommissioning and waste disposal. During decommissioning of the proposed NEF, the NRC would oversee onsite activities. As discussed in sections 2.1.9 and 4.2.14.4 of the Draft EIS, waste would be shipped to a low-level radioactive waste disposal facility located in an Agreement State, such as Envirocare of Utah. The states in which disposal facilities are located implement a regulatory program compatible with the NRC's regulatory program to ensure that incoming waste is acceptable for disposal and meets the requirements in the regulations. Licensees may also use Subpart K of 10 CFR Part 20 to manage low-level radioactive waste (e.g., see 10 CFR § 20.2002).*

## **I.22 Cumulative Impacts**

### **Comment: M-50**

Several commenters expressed opposition to the NRC's conclusion that a conversion facility adjacent to the proposed NEF would be a viable waste conversion strategy, stating it should not be considered in the Draft EIS. The commenters stated further that if the NRC retains a discussion of the conversion facility in the EIS, its environmental effects must be considered cumulatively with those of the proposed NEF. The commenters stated that environmental impacts from the facility would not occur independently of the environmental effects of the proposed NEF.

*Response: LES has indicated that its primary strategy for DUF<sub>6</sub> conversion is through a private conversion facility, as discussed in news articles (LES, 2005d). The NRC staff recognized this strategy as plausible; as such, the EIS must discuss the impacts of this connected action on the proposed NEF. The memorandum of understanding between LES and AREVA to develop a conversion facility represents an initial step in the process for siting, licensing, construction, and operation of a private conversion facility. An evaluation of potential impacts for this facility would need to make a reasonable assumption regarding possible sites. Since there are no legal restrictions on the siting of a DUF<sub>6</sub> private conversion facility adjacent to the proposed NEF, this location was determined to be reasonable. The impacts of an adjacent conversion facility are presented in section 4.2.14.3 of the Draft EIS and need not be addressed separately under cumulative impacts.*

### **Comment: 032-5; 032-11; 316-2; 316-18**

Several commenters suggested that the NRC staff should take into account all industrial facilities and land uses that surround the proposed NEF site that may contribute to cumulative health effects that would be compounded by the proposed NEF. One commenter did not agree with the NRC's conclusion of a small to moderate impact. Another commenter expressed concern about latent cancer fatalities and stated that existing hydrogen sulfide and other pollutants from the oil and gas industry would combine with radioactivity from the proposed NEF to increase cancer and death rates in the area.

*Response: As discussed in sections 4.2.12 and 4.4.8 of the Draft EIS, the quantity of radiological releases would not result in any distinguishable increase in cancers. In addition, the NRC staff did not specifically evaluate the current human health impacts of pre-existing facilities that could pose risks not associated with the proposed NEF. Such an evaluation is outside the scope of the EIS. However, some of the impacts discussed throughout Chapter 4 of the EIS do encompass impacts from other surrounding facilities, as do some of the cumulative impacts in section 4.4 of the EIS (e.g., impacts to the municipal water supply indirectly address other facilities that use the municipal water supply). WCS plans for new operations and other planned facilities in the local area were specifically addressed in section 4.4. The NRC staff concluded that the additional impacts from the proposed NEF to the existing environment would still be considered SMALL to MODERATE for the reasons provided in the Draft EIS.*

### **Comment: 034-54; 043-2**

A commenter stated the EIS should explain why there would not be cumulative impacts to cultural and historical resources, visual/scenic resources, ecological resources, noise, and waste management. Another commenter stated that cumulative impacts to native plants and wildlife are not addressed in the EIS, and that cumulative impacts to land use should be addressed in more detail.

