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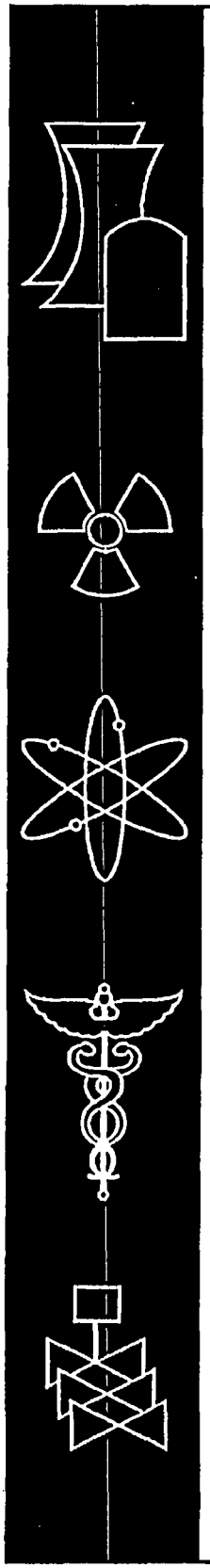
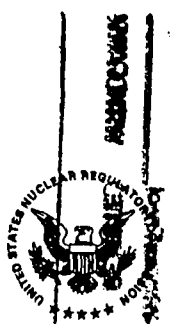


Safety Evaluation Report
for the National Enrichment Facility in Lea County, New Mexico

Docket No. 70-3103

Louisiana Energy Services

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



LES Exhibit 121

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SECY-02

U.S. NUCLEAR REGULATORY COMMISSION

In the Matter of Louisiana Energy Services, L.P.

Docket No. 70-3103-ML Official Exhibit No. LES 121

OFFERED by: (Applicant/Licensee) Intervenor _____

NRC Staff Other _____

IDENTIFIED on 2/13/00 Witness/Panel Krich

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1.0 GENERAL INFORMATION

1.1 FACILITY AND PROCESS DESCRIPTION

The purpose of the U.S. Nuclear Regulatory Commission's (NRC's) review of the proposed Louisiana Energy Services (LES) facility and process description is to determine whether the application includes an overview of the facility layout and a summary description of the proposed processes. A more detailed description of the facility and processes is contained in the "Integrated Safety Analysis (ISA) Summary" (LES, 2005b).

1.1.1 REGULATORY REQUIREMENTS

The regulations in 10 CFR 30.33, 10 CFR 40.32, and 10 CFR 70.22 require each application for a license to include information on the proposed activity and the equipment and facilities that will be used by the applicant to protect health and minimize danger to life and property. In addition, the regulations in 10 CFR 70.65 require each application to include a general description of the facility, with emphasis on those areas that could affect safety, including identification of the controlled area boundaries.

1.1.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria applicable to NRC's review of the facility and process description section of the application are contained in Section 1.1.4.3 of the "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," NUREG-1520 (NRC, 2002).

1.1.3 STAFF REVIEW AND ANALYSIS

In Section 1.1 of the Safety Analysis Report (SAR) (LES, 2005a), the applicant provides a summary description of the proposed gas centrifuge uranium enrichment plant and processes. This description includes discussion of the major chemical and mechanical processes to be used in the facility. The facility is proposing to use a gas centrifuge enrichment process to enrich uranium from its natural isotopic concentration of about 0.7 percent uranium-235 (U-235) to 5 percent U-235. The proposed plant will have a nominal enrichment capacity of 3 million Separative Work Units (SWUs). (A SWU is a measure of the effort required to perform isotopic separation.) The process uses uranium in the chemical form of uranium hexafluoride (UF_6). Gaseous UF_6 enters a high-speed rotor at subatmospheric conditions where centrifugal forces press the heavier isotope of uranium, uranium-238 (U-238), to the outer wall of the rotor. The lighter isotope, U-235, remains closer to the center, away from the rotor wall. Internal scoops are used to collect the heavier and lighter fractions and circulate them to other centrifuges piped in a cascade arrangement.

The proposed plant will be constructed to have three Separations Building Modules, each having two Cascade Halls, with each Cascade Hall having eight cascades. Each Separations Building consists of a UF_6 Feed System, Cascade Systems, a Product Take-off System, and a Tails Take-off System. The plant also has a Product Liquid Sampling System and a Product Blending System.

Natural uranium feed is shipped to the plant primarily by truck in cylindrical steel containers having a capacity of up to 12.7 metric tonnes (MT) (14 tons) of UF_6. Under ambient conditions, the UF_6 is a solid. Feed containers are vented to remove air and hydrogen fluoride (HF) gases and then heated to sublime the solid UF_6 to a gas. The feed system is designed to preclude the UF_6 from becoming liquid. The light gases and gaseous UF_6 pass through the Feed Purification Subsystem to remove the light gases that are directed through the Gaseous Effluent Ventilation System (GEVS) to ensure that HF and UF_6 are removed and not released to the atmosphere. After the venting is complete, the UF_6 feed from the Solid Feed Stations is directed to a cascade for enrichment.

After enrichment in gas centrifuge machines, both depleted and enriched products are withdrawn from the cascade and desublimed at subatmospheric pressure in the Tails Take-off System and the Product Take-off System, respectively. Tails and Product Take-off Systems are designed to preclude UF_6 from becoming a liquid.

Sampling to verify the assay level is performed in the Product Liquid Sampling Autoclave. In the autoclave, UF_6 is heated to a liquid; the cylinder is tilted so that UF_6 can flow into sample manifold and sample bottles; and the cylinder is returned to its original horizontal position. This is the only system in the plant where UF_6 is in a liquid form.

To produce enriched uranium meeting customer-assay specifications, the Product Blending System is used to mix enriched uranium at two different enrichment levels to one meeting the customer specifications. This system can also be used to transfer product between cylinders.

Facility information contained in the ISA Summary (LES, 2005b) is provided in the application in layout drawings of the plant buildings and the location of plant systems within the buildings. Geographical features and transportation routes are also provided on these drawings.

The proposed facility is expected to possess natural, enriched, and depleted uranium. It is expected to handle, on an annual basis, approximately 690 nominal 12.5-MT (14-ton) or 9.5-MT (10.5-ton) natural uranium feed cylinders; 350 nominal 2-MT (2.5-ton) enriched-uranium product cylinders; and 625 nominal 12.5-MT (14-ton) depleted uranium tails cylinders.