*Response: The NRC staff has revised section 4.4 of the EIS either to describe why each of the areas (cultural and historical resources, visual/scenic resources, ecological resources, noise, and waste management) do not have cumulative impacts or to refer to the appropriate subsection in section 4.2 where cumulative impacts are included in the analysis of the impacts from the proposed action. For example, section 4.2.3 of the Draft EIS includes the impact of the presence of nearby facilities as part of the analysis. Waste management impacts, specifically DUF<sub>6</sub> disposition, are addressed as connected actions.*

**Comment: 284-9; 355-6**

A commenter stated that existing and proposed activities involving radioactive materials in the area (e.g., Waste Isolation Pilot Plant, Modern Pit Facility) could interact with the proposed NEF and the WCS facility. The commenter stated that it is reasonable to assume that WCS would apply for a license to initiate fuel fabrication or other NRC-licensed activities. The two commenters stated that the pattern of development reflected by the proposed NEF and WCS in Andrews, Texas, and southeast New Mexico suggests that cumulative impacts would be greater than those discussed in section 4.4 of the Draft EIS.

*Response: The NRC staff evaluated the cumulative impacts for activities that are known or have a reasonable likelihood of occurring in the future. The impact of the proposed NEF would be low and would not adversely affect the health of the surrounding population or the environment, even when combined with any potential activities at WCS that could involve radioactive materials. Section 2.1.9 of the Draft EIS has been revised to describe the regulatory actions needed before the proposed NEF could ship its DUF<sub>6</sub> to a private conversion facility in Texas. The depleted U<sub>3</sub>O<sub>8</sub> could be disposed of at the WCS facility if the facility were to receive a license to accept this material.*

**Comment: 316-8**

A commenter referred to Table 3-11 of the Draft EIS, stating that samples taken at the proposed NEF site indicate that the EPA's maximum contaminant levels are exceeded for several substances. The commenter asked what cumulative health effects would be expected as a result of combining the existing contamination at the site with proposed NEF activities, which would produce large quantities of uranium-238. The commenter also asked what impact these substance would have on water resources.

*Response: Table 3-11 of the Draft EIS presents the chemical analysis of groundwater that exists approximately 67 meters (220 feet) below the proposed NEF. The results show that this groundwater naturally exceeds EPA maximum contaminant levels for specific chemicals or analysis categories. There are no plans to use this water in proposed NEF activities. Likewise, the operation of the proposed NEF and associated low releases to the environment would not interact with this groundwater. Thus, there would be no additional or cumulative impact associated with this groundwater.*

**Comment: 316-9**

A commenter referred to a statement in section 3.6.4 of the Draft EIS indicating that Cesium-137 is prevalent around the NEF site. The commenter asked what cumulative health effects would be expected as a result of combining radiological impacts from the proposed NEF with the Cesium-137.

*Response: The measured level for Cesium-137 is very low (approximately 2.9 becquerels/kilogram) and cannot be considered pervasive. The purpose of the referenced text is to note that the Cesium-137 is not*

*naturally occurring and was a result of past atmospheric weapons testing. The very low quantities of Cesium-137 would not have any measurable health effects, even if combined with the small releases from the proposed NEF.*

**Comment: 316-45**

A commenter referred to a discussion in section 4.2.4.2 of the Draft EIS regarding expected air emissions from the proposed NEF. The commenter asked how the NRC staff regards the cumulative impact of these emissions.

*Response: The methodology for judging cumulative impacts for air quality is presented in section 4.4.4 of the Draft EIS. The proposed NEF emissions are presented in Table 4-20 in comparison with similar emissions for Lea County, Andrews County, and WCS. As shown in the table, proposed NEF emissions would be several orders of magnitude smaller than these other sources. In addition, the region is in attainment for all criteria pollutants. Because the amount of emissions from the proposed NEF would be so small when added to other past, present, and reasonably foreseeable future actions within the region, the cumulative impact would also be SMALL.*

**Comment: 358-33**

A commenter stated that the EIS should include a cumulative effects analysis for accidents that would address chemical and radioactive health effects, as well as socioeconomic impacts.

*Response: As discussed in section 1.4 of the Draft EIS, the EIS addresses the environmental impacts that could result should an accident occur. Section 4.2.13 of the Draft EIS discusses the public and occupational health impacts from potential accidents during operation of the proposed NEF. In addition, section 4.4.8 of the Draft EIS addresses the cumulative impacts to public and occupational health from the proposed NEF.*

## **I.23 Environmental Measurements and Monitoring Program**

### **I.23.1 Proposed NEF Facilities**

#### **Comment: M-51**

Several commenters noted that section 4.2.6.2 of the Draft EIS states that the evaporative pond and retention basins around the site would create pools of perched water in the ground beneath the site. The commenters stated that Chapter 6 of the EIS should include a discussion of monitoring the perched water.