Gaseous airborne effluents will be released from the proposed facility. The applicant estimates that less than 10 grams (0.35 ounces (oz)) of uranium and less than 1 kilogram (kg) (2.2 pounds (lbs)) of HF will be released annually in 2.47×10^9 cubic meters of air discharge. These effluents are significantly below 10 CFR Part 20 and U.S. Environmental Protection Agency National Emission Standards for Hazardous Air Pollutants (NESHAPs) airborne release limits.

Liquid discharges include contaminated process effluents, cooling tower blowdown, and stormwater discharges. Liquid effluents will be significantly below Part 20 liquid effluent requirements.

Wastes expected to be generated include non-hazardous industrial, Class A radioactive, hazardous, and mixed wastes. Construction wastes will also be generated in construction of the plant. Radioactive wastes will be disposed of at properly licensed low-level radioactive waste disposal facilities. Hazardous chemical wastes will be properly treated and disposed of at permitted treatment and disposal facilities. Mixed low-level radioactive and chemically hazardous wastes will be treated and disposed of at facilities having the proper licenses and

permits for these wastes. Depleted uranium tails will be stored on-site on the Uranium Byproduct Cylinder (UBC) pad until they are transferred to another licensee for commercial use or they are designated for disposal as waste. If designated as waste, the applicant is proposing to use either a commercial disposition path or the U.S. Department of Energy (DOE) disposition path set out in the USEC Privatization Act of 1996. The applicant has committed to not store depleted uranium tails for longer than the 30-year life of the plant.

1.1.4 EVALUATION FINDINGS

The staff has reviewed the proposed general facility and process descriptions according to Section 1.1 of the Standard Review Plan. The applicant has adequately described: (1) the facility and processes so that the staff has an overall understanding of the relationships of the facility features; and (2) the function of each feature. The staff concludes that the applicant has met the requirements and acceptance criteria applicable to this section.

1.2 INSTITUTIONAL INFORMATION

The purpose of NRC's review of institutional information is to establish whether the license application includes adequate information identifying the applicant, the applicant's characteristics, and the proposed activity.

1.2.1 REGULATORY REQUIREMENTS

The regulations in 10 CFR 30.32 and 10 CFR 40.31 require each application for a license to include: (a) information on the identity of the applicant; (b) name, chemical and physical form, and maximum amount that will be possessed; and (c) purpose for which the licensed material will be used. The regulations in 10 CFR 70.22 require each application for a license to include: (a) information on the corporation applying for a license; (b) the location of the principal office; (c) the names and citizenship of the principal officers; (d) information concerning ownership and control; (e) the proposed site activities; (f) financial qualifications; and (g) the name, amount, and specifications of the licensed material to be used. The regulations in 10 CFR Part 95 contain provisions for obtaining a facility security clearance. The regulations in 10 CFR 140.13b require applicants for uranium enrichment facilities to provide and maintain liability insurance.

1.2.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria applicable to NRC's review of the facility and process description section of the application are contained in Section 1.2.4.3 of the "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," NUREG-1520 (NRC, 2002).

1.2.3 STAFF REVIEW AND ANALYSIS

1.2.3.1 Corporate Identity

In Section 1.2.1 of the SAR (LES, 2005a), the applicant provides information on the corporate organization. LES is a Limited Partnership chartered in Delaware. If was formed solely to provide uranium enrichment services to the commercial nuclear power sector. LES has a 100-percent-owned subsidiary, NEF Series 2004, LLC, a limited liability company, organized under

the laws of the State of Delaware, formed to purchase Industrial Revenue Bonds issued by Lea County. The General Partners are as follows:

1. Urenco Investments, Inc., a Delaware corporation and wholly owned subsidiary of Urenco Limited, a corporation formed under laws of the United Kingdom and owned equally 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, which is wholly owned by the Government of the United Kingdom. UCN is 99 percent owned by the Government of the Netherlands and 1 percent owned by the Royal Dutch Shell Group, DSM, Koninklijke Philips Electronics N.V., and Stork N.V. Uranit is owned equally by Eon Kernkraft GmbH and RWE Power AG, which are corporations formed under laws of the Federal Republic of Germany.

2. Westinghouse Enrichment Company, LLC, a Delaware limited liability company and wholly owned subsidiary of Westinghouse Electric Company LLC, also 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 British Nuclear Fuels plc, which is wholly owned by the Government of the United Kingdom.

The Limited Partners are as follows:

1. Urenco Deeinemingen B.V., a Netherlands corporation and wholly owned subsidiary of Urenco Nederlands B.V.

2. Westinghouse Enrichment Corporation, LLC, a Delaware limited liability company and wholly owned by Westinghouse Electric Company, LLC.

3. Entergy Louisiana, Inc., a Louisiana corporation and wholly owned subsidiary of Entergy Corporation, a publicly owned Delaware corporation and a public utility holding company.

4. Claiborne Energy Services, Inc., a Louisiana corporation and wholly owned subsidiary of Duke Energy Corporation, a publicly owned North Carolina corporation.

5. Cenesco Company, LLC, a Delaware limited liability company and wholly owned subsidiary of Exelon Generation Company, LLC, a Pennsylvania limited liability company.

6. Penesco Company, LLC, a Delaware limited liability company and wholly owned subsidiary of Exelon Generation Company, LLC, a Pennsylvania limited liability company.

Urenco owns 70.5 percent of the partnership while Westinghouse Electric Company owns 19.5 percent. Entergy, Duke Energy Corporation, and Exelon Generation Company own the remaining 10 percent in equal shares.

No other companies will be present or operating on the uranium enrichment plant property other

than where the applicant has contracted such services. The principal location for business is Albuquerque, New Mexico.

The applicant provided the name of the President of LES, who is a citizen of the United States.

1.2.3.2 Foreign Ownership, Control, or Influence

With respect to a foreign ownership, control, or influence (FOCI) determination for LES' National Enrichment Facility, the NRC staff received a letter from the Department of Energy (DOE) dated March 31, 2005 (DOE, 2005), which states in part that "...any additional FOCI mitigation measures placed on LES would provide no additional benefit to the National Security of the U.S." The letter further recommends that the NRC waive the requirement for FOCI mitigation associated with the granting of a nuclear facility licence to LES. The NRC accepts this finding by DOE based on an Interagency Agreement between NRC and DOE dated May 6, 2002. (DOE, 2002).

1.2.3.3 Financial Qualifications

1.2.3.3.1 Project Costs

The applicant estimates the total construction cost of the facility to be approximately $1.2 billion, in 2002 dollars, which excludes escalation, interest during construction, tails disposition, decommissioning, and any replacement equipment required during the operating life of the facility. The facility SAR (LES, 2005a) and supporting supplements addressing NRC's April 19, 2004, Request for Additional Information (RAI), provide detailed bases that supported the $1.2 billion estimate. The supporting supplements included detailed proprietary construction cost estimates for the facility.

As part of the financial review, before starting the detailed review of the cost estimate, the staff conferred with the technical reviewers assigned to evaluate the support systems/structures necessary to support the safe operation of the facility to confirm that the necessary systems had been identified in the SAR (LES, 2005a). The staff also conducted a detailed review of the SAR, Section 1.1.1 (LES, 2005a), which provided a detailed description of each supporting structure/system, and then compared the support systems for each building with the systems identified in the cost estimate, to confirm that the cost estimate and the facility description were consistent. The cost estimate is based on a reasonable estimate of the cost of the supporting systems and structures, as well as confirming that all the major equipment necessary to support safe operation were included.

The applicant identified the principal buildings necessary to support the operation of the facility. The buildings are: (a) Separation Building/3-modules; (b) Technical Services Building (TSB); (c) Centrifuge Assembly Building; (d) site infrastructure; (e) central utilities; (f) Cylinder Receipt and Dispatch Building (CRDB); and (g) blending and liquid sampling area. The applicant also identified each of the principal components/systems necessary to support its operation and further divided the cost estimate by components/systems and buildings necessary to support the operation of the facility. For each of the major structures, the applicant typically divided the systems into the following: 1) engineering and project management support; 2) centrifuge mounting and equipment; 3) UF_6 systems; 4) control and instrumentation; 5) auxiliary systems; 6) electrical systems; 7) site, building, and landscape; 8) miscellaneous costs including start-up

cost; and 9) a contingency of approximately of 10 percent. The staff reviewed each of the detailed costs for the major facilities and its supporting components, and based on its review, the staff has concluded the costs for each of the major structures is reasonable.

The validity of the estimated cost and its supporting assumptions were also key factors in determining if the applicant is financially qualified to construct the facility. The applicant stated that it plans to meet contingencies for cost overruns and construction revenue shortfalls in several ways. Unforeseen construction contingencies will be minimized by the use of a turnkey contractor for the engineering, procurement, and construction of the facility. For cost overruns not covered under the turnkey provisions of the contract, the applicant will seek additional partner equity contributions. However, if cost overruns are much higher than could be anticipated, the applicant would cancel the project and leave an allowance for site stabilization. The facility will begin operation in a phased approach, with each separation module capable of production of one-third of the plant's capacity. This will allow the facility to generate income while coming up to full production.

The staff considers that the construction cost estimate, as presented in the application, and supporting supplements in response to the staff's RAIs, is reasonable and, therefore, the staff concluded that the $1.2 billion estimate is a reasonable estimate to construct the facility.

1.2.3.3.2 Financial Qualifications

The applicant made commitments that construction of the facility will not begin before funding is fully committed. Of this funding (equity and debt), the applicant will have in place, before construction, a minimum of equity contributions of 30 percent of the project's estimated costs of $1.2 billion from the parents and affiliates of the partners, and firm commitments ensuring funds for the remaining project costs. The applicant plans to fund the construction phase of the project with a mix of approximately 50 percent debt and 50 percent equity contributions by the two major partners. The applicant's reliance on approximately 50 percent equity is viewed as a positive endorsement because, by contrast, some analogous construction projects rely on 100 percent financing, which often proves to be difficult to secure from financial institutions.

The applicant has no reported income statements. However, the partners have assets to support their respective equity ownership portions of LES. Urenco Investments, Inc., is a wholly owned subsidiary of Urenco Limited, which in turn is owned in equal shares by BNFL EL; UCN; and Uranit - companies that are formed under English, Dutch and German law, respectively. BNFL EL is wholly owned by British Nuclear Fuels plc, 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 1 percent owned collectively by private consortiums. Uranit is equally owned by Eon Kernkraft GmbH and RWE Power AG, which are both German companies.

For the year ending December 31, 2003, Urenco Group had total assets of €1.49 billion, with cash assets of €14.4 million. Urenco Group's net income in 2003 was €107.9 million. Urenco Limited is the holding company for the Urenco Group.

Cenesco Company and Penesco Company are both wholly owned subsidiaries of Exelon Generation Company. For the year ending December 31, 2003, Exelon Generation Company had total assets of $14.76 billion, with cash or near-cash assets of $233 million. The company

sustained a net loss of $133 million in 2003. Net losses in 2003 can be attributed primarily to operating expenses, in particular the costs of purchased fuel, purchased power, impairment of long-lived assets, and other operating and maintenance expenses. Furthermore, for the 9 months ending September 30, 2004, the company had a positive net income of $599 million.

Duke Energy Corporation, a publicly held North Carolina corporation, is the owner of Claiborne Energy Services, Inc., which is also a 3.33 percent owner of LES. For the year ending December 31, 2003, Duke Energy Corporation had total assets of $56.2 billion, with cash or near-cash assets of $1.16 billion. Duke Energy Corporation sustained a net loss of $1.3 billion in 2003. Net losses in 2003 can be attributed primarily to operating expenses, in particular the costs of purchased natural gas and petroleum products. Furthermore, for the 9 months ending September 30, 2004, the corporation had a positive net income of $1.13 billion.

Entergy Corporation, a public utility holding company, is the owner of Entergy Louisiana Inc., which is a 3.33 percent owner of LES. For the year ending December 31, 2003, Entergy Corporation had total assets of $28.55 billion, with cash or near-cash assets of $692 million. Entergy Corporation's net income in 2003 was $950 million.

Westinghouse Enrichment Company, LLC, is a wholly owned subsidiary of Westinghouse Electric Company, LLC, whose ultimate parent, through two intermediary Delaware corporations and one corporation under United Kingdom laws, is British Nuclear Fuels plc. British Nuclear Fuels plc is wholly owned by the Government of the United Kingdom.