*Response: Any perched water could be monitored under the State groundwater discharge permit program. As presented in Table 1-3 of this EIS, LES has submitted a Groundwater Discharge Permit/Plan application to the New Mexico Environment Department Water Quality Bureau that includes groundwater monitoring wells. The New Mexico Environment Department Water Quality Bureau has deemed the application administratively complete and is reviewing the application.*

#### **Comment:M-52**

Several commenters asked whether an independent NRC contractor or LES would be collecting and analyzing environmental samples from the proposed NEF site. The commenters expressed concern about the independence and credibility of the results, and asked who would be responsible for quality control and assurance.

*Response: LES would conduct the required sampling in accordance with its quality assurance commitments made in its license application. The NRC staff would review radiological sample data as part of its regulatory responsibilities throughout the license term.*

#### **Comment: M-54**

Several commenters asked whether any monitoring would be required for groundwater in the Santa Rosa Formation.

*Response: Because no contamination is expected in the Santa Rosa Aquifer, no sampling would be required. No contamination is expected, because over 305 meters (1,000 feet) of highly impermeable clay separates the aquifer from surface activities.*

#### **Comment: M-55**

Several commenters stated that the Draft EIS does not specify administrative action levels for physiochemical constituents. The commenters stated that LES must consult with EPA Region 6 and the New Mexico Environment Department to determine these administrative action levels, and that NRC must consider the levels in its licensing evaluation.

*Response: The NRC's jurisdiction associated with the proposed NEF would be limited to radiological constituents. Further, the NRC's licensing review considers the design of the facility and not permit limits, which could be several times greater than actual emissions or effluents from the proposed NEF.*

#### **Comment: M-56; 034-62; 036-9**

One commenter stated that the EIS should identify and differentiate between the minimum monitoring requirements and monitoring that would be optional. Several commenters asked that the NRC discuss safeguards in place if emissions of radioactive and hazardous constituents exceed Federal and/or State regulatory standards. The commenters asked which agency would oversee corrective actions and whether an operating license can be suspended or revoked.

*Response: The NRC regulations focus on monitoring radiological releases from licensed facilities, as specified in 10 CFR Part 70. As stated in section 6.2 of the EIS, physiochemical monitoring would be conducted to monitor nonradiological discharges in relation to, and in compliance with, environmental permits that are issued by the EPA and the State of New Mexico, such as NPDES wastewater discharge permits and air quality permits. The NRC staff revised section 6.2 to indicate that changes to these monitoring programs would be contingent on regulatory approval.*

*Both Federal and State agencies would have enforcement authority over various aspects of the proposed NEF. NRC enforcement actions concerning radiological releases include fines, more frequent inspections, corrective actions, and other actions in accordance with enforcement policy. The NRC could suspend or revoke a license to ensure public safety; such a decision would be made on a case-by-case basis.*

*The New Mexico Environment Department or EPA would have jurisdiction associated with air, ecological, and water permits, as described in Table 1-3 of the Draft EIS. These agencies would review and oversee any corrective actions that could be required through the applicable permits. Specific corrective actions cannot be defined at this time because the corrective actions are dependent on the nature of the violation. If administrative action levels are exceeded, but not permit levels, then LES may institute corrective actions without oversight from a regulatory agency, depending on the permit/license requirements. Section 6.1.1 of the Draft EIS describes possible steps that could be taken if an administrative action level is exceeded. These agencies also have the authority through permits and licenses to impose penalties, including revoking or suspending the appropriate permit or license. Should regulatory standards be exceeded, safeguards could include suspension of operations, establishment of penalties, increased monitoring, or other actions.*

**Comment: 034-63**

A commenter stated that an assumption in section 6.1.1.1 of the Draft EIS indicates that the proposed NEF would have twice the gaseous emissions of the proposed Claiborne enrichment facility because the NEF would be twice the size of the proposed Claiborne facility. The commenter stated that the EIS should provide a justification for considering this assumption to be conservative.

*Response: The amount of radioactive airborne effluents estimated in the Draft EIS is approximately thirty-five times greater than the estimated annual release of 10 grams (0.4 ounce) of uranium and, therefore, conservative. The NRC staff revised section 6.1.1.1 of the EIS to clarify this statement.*

**Comment: 034-65**

A commenter stated that there should be a requirement for periodic chemical sampling of the septic systems. The commenter stated a risk could be posed by not requiring such sampling merely because no process-related effluents would be expected to be introduced into the septic systems.

*Response: Monitoring of the septic systems is under the jurisdiction of the New Mexico Environment Department. LES would conduct sampling and analysis as required by the New Mexico Environment Department.*

**Comment: 036-12**

A commenter stated that the NRC should require the installation of plutonium-detection equipment, because the proposed NEF could receive UF<sub>6</sub> contaminated with plutonium.

*Response: To ensure that the proposed NEF does not process uranium contaminated with plutonium, LES intends to review and regularly audit the suppliers' practices. Detection equipment would not be*



*installed at the proposed NEF site, because such equipment would not be able to detect contamination levels (i.e., very small amounts) of plutonium in the full cylinders. LES has requested a possession limit (if a license is issued) to account for the inadvertent receipt of plutonium contamination in uranium feed cylinders.*

**Comment: 041-2**

A commenter noted that proposed monitoring would not be frequent enough, and should be on a monthly basis.

*Response: Most of the monitoring would be conducted continuously or at least monthly. The gaseous effluent vent systems associated with the Separations Building and the Technical Services Building would be monitored continuously with additional grab samples taken periodically. Radiological sampling frequency along the proposed property boundary for radiological exposure, vegetation/soil, and groundwater is specified as quarterly or semi-annually in Table 6-6 of the Draft EIS. In addition, LES has committed to calculating public doses on a monthly basis (LES, 2005c). Air-monitoring stations along the site boundary and at nearby residential areas and businesses would operate continuously with sample retrieval on a biweekly basis as specified in Chapter 6 of the Draft EIS. Liquid releases to the Treated Effluent Evaporative Basin would be analyzed prior to release to the basin. The septic system would be monitored according to State requirements. Physiochemical sampling is conducted quarterly as specified in Tables 6-8 and 6-9. Ecological monitoring would be conducted annually. If LES or the NRC (or another regulatory agency), through review of the monitoring data, finds that it is necessary to change the sampling frequency or methods, then revisions to the monitoring program could be required.*

**Comment: 042-25**

A commenter stated that the New Mexico Environment Department would likely require LES to add three alluvial wells, which would be completed in the alluvium at the top of the Chinle Formation, to monitor any leakage or changes in water quality from the ponds or septic system. The commenter suggested that the alluvial wells be monitored quarterly for water levels and sampled when water is present.

*Response: LES would meet all requirements imposed by the New Mexico Environment Department in the groundwater discharge permit for the proposed NEF.*

**Comment: 042-44**

A commenter stated that the EIS should discuss the frequency of visual inspections and whether there would be inspections following hail, lightning, or other severe weather at the proposed NEF.

*Response: The information provided in Tables 5-1 and 5-2 of the EIS are summaries of LES's proposed programs for mitigation during construction and operation of the facility. The mitigation programs are in compliance with current NRC and EPA regulations.*

**Comment: 048-83**

A commenter noted that the discussion of the administrative action levels for sample parameters only applies to physiochemical monitoring and should be relocated to section 6.2 to be consistent with the Environmental Report. The commenter also stated that the discussion of administrative action levels applicable to radiological effluent monitoring sample parameters in section 6.1.1 of the Environmental Report should instead be included in section 6.1.1 of the EIS.

*Response: The NRC staff revised sections 6.1.1. and 6.2 of the EIS to reflect the commenter's suggestion.*

**Comment: 048-87**

A commenter noted that the location of the septic tank samples and sampling and collection frequency should be revised to be consistent with Table 6.1-4 of the Environmental Report. The commenter stated that the location should be revised to “one from each affected tank” and the sampling and collection frequency should be revised to “1 to 2 kilograms (2.2 to 4.4 pounds) sludge samples collected from each affected tank prior to pumping.”