For the year ending March 31, 2004, Westinghouse Electric Company had total assets of £1.02 billion. The company's pre-tax net income was £17 million for that financial year. Westinghouse Electric Company is a subsidiary of British Nuclear Fuels, which had total assets of £23.94 billion for the year ending March 31, 2004. British Nuclear Fuels sustained a net loss of £194 million after taxes for that financial year (pre-tax losses were £299 million).

The remaining 50 percent of the estimated $1.2 billion construction costs will be financed through financial institutions and bond holders.

Lea County will serve as the lessor-owner of the facility during the 30-year term of Industrial Revenue Bonds (IRB) issuance by the State of New Mexico. 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 IRB. This financial structure will allow the applicant to take advantage of certain tax abatements, tax avoidance, and make other payments in lieu of taxes available under New Mexico law. The IRB is not a vehicle for financing the plant.

Lea County will have no authority to operate the facility as a business or otherwise use or acquire the facility for any purpose, except in its limited role as lessor. During the term of the lease, the applicant is solely responsible, on behalf of, and as agent for, the County, for acquiring, constructing, and installing the equipment into the facility. At the conclusion of the 30-year lease, which corresponds to the 30-year term of the IRB, the applicant will purchase the land and facility from Lea County for the sum of $1.00.

On December 3, 2003, the applicant announced that the first round of contracts with several

U.S. nuclear power plants, including Exelon, were signed. These contracts represent at least 70 percent of the facility's first 10 years of production. As the project construction progresses, LES will make a decision to continue, based on a comparison of future incremental construction and operations and maintenance costs to the expected revenues generated from enrichment services sales.

The NRC staff finds that LES and its partner-owners appear to be financially qualified to build and operate the proposed facility, in accordance with 10 CFR 70.23(a)(5). The applicant identified sources of debt and equity for construction, and has reasonable assurance of securing additional financial resources, if needed.

1.2.3.3.3 Liability Insurance

Under 10 CFR 140.13b, a uranium enrichment facility is required to carry liability insurance to cover public claims arising from any occurrence, within the U.S. that causes, within or outside the U.S., bodily injury, sickness, disease, death, loss of, or damage to, property, or loss of use of property arising from the radioactive, toxic, explosive, or other hazardous properties of chemicals containing licensed material. The applicant is proposing to have and maintain up to $300 million to satisfy the 10 CFR 140.13b requirement. The applicant has already obtained a nuclear energy liability policy with a limit of $1 million as a standby policy until the facility is ready to begin operations. At that time, the applicant will increase the amount to approximately $300 million.

Because full liability insurance coverage will not be provided until prior to receipt of licensed material, NRC staff is imposing the following license condition:

> "The licensee shall provide proof of full liability insurance as required under 10 CFR 140.13b, at least 30 days prior to the planned date for obtaining licensed material. If the licensee is proposing to provide less than $300 million of liability insurance coverage, the licensee shall provide, to the NRC for review and approval, an evaluation supporting liability insurance coverage in amounts less than $300 million at least 120 days prior to the planned date for obtaining licensed material."

1.2.3.4 Type, Quantity, and Form of Licensed Material

Table 1.2-1 of the SAR (LES, 2005a) lists the type, quantity, and form of the licensed material proposed for possession. The applicant proposes to use and possess the amounts of special nuclear material, source material, and byproduct material given in Table 1.2-1. The quantities of Tc-99 and transuranics from residual contamination as a consequence of the historical feed of recycled uranium at other facilities are expected to have no significant radiological impact.

1.2.3.5 Authorized Uses

The application is for the issuance of licenses under 10 CFR Parts 30, 40, and 70. The applicant is proposing to use special nuclear material and source material in the enrichment of uranium. The uranium enrichment services would be sold to clients for the production of low-enriched uranium that would be ultimately used in the manufacture of fuel for commercial nuclear power plants. Byproduct material would be used in instrument-calibration sources and may be present as contamination as a consequence of the historical feed of recycled uranium at

other enrichment facilities. Feed cylinders that have been previously used to transport or store recycled uranium must be decontaminated before being allowed on the facility site. In addition, natural UF_6 supplied to the facility will meet American Society for Testing and Materials (ASTM) ASTM C787, "Standard Specification for Uranium Hexafluoride for Enrichment" (ASTM, 2003), and periodic audits of suppliers will be performed to ensure that these conditions are met. The applicant intends to identify specific byproduct calibration sources in future license amendment requests. The applicant proposed a 30-year license term. The applicant also requested approval of a classified-matter facility clearance, under 10 CFR Part 95.

Table 1.2-1
Proposed Possession Limits

Source or Special Nuclear Material	Physical and Chemical Form	Maximum Amount to be Possessed at Any One Time
Uranium (natural and depleted) and daughter products	Physical: Solid, Liquid, and Gas Chemical: UF_6, UF_4, UO_2F_2, oxides and other compounds	136,120,000 kg (300,093,231 lbs)
Uranium enriched in isotope U-235 up to 5 percent by weight and uranium daughter products	Physical: Solid, Liquid, and Gas Chemical: UF_6, UF_4, UO_2F_2, oxides and other compounds	545,000 kg (1,201,519 lbs)
Tc-99, transuranic isotopes and other contamination	Any	Amount that exists as contamination as a consequence of the historical feed of recycled uranium at other facilities

Note: Tc-99 - Technetium-99
UF_4 - Uranium Fluoride
UO_2F_2 - Uranyl Fluoride

1.2.3.6 Special Exemptions or Special Authorizations

In Section 1.2.5 of the SAR (LES, 2005a), the applicant addressed an exemption request to 10 CFR 40.36 and 10 CFR 70.25 to provide incremental funding for decommissioning to reflect its phased approach for enrichment capacity at the facility and its expected depleted uranium tails generation rate. As discussed in Section 10.2.2 of the SAR (LES, 2005a), the applicant stated that it would initially provide funding for the projected cost of facility decontamination and decommissioning, assuming operation at full capacity, and disposition of the tails generated during the first three years of operation. Thereafter, the applicant will provide NRC with revised funding instruments for depleted uranium disposition on an annual forward-looking incremental basis. In the event that the applicant does not employ all projected modules as expected, updates required under 10 CFR 40.36 and 10 CFR 70.25 could reflect a corresponding reduction in the anticipated facility decommissioning costs based on the actual number of

modules used. NRC staff will review revisions to the cost estimate and the financial instrument, which are presented in Section 10.2.2 of the SAR (LES, 2005a), before the applicant takes possession of licensed material. NRC staff will also review all subsequent revisions to the cost estimate and financial instruments.

Under 10 CFR 40.14 and 10 CFR 70.17, the Commission may grant exemptions from the requirements of the regulations as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest. NRC staff evaluated the exemption request and determined that such exemption is not prohibited by law. Staff also determined that, because the incremental funding approach proposed by the applicant will provide funding for the all applicant's decommissioning obligations at any point time, the approach will not endanger life or property or the common defense and security. Because the incremental funding approach will reduce the applicant's expenses from having to fund a 30-year decommissioning obligation when, in actuality, the decommissioning obligations prior to the end of the 30-year operating period are less, the staff has determined that the proposed approach will be in the public interest by reducing unnecessary regulatory costs. Therefore, the staff grants the requested exemption as provided in Section 1.2.5 of the SAR. A license condition will be included in the license that will address the applicant's commitments for updating the decommissioning funding plan over time. This license condition is discussed further in Section 10.3.1.10 of this SER.

1.2.3.7 Security of Classified Matter

The purpose of this review is to verify that the applicant provided sufficient information to conclude that there is an adequate Standard Practice Procedures Plan (SPPP) for the protection of classified matter at the proposed facility to be located in Lea County, New Mexico, and a facility clearance can be issued.

1.2.3.7.1 Regulatory Requirements

10 CFR 70.22(m) provides the regulatory requirements for the SPPP that describes the facility's proposed security procedures and controls, as set forth in 10 CFR 95.15(b).

The applicable portion of 10 CFR 70.22(m) identifies that the requirements to protect against unauthorized viewing of classified enrichment equipment and unauthorized disclosure of classified matter are contained in 10 CFR Parts 25 and 95.

1.2.3.7.2 Regulatory Acceptance Criteria

The LES SPPP was reviewed for compliance with the requirements of 10 CFR Parts 25 and 95, by using "Standard Practice Procedures Plan Standard Format and Content for the Protection of Classified Matter for NRC Licensee, Certificate Holder and Others Regulated by the Commission" (NRC, 1999).

1.2.3.7.3 Staff Review and Analysis

The staff reviewed and evaluated information provided by LES in the facility's proposed security procedures and controls to ensure that classified matter is used, processed, stored, reproduced, transmitted, transported, and destroyed in accordance with the requirements of 10 CFR Parts

25 and 95.

NRC staff reviewed the LES SPPP and found it satisfied the requirements of 10 CFR Parts 25 and 95. The applicant has made commitments that meet the requirements of 10 CFR Parts 25 and 95 by providing an acceptable SPPP that establishes controls to ensure that classified matter is used, processed, stored, reproduced, transmitted, transported, and destroyed only under conditions that will provide adequate protection and prevent access by unauthorized persons. By meeting these requirements, the applicant complies with the requirements of 10 CFR 70.22(m). On the basis of these findings, the staff concludes that the SPPP is acceptable for implementation.

1.2.4 EVALUATION FINDINGS

The staff reviewed the institutional information for the proposed LES uranium enrichment facility, according to Section 1.2 of the Standard Review Plan. The applicant has adequately described and documented the corporate identity, structure, and financial information, and is in compliance with those parts of 10 CFR 30.32, 10 CFR 40.31, 10 CFR 70.22, and 10 CFR 70.65 related to institutional information.

The staff reviewed the information provided by the applicant on liability insurance. This information meets the requirements of 10 CFR 140.13b. Because full liability insurance coverage will not be provided until prior to receipt of licensed material, NRC staff is imposing the following license condition:

> "The licensee shall provide proof of full liability insurance as required under 10 CFR 140.13b, at least 30 days prior to the planned date for obtaining licensed material. If the licensee is proposing to provide less than $300 million of liability insurance coverage, the licensee shall provide, to the NRC for review and approval, an evaluation supporting liability insurance coverage in amounts less than $300 million at least 120 days prior to the planned date for obtaining licensed material."

In addition, in accordance with 10 CFR 30.32, 10 CFR 40.31, and 10 CFR 70.22(a)(2) and (4), the applicant has adequately described the types, forms, and quantities and proposed purpose and authorized uses of licensed materials to be permitted at the facility. The applicant provided information on an exemption request related to decommissioning funding that meets the requirements of 10 CFR 40.14 and 10 CFR 70.17. The applicant has also adequately described information related to FOCI and its plans to secure classified matter for a facility clearance under 10 CFR Parts 25 and 95. The staff concludes that the applicant has met the requirements and acceptance criteria applicable to this section.

1.3 SITE DESCRIPTION

The purpose of a site description review is to determine whether the information provided by an applicant adequately describes the geographic, demographic, meteorological, geologic, hydrologic, and seismologic characteristics of the site and the surrounding area. The site

description is a summary of the information that the applicant used in preparing the environmental report, emergency plan, and integrated safety analysis summary.

1.3.1 REGULATORY REQUIREMENTS

The regulations in 10 CFR 30.33, 10 CFR 40.32, 10 CFR 70.22, and 10 CFR 70.65(b)(1) require each application to include a general description of the site, with emphasis on those factors that could affect safety (i.e., nearby facilities, meteorology, and seismology).

1.3.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria applicable to the NRC review of the site description section of the application are contained in Section 1.3.4.3 of NUREG–1520 (NRC, 2002).

1.3.3 STAFF REVIEW AND ANALYSIS

1.3.3.1 Site Geography

1.3.3.1.1 Location

The proposed site is in Southeastern New Mexico in Lea County, approximately 1.6 km (1 mi) west of the New Mexico-Texas border on the north side of New Mexico Highway 234. Andrews County, Texas, lies across the border from the site. The site is about 8 km (5 mi) east of Eunice, New Mexico, and 32 km (20 mi) south of Hobbs, New Mexico. The site is 220 ha (543 acres) in size and is located within County Section 32, Township 21 South, Range 38 East. The site is owned by Lea County.

The proposed site is relatively flat with elevations between 1033 and 1045 m (3,390 to 3,430 ft) above sea level. The site slopes to the southwest, is undeveloped, and is used for domestic livestock grazing.