*Response: The NRC staff revised Table 6-6 to reflect the commenter’s suggestion.*

### **I.23.2 Ecological**

#### **Comment: M-53; V-1; 036-11; 041-3**

Several commenters stated that Environmental Sampling Program report submitted annually to the NRC should be made public. The commenters asked how this information would be made available.

*Response: The environmental monitoring report discussed in the EIS refers to ambient and media-specific radiological monitoring. The NRC would make the annual reports publicly available through its ADAMS. Nonradiological monitoring, sampling, and enforcement would be overseen by the State of New Mexico or EPA, as applicable.*

#### **Comment: 034-67; 034-68**

A commenter stated that the EIS should explain why there is little detail regarding monitoring of mammals in comparison with reptiles and amphibians; and why replicated sample sites beyond the proposed NEF would be used for reptiles and amphibians, but not for other ecological resources, such as vegetation, birds, and mammals.

*Response: The basis for selecting the use of replicate sample sites for reptiles and amphibians and not other types of ecological media is that these two species are very sensitive to climatic conditions (e.g., the amount of moisture an area receives in a given year). Because the climate in New Mexico is variable and can exhibit dramatic changes within a few kilometers, LES would use nearby replicate sampling locations to obtain more representative reptile and amphibian population samples in the area around the proposed NEF. Onsite sampling for other ecological media (e.g., vegetation, birds, or mammals) would be considered sufficient to characterize changes in the composition of these media associated with the operation of the proposed facility.*

#### **Comment: 048-79; 048-82**

A commenter stated that the sampling location in Figure 6-2 of the Draft EIS should be deleted because it is not consistent with the sampling and monitoring commitments provided in the Environmental Report, section 6.1, Radiological Monitoring, and section 6.2, Physiochemical Monitoring.

*Response: The NRC staff revised Figure 6-1 of the EIS accordingly. In particular, the soil sampling location at the west stormwater diversion ditch outfall was removed from the figure and associated text.*

## **I.24 Cost Benefit Analysis**

### **I.24.1 DUF<sub>6</sub> Disposition**

#### **Comment: M-59; 103-7; 358-26**

Several commenters requested more information concerning the \$5.50 per kilogram estimate for decommissioning funding. One commenter asked whether this figure is presented in 2002 dollars. The commenter requested that inflation be considered in the SER evaluation of disposition costs. Another commenter requested that the EIS include an estimate and basis of the disposal costs, assuming the DUF<sub>6</sub> would be first converted. Another commenter stated that the references provided in the EIS associated with this cost were not accessible, but that it appears the estimate is based on Urenco's European experience and does not include all conversion and disposal costs. The commenter noted that European costs and regulatory requirements are different from those in the United States.

*Response: As discussed in section 7.2.3 of the Draft EIS, LES is required to put in place a financial surety bonding mechanism to assure that adequate funds would be available to dispose of all DUF<sub>6</sub> generated by the proposed NEF. The NRC staff evaluated the adequacy of the proposed funding in the SER.*

#### **Comment: 031-7; 358-25**

Two commenters expressed concern that funding for decommissioning and waste disposal associated with the proposed NEF could fall to taxpayers. One commenter stated that private uranium mines, mills, and tailings operations in New Mexico have not adequately funded decommissioning and waste disposal activities in the past, and that Federal and State funding was required for these sites. Another commenter asked about the proposed NEF's status with regard to the EPA list of Superfund sites. The commenter asked how much time would be required for the proposed NEF waste cleanup, and what would be the taxpayer cleanup costs.