1.3.3.1.2 Nearby Highways

Information concerning public roads is provided in Section 1.3.2.4 of the SAR (LES, 2005a) and Section 3.2.1.2 of the ISA Summary (LES, 2005b). The New Mexico State Highway 234 passes along the southern boundary of the proposed facility.

Based on review of the information provided on nearby highways, staff concludes that the data used in the analysis are accurate and are from acceptable sources.

1.3.3.1.3 Nearby Gas Pipelines

Information concerning gas pipelines passing through or located near the proposed facility site is provided in Sections 1.3.2.4 of the SAR (LES, 2005a) and 3.2.2.4 of the ISA Summary (LES, 2005b).

Natural Gas Pipeline

The applicant identified an underground natural gas pipeline located along the south property

line running parallel to New Mexico State Highway 234. A parallel gas pipeline is also identified, but is not in use.

Carbon Dioxide Pipeline

An underground carbon dioxide pipeline currently runs across the property. The ISA Summary (LES, 2005b) indicated this pipeline will be relocated along the western and southern boundary of Section 32 so the pipeline will be positioned at least 396.2 m (1300 ft) from the facility restricted area and is approximately 945m (3100 ft) [estimated from Figure 3.2-3 of the ISA Summary (LES, 2005b)] from a Separations Building Module, a safety-significant structure that houses two cascade halls. The applicant concluded that, at this distance from the proposed facility, the pipeline was not a safety concern. Staff agrees with the applicant's assessment that the carbon dioxide pipeline is not a safety concern to the Separations Building Module.

Onsite Natural Gas Pipeline

The proposed facility will include an on-site natural gas pipeline (Harper, 2003a). This pipeline will be used to provide natural gas for heating the boiler in the Central Utility Building (CUB).

Summary

Staff reviewed information provided in the SAR (LES, 2005a) and ISA Summary (LES, 2005b) on nearby highways, natural gas pipelines, and carbon dioxide pipelines and finds the data used to be accurate and from reliable sources.

1.3.3.1.4 Nearby Air Transportation

Information relating to local air transportation is provided in Sections 1.3.2.4 of the SAR (LES, 2005a), and Section 3.2.1.2.4 of the ISA Summary (LES, 2005b). The information included the number of operations and holding patterns of six local airports. These airports include:

- Lea County Regional Airport—40 km (25 statute miles) northwest of the proposed facility site;
- Eunice Airport—24 km (15 statute miles) west of the proposed facility site;
- Lea County/Jal Airport—40 km (25 statute miles) south-southwest of the proposed facility site;
- Andrews County Airport—48 km (30 statute miles) east of the proposed facility;
- Gaines County Airport—48 km (30 statute miles) northeast of the proposed facility; and
- Seminole Spraying Services (private)—48 km (30 statute miles) northeast of the proposed facility.

The information about the number of operations and holding patterns of each airport was obtained from the Federal Aviation Administration (FAA) (Yeung, 2003). Military flights are

operated from the Lea County Regional Airport. The number of military operations is included in the number of operations for the Lea County Regional Airport.

Based on information from the FAA (Yeung, 2003), the applicant concluded the holding patterns for four of the six airports were, in general, more than the 3.2-km (2-statute miles) proximity criterion (third criterion) provided in Section 3.5.1.6 of NUREG–0800 (NRC, 1981) for airway distance from the site of interest. The applicant pointed out no specific holding patterns existed for Eunice or Lea County/Jal Airport (LES, 2004a; LES, 2005a). For the Eunice Airport, the annual operations are small, approximately 480 flights per year. This number is substantially smaller than the threshold limit (225,000 annual operations) provided in NUREG–0800 (NRC, 1981). For the Lea County/Jal Airport, the applicant indicated the airport is more than 32 km (20 mi) away from the proposed facility, and the landing procedure usually will not be initiated until an aircraft is within 32 km (20 mi) of the airport (LES, 2004a; LES, 2005a). Therefore, even if an aircraft is placed in a holding pattern, it will not bring the aircraft near the proposed facility.

The applicant identified a low-level Federal airway passing within 9 km (• 6 statute miles) northeast of the proposed facility. This airway was analyzed in the 'ISA Summary" and shown to pose no hazard to the proposed facility.

Three military training routes were identified in the region. The closest route to the proposed facility was approximately 26 km (16 statute miles) southwest of the site.

Based on the review of aircraft-crash risk assessment, staff concluded that the aircraft transportation information used in the analysis is accurate and was obtained from a reliable source.

1.3.3.2 Demographics

Information about demographics is provided in Section 1.3.2 of the SAR (LES, 2005a).

1.3.3.2.1 Local Population and Land Use

The proposed site is in Lea County, New Mexico, and is about 1.6 km (1 mi) from the New Mexico-Texas border. Andrews County, Texas abuts the border on the Texas side. Together, the counties have a combined population of 68,515, based on the 2000 census. In 1990, the combined population was 70,130. This decrease is counter to the trends within New Mexico and Texas, which had state-wide population increases of 20.1 percent and 22.8 percent, respectively, over that 10-year period. The population decreases in Lea and Andrews Counties are caused by decrease in petroleum industry jobs since the mid-1980s. It is expected that population growth in these two counties in the next 30 years will be at a lower rate than the overall rates in New Mexico and Texas.

Lea County covers 11,378 km^2 (4393 mi^2), which is about three times the size of the State of Rhode Island. Andrews County covers 3,895 km^2 (1504 mi^2).

Major population centers near the proposed site include the following:

Eunice, New Mexico, about 8 km (5 mi) west of the site;
Hobbs, New Mexico, about 32 km (20 mi) north of the site;
Jal, New Mexico, about 37 km (23 mi) south of the site;
Lovington, New Mexico, about 64 km (39 mi) north-northwest of the site;
Andrews, Texas, about 51 km (32 mi) east of the site;
Seminole, Texas (in Gaines County) about 51 km (32 mi) east-northeast of the site; and
Denver City, Texas (in Gaines County) 65 km (40 mi) north-northeast of the site.

Outside of these population centers, population density is very low. The nearest residences are located about 4.3 km (2.6 mi) west of the proposed facility site.

Within 8 km (5 mi) of the site, land is primarily open land used for cattle grazing. Oil and gas potentials are absent within this range, although operations are widespread beyond this area. Nearby industrial activities include a quarry and a "produced-water" reclamation company. Lea County operates a county landfill on the south side of New Mexico Highway 234, and about 1.6 km (1 mi) east of the proposed site, Waste Control Specialists operates a hazardous chemical waste disposal facility and has licenses for the treatment and storage of low-level radioactive and mixed wastes. A natural gas processing plant is located about 6 km (4 mi) from the site.

1.3.3.2.2 Local Public Services

Fire fighting services are provided locally by Eunice Fire and Rescue, which is located 8 km (5 mi) from the proposed site. It is staffed by a full-time fire chief and 34 volunteer firefighters. Equipment includes three pumpers, one tanker, and three grass trucks. Eunice Fire and Rescue also has agreements for mutual assistance with all Lea County fire departments.

Police and law enforcement services are provided by the Eunice Police Department, which has five full-time officers. The Lea County Sheriff's Department also has a substation in Eunice. Agreements between Lea and Andrews Counties provide mutual support when needed. The New Mexico State Police can also provide support.

Educational institutions in Eunice include an elementary school, a middle school, a high school, and a private K-12 school. The nearest other schools are in Hobbs, New Mexico, 32 km (20 mi) north of Eunice. The nearest schools in Andrews County, Texas, are in Andrews, Texas, about 51 km (32 mi) from the proposed site.

There are two hospitals in Lea County – one is located in Hobbs, New Mexico, 32 km (20 mi) north of the proposed site, and the other in Lovington, New Mexico, 64 km (39 mi) north-northwest of the site. The hospital in Hobbs is a 250-bed facility capable of handling acute and stable chronic care patients. The hospital in Lovington is a full-service, 27-bed facility. The Eunice clinic is the nearest medical center to the proposed facility site. The nearest nursing home facilities are in Hobbs, New Mexico.

There are no recreation facilities near the site. The Eunice Golf Course is located approximately 15 km (9.2 mi) west of the site. A historical marker and picnic area are located about 3.2 km (2 mi) west of the proposed site at the intersection of New Mexico Highways 234 and 18.

1.3.3.2.3 Water Use

Southeast New Mexico has a semi-arid climate with an average annual precipitation of 33 to 38 cm (13 to 15 in.). The proposed site has no surface water and/or drainage features. Essentially all precipitation either infiltrates the soil or is evapotranspirated. There are no significant bodies of water or navigable waterways in the vicinity of the proposed site. There is also no agricultural activity in the site vicinity although there are various crops grown in Lea and Andrews Counties. Cattle grazing does occur at the proposed site and in the nearby vicinity. Dairy farming is important in Lea County, although none takes place near the site and/or in Andrews County.

Known sources of water near the site include: a man-made pond at the quarry, adjacent to the proposed site, stocked with fish for private use; Baker Spring, which is an intermittent surface-water feature, located about 1.6 km (1 mi) northeast of the proposed site; and several cattle watering holes, where groundwater is pumped by windmills and stored in above-ground tanks.

1.3.3.2.4 Summary

The staff reviewed the site demographic information presented by the applicant and finds that the applicant has adequately described and summarized general site demographical information related to local population, identification of population centers, schools, commercial facilities, land use, and water use. Population information is provided based on the latest census information.

1.3.3.3 Meteorology

1.3.3.3.1 Tornado Hazard and Tornado-Generated Missiles

Information about the tornadoes and design-basis tornado at the proposed facility is provided in Sections 1.3.3.3 of the SAR (LES, 2005a), and Section 3.2.3.4.1 of the ISA Summary (LES, 2005b).

There is an average of nine tornadoes a year in New Mexico, and the occurrence of tornadoes in the vicinity of the proposed facility is rare. Tornadoes are classified using the Fujita Tornado Damage Scale (F-scale) with classifications ranging from F0-F5 (NOAA, 2005). Eighty-seven tornadoes of low magnitude (F0 to F2) were reported in Lea County, New Mexico, between January 1, 1950, and December 31, 2004. Only one additional tornado was reported as F3 on May 17, 1954. Two tornadoes, one in 1998 and the second in 1999, had a magnitude of F0 and were located near Eunice. All the reported tornadoes were associated with very light damage (NCDC, 2005).

The tornado-generated missiles the applicant considered for the proposed facility included three classes of missiles. These missiles were: (i) a 6.8-kg (15-lb), 10.2- × 30.5-cm (2- × 4-in.) timber plank; (ii) 34-kg (75-lb), 7.6-cm (3-in.)-diameter steel pipe; and (iii) 1361-kg (3000-lb) automobile. The associated vertical and horizontal impact velocities for each missiles also were provided in the ISA Summary (LES, 2005b). According to the applicant (Harper, 2003b), the tornado-generated missiles were determined based on DOE–STD–1020–2002 (DOE, 2002).

Based on the review of the information concerning tornados and tornado-generated missiles, NRC concludes: (i) the information is accurate and is from reliable sources; and (ii) the design-bases tornado-generated missiles are acceptable because they were determined based on an

appropriate DOE standard. The use of a DOE standard is an acceptable approach to NRC staff.

1.3.3.3.2 High Winds and Hurricanes

Information about high winds at the proposed facility is provided in Sections 1.3.3.1 of the SAR (LES, 2005a); Section 3.2.3.4.2 of the ISA Summary (LES, 2005b), and Section 3.6.1.4 of the Environmental Report (ER) (LES, 2005c).

According to the SAR (LES, 2005a), no meteorological data were available for the proposed facility site. Although the measured wind data at Midland–Odessa, Texas, and Roswell, New Mexico, were discussed in the SAR (LES, 2005a) and ER (LES, 2005c), the Midland–Odessa annual extreme wind data were used exclusively to estimate the high-wind hazard at the proposed facility site (LES, 2005b; Harper, 2003b). The annual extreme data used range from 1973 through 1999. The wind speeds were 3-second gust speeds measured at 10 m (32.8 ft) above ground. The Midland–Odessa weather station is located at the regional airport approximately 103 km (64 mi) east-southeast of the proposed site, whereas the Roswell station is approximately 161 km (100 mi) northwest of the proposed site. The climate data for both locations were collected by the National Oceanic and Atmospheric Administration (NOAA) (LES, 2005c).