*Response: The uranium milling and tails sites referred to in the comment operated prior to the promulgation of NRC's decommissioning funding requirements. The NRC's objective now is to ensure that NRC-licensed sites (unlike Superfund sites) never require taxpayer funds to complete decommissioning. The NRC does this through its decommissioning financial assurance requirements (see 10 CFR § 40.36 and 70.25). In the event that the licensee is unable to carry out decommissioning through bankruptcy or other reason, the financial assurance provisions provide the funding for decommissioning, and the NRC would ensure that proper site remediation takes place. For uranium enrichment facilities, applicants must provide a decommissioning funding plan consisting of a site-specific cost estimate for decommissioning and a financial instrument, such as a surety bond or letter of credit. LES has chosen to use a surety bond for its financial mechanism. Further, as stated in 10 CFR § 40.36(d) and 70.25(e), decommissioning cost estimates must be adjusted at intervals not to exceed 3 years. The NRC staff has addressed this issue in the SER..*

#### **Comment: 031-8; 031-9; 103-26**

Commenters expressed concern about sufficient funding for decommissioning and waste disposal. One commenter stated that the proposed NEF cleanup bonds appear to be only one-tenth of what the actual cleanup costs would be as compared with taxpayer-funded cleanup efforts. The commenter wanted to know who would guarantee that the proposed NEF bonds would be sufficient for cleanup costs in 30 years, with no cost to taxpayers. Another commenter asked whether sufficient funds would be available for DUF<sub>6</sub> disposal in the event that the proposed NEF were to stop enrichment activities earlier than expected. The commenter also asked if the potential conversion and disposal facilities discussed in the Draft EIS would be available in such a situation. The commenter stated that the EIS should discuss these contingencies.

*Response: Funding for decommissioning must be provided before the NRC staff could issue a license for the proposed NEF. Further, as stated in 10 CFR § 40.36(d) and 70.25(e), decommissioning cost estimates must be adjusted at intervals not to exceed 3 years. The periodic adjustments would account for inflation, changes in the costs of goods and services (e.g., waste disposal), changes in facility conditions or operations, and changes in expected decommissioning procedures. Periodic updates to the decommissioning funding plan would ensure that there is sufficient funds to decommission the facility throughout its lifetime. The SER provides more detailed information regarding the decommissioning funding plan.*

**Comment: 103-21**

A commenter stated that to determine the commercial practicality of DUF<sub>6</sub> disposal options, the EIS should include a cost estimate and basis for each element of the options discussed on page 4-34 of the Draft EIS. The commenter suggested that a letter from an existing facility indicating it can accept U<sub>3</sub>O<sub>8</sub> and CaF<sub>2</sub> at a range of costs for service would be acceptable documentation.

*Response: As stated in section 7.2.3 of the Draft EIS, a cost estimate for the disposal of the DUF<sub>6</sub> generated by the proposed NEF is evaluated in the NRC staff's safety review. The NRC would require that LES demonstrate it has sufficient financial resources to fully fund the proposed NEF. The NRC staff has documented its review of LES's decommissioning financial surety and decommissioning cost estimates in the SER.*

**Comment: 316-34**

A commenter stated that the conversion plant for the DUF<sub>6</sub> from the proposed NEF would be of a smaller scale than the DOE conversion facilities, with different economics of operation and needed rates of return. The commenter stated that a Lawrence Livermore National Laboratory report estimated that a conversion plant such as that proposed by LES would have costs nearly as high as the cost of operating a plant with four times the throughput. The commenter asked what cost reductions would be attempted, and at what price to safety and the environment.

*Response: The issues raised by the commenter are beyond the scope of the EIS and would be addressed in the review of any such private conversion facility.*

**Comment: 358-27**

A commenter stated that the EIS (and not only the SER) should include a complete description and analysis of waste disposal costs. The commenter also stated that more realistic and higher cost estimates must be used and justified in detail, so that the public can fully comment on the adequacy and reliability of those estimates and the funding mechanisms that would be required.

*Response: The provision of a detailed cost analysis of alternative disposal options is not within the scope of this EIS. Detailed construction cost information has been reviewed by the NRC staff as part of the safety evaluation.*

## **I.24.2 Construction Costs and Revenues**

**Comment: M-58**

Several commenters stated that to accurately gauge the benefit of the proposed NEF, the NRC must include the estimate of enriched uranium to be produced by the proposed NEF, as well as the expected profit on its sale per pound.

*Response: At full production, the proposed NEF would produce up to 800 metric tons (1,764 million pounds) of enriched UF<sub>6</sub> product annually. LES profits on the sale of this enriched product is not within the scope of this EIS. As discussed in section 7.2.3 of the Draft EIS, the NRC staff reviews LES's decommissioning financial surety and decommissioning cost estimates for disposal of DUF<sub>6</sub> and decommissioning. The NRC staff has documented its review in the SER.*

**Comment: 103-9**

A commenter noted that the Draft EIS construction cost estimate of \$1.2 billion does not include escalation, contingencies, and interest. The commenter requested that the EIS provide a complete estimate, including contingencies and interest.

*Response: Detailed construction cost information has been reviewed by the NRC staff as part of the safety evaluation and addressed in the SER.*

### **I.24.3 Nuclear Power Industry**

**Comment: 316-10**

A commenter requested that the EIS include a calculation of the length of time and the quantity of electricity consumed by the proposed NEF before the fuel it produces creates electric power in excess of that which was used to enrich the fuel. The commenter stated that this calculation is necessary to judge the value of this fuel over others that may more efficiently recover the energy lost in attaining, capturing, refining, or exploiting a fuel.

*Response: Calculation of power efficiencies is beyond the scope of the EIS. However, a comparison of the cost to enrich the uranium hexafluoride is provided in section 2.2.2.3 of the Draft EIS. The current U.S. uranium enrichment program uses the gaseous diffusion process, which consumes approximately 2,200 kilowatt hours of electricity per kilogram of SWU of enriched uranium hexafluoride. In comparison, the gas centrifuge technology planned for the proposed NEF uses approximately 40 kilowatt hours per kilogram of SWU produced. Therefore, the gas centrifuge technology planned for the proposed NEF is approximately 55 times more energy efficient than the enrichment process currently being used in the United States.*

### **I.25 Terrorism, Security and Nonproliferation**

**Comment: AA-1**

Several commenters stated that constructing the facility in phases and bringing cascades on-line in stages would create a security vulnerability. The commenters asked how LES would assure that construction workers have sufficient security clearances when working adjacent to operational facilities.

*Response: The proposed NEF would be housed in multiple buildings. Each building would be fully constructed and tested before being brought on-line. Once operational, the construction crews would be excluded from the completed building and assigned to the next portion of the facility being constructed. Entry to the operational portions of the facility would require special keys and other security measures to which construction crews would not have access.*

**Comment: 032-2; 032-6; 032-19; 046-4; 046-7; 104-3; 105-3; 105-5; 151-5; 316-11; 316-12**

Several commenters expressed concern that terrorism and related security concerns were not addressed in the Draft EIS. Commenters stated that environmental and health and safety impacts related to terrorism and security issues are valid areas for analysis under NEPA. One commenter stated that production from the proposed NEF could threaten the Megatons to Megawatts program, negatively impacting

nonproliferation efforts and U.S. security. Another commenter asked if the Department of Homeland Security had been contacted for its input on the Draft EIS. One commenter indicated that the proposed NEF would not contribute to the threat of terrorism and stated several examples to support this conclusion.

*Response: These comments raise issues which are beyond the scope of the EIS: As discussed in sections H.4.1.5. and H.4.1.6 of Appendix H, nonproliferation is a national U.S. policy issue and terrorism is not appropriately addressed in the context of NEPA. Nevertheless, the NRC is devoting substantial time and attention to terrorism-related matters. For example, as part of fulfilling its mission to protect public health and safety and common defense and security pursuant to the Atomic Energy Act, the NRC staff is conducting security assessments of commercial uses of radioactive material. The NRC has issued interim compensatory measures and a number of other orders imposing enhanced security requirements on its licensees. Also, the NRC has acted to increase security awareness in its applicants.*

*The NRC did not receive comments from the Department of Homeland Security on the Draft EIS.*

## **I.26 Conflict of Interest**

### **Comment: M-2**

Several commenters stated that the preparation of the Draft EIS by Advanced Technologies and Laboratories International, Inc. (ATL) results in a conflict of interest. The commenters noted that Advanced Technologies and Laboratories International, Inc. listed among its clients Westinghouse and Oak Ridge National Laboratories, to which British Nuclear Fuels Limited and Westinghouse are contractors. The commenters stated that Westinghouse and British Nuclear Fuels Limited are members of the LES consortium and that ATL would benefit from the licensing of the proposed NEF through its various associations with these organizations. The commenter stated that ATL should not have been contracted to prepare the Draft EIS without a disclosure statement. The commenter recommended that, because no disclosure statement was released, the Draft EIS be rejected and rewritten by another organization.

*Response: The NRC staff does not believe that ATL should be disqualified from developing the EIS for the proposed NEF. The work of ATL for Westinghouse was completed in 1998. The work at Oak Ridge National Laboratory was conducted to support Bechtel Jacobs and the University of Tennessee and was completed in 2001. Neither of these jobs involved activities that could be construed to present any direct, indirect, or implied conflict of interest with the development the EIS for the proposed NEF. The task to develop the EIS was not issued to ATL until 2002. ATL has kept the NRC informed of all work provided to other clients since being awarded the contract in 2000.*

### **Comment: M-3**

Several commenters stated that Paul Abramson, one of the associate chief administrative judges on the ASLB, is a former partner of the Winston and Strawn law firm. The commenter noted that Winston and Strawn is currently the legal representative for LES, and that Mr. Abramson, therefore, should be disqualified from deciding whether to issue a license to LES.

*Response: Conflicts of interest with regard to the ASLB are beyond the scope of the EIS and are not within the NRC staff's purview.*

### **Comment: 032-24**

A commenter identified a possible conflict of interest, referring to information about LES contributions to a program of New Mexico Governor Richardson's according to the web site, [www.MoveOn.org](http://www.MoveOn.org).

*Response: LES's financial contributions to the activities of the Governor of New Mexico are beyond the scope of the EIS.*

**Comment: 284-1; 284-2**

A commenter stated that a potential conflict of interest exists when public figures associate with private interests. The commenter indicated that relationships among political, legal and regulatory institutions and self-interested corporations and individuals affect the selection of facts deemed relevant to the license application and influence the NRC's decision whether to issue a license for the proposed NEF.

*Response: The NRC is an independent agency whose mission is to protect public health and safety and the environment. The NRC conducted the review of the proposed NEF in accordance with all applicable Federal regulations. As stated in the Draft EIS, the discussion on whether to grant a license to the applicant would be made by the NRC in accordance with 10 CFR Parts 30, 40, and 70. These regulations define several steps in the decisionmaking process, including a safety review. The NRC conducted a safety review and an environmental review that are documented in the SER and the EIS, respectively.*

**I.27 Editorial Comments**

**Comment: M-7; M-45; 034-9; 034-10; 034-11; 034-12; 034-14; 034-17; 034-48; 034-56; 034-60; 034-61; 034-64; 034-66; 038-4; 038-5; 038-6; 042-39; 042-40; 048-2; 048-6; 048-8; 048-11; 048-12; 048-15; 048-20; 048-21; 048-22; 048-23; 048-24; 048-25; 048-26; 048-27; 048-28; 048-29; 048-30; 048-31; 048-33; 048-34; 048-37; 048-38; 048-39; 048-41; 048-45; 048-51; 048-52; 048-53; 048-54; 048-55; 048-56; 048-57; 048-60; 048-61; 048-62; 048-63; 048-64; 048-66; 048-67; 048-68; 048-69; 048-70; 048-71; 048-72; 048-73; 048-74; 048-75; 048-76; 048-77; 048-78; 048-80; 048-81; 048-84; 048-88; 048-91; 048-92; 048-93; 048-94; 048-95; 048-96; 048-97; 048-98; 103-16; 103-17; 316-56; 358-20**

Commenters suggested corrections for typographical errors, misspellings, and grammatical mistakes in the Draft EIS. Several commenters also proposed text to clarify discussions in the Draft EIS.

*Response: Proposed changes were made when appropriate and when they did not alter the impact assessment. Where proposed changes were intended to correct inaccuracies or inconsistencies, they were checked for accuracy prior to incorporation in the EIS.*

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