The largest wind speed for the annual extreme straight-line winds from 1973 through 1999 at Midland–Odessa was 140 km/h (87 mph) and the smallest annual extreme straight-line wind speed was 84 km/h (52 mph) (Harper, 2003b). The mean and standard deviation wind speeds were 111.5 and 16.6 km/h (69.3 and 10.3 mph).

The high-wind hazard assessment was performed by fitting the annual extreme wind data using the Fisher–Tippett Type I distribution model. The applicant chose the speed of a wind with an annual probability of 1.0×10^{-5} for the design-basis straight-line wind speed for the proposed facility. This design-basis straight-line wind speed was 252 km/h (157 mph) (LES, 2005b).

Because the proposed facility is not located near the coastal area [805 km (500 mi) from the coast], hurricanes affecting the coastal area will have no effect on the performance of the proposed facility. Consequently, consideration of hurricane hazards on the design of the proposed facility is not needed.

Based on the review of the information concerning high winds, the staff concludes that high-wind hazards and the associated design-basis straight-line winds have been addressed acceptably because the data used for assessment were from a recognized source and the method used for assessing high-wind hazards is a commonly used and accepted method.

1.3.3.3.3 Temperature Extremes

Information about the temperature at the proposed facility site is provided in Section 3.6.1.2 of the ER (LES, 2005c).

The regional temperatures in Hobbs, New Mexico [32 km (20 mi) north of the proposed facility site]; Midland–Odessa, Texas; and Roswell, New Mexico, are discussed in the ER. The discussions are based on 30-year records (from 1971 through 2000). As indicated previously,

NOAA collected the climate data for Midland–Odessa and Roswell. However, the Western Regional Climate Center collected the climate data for Hobbs (LES, 2005c).

The highest recorded monthly mean maximum temperature was 38.9 °C (102.1 °F), and the lowest recorded monthly mean minimum temperature was • 5.1 °C (22.8 °F) for Hobbs, New Mexico. No such data were presented in the ER for Midland–Odessa or Roswell. The highest daily maximum and lowest daily minimum temperatures were 46.7 °C (116.0 °F) and • 23.9 °C (• 11.0 °F) for Midland–Odessa, and 45.6 °C (114.0 °F) and • 22.8 °C (• 9.0 °F) for Roswell. No such data were presented for Hobbs. As indicated, the highest daily maximum and the lowest daily minimum temperatures for Midland–Odessa and Roswell were similar.

The staff reviewed the temperature information and find the information acceptable because recognized data sources were used and the temperature extremes are properly determined.

1.3.3.3.4 Extreme Precipitation

Section 1.3.3.2 of the SAR (LES, 2005a); and Sections 3.2.3.2 and 3.2.3.4.4 of the ISA Summary (LES, 2005b) discuss the rainfall precipitation at the proposed facility site. The precipitation data for Hobbs, Midland–Odessa, and Roswell were listed in Tables 3.2-14 through 3.2-16 of the ISA Summary (LES, 2005b). These data were collected from the Western Regional Climate Center and NOAA and are based on data from 1971 through 2000 (LES, 2005c). The maximum monthly totals were 35.13 cm (13.83 in.) for Hobbs; 24.6 cm (9.7 in.) for Midland–Odessa; and 17.5 cm (6.88 in.) for Roswell. The minimum monthly totals were zero for all locations. The highest 24-hour precipitation was 15.2 cm (5.99 in.) for Midland–Odessa and 12.5 cm (4.91 in.) for Roswell.

According to the SAR (LES, 2005a), the local intense probable maximum precipitation was estimated from NOAA data (NOAA, 1982). The local intense probable maximum precipitation was approximately 43.9 cm (17.3 in.) in 1 hour, over a 2.6-km^2 (1-mi^2) area.

The staff reviewed the information concerning regional precipitation and local intense probable maximum precipitation presented in the SAR (LES, 2005a) and the ISA Summary (LES, 2005b) and find the information acceptable because recognized data sources, such as NOAA, were used.

1.3.3.3.5 Snow

Section 1.3.3.2 of the SAR (LES, 2005a), and Section 3.2.3.3 of the ISA Summary (LES, 2005b) discuss the regional snowfall. NOAA collected the snowfall data. The maximum monthly snowfall/ice pellets were 24.9 cm (9.8 in.) for Midland–Odessa and 53.3 cm (21.0 in.) for Roswell. The maximum snowfall/ice pellets during a 24-hour period were 12.47 cm (4.91 in.) for Midland–Odessa and 41.91 cm (16.5 in.) for Roswell. No snowfall information was available for Hobbs, New Mexico.

The staff reviewed the information concerning snow precipitation presented in the SAR (LES, 2005a) and the ISA Summary (LES, 2005b) and find the information acceptable because recognized data sources, such as NOAA, were used.

1.3.3.3.6 Lightning and Thunderstorms

Section 1.3.3.3 of the SAR (LES, 2005a), and Section 3.2.3.4.5 of the ISA Summary (LES, 2005b) describe the potential of thunderstorms and lightning strikes at the proposed facility site. The applicant indicated thunderstorms occur every month and are most common in spring and summer at the proposed facility site.

The applicant estimated the lightning strike frequency at the proposed facility site to be 1.36 flashes per year. The applicant also stated in the ISA Summary (LES, 2005b) that the proposed facility will be designed for lightning protection.

The staff reviewed the information about lightning and find the lightning strike frequency determined for the site is acceptable and appropriate. Staff further concludes the design approach proposed by the applicant to protect the proposed facility from lightning effects is acceptable.

1.3.3.3.7 Sandstorms

Section 1.3.3.3 of the SAR (LES, 2005a) describes the potential of sandstorms at the proposed facility site.

According to the SAR (LES, 2005a), blowing sand and dust may occur occasionally. Large dust storms with the potential of covering a large region are rare. Staff reviewed the information about sandstorms presented in the SAR (LES, 2005a) and find the information sufficient and acceptable.

1.3.3.4 Geology

1.3.3.4.1 Seismic Hazard

Seismic hazards are discussed in Section 1.3.5 of the SAR (LES, 2005a); and Sections 3.2.5 and 3.2.6 of the ISA Summary (LES, 2005b).

The following areas concerning the seismic hazard applicable to the safety analysis and design of the proposed facility were reviewed:

- Seismic source characterization;
- Ground motion attenuation;
- Seismic hazard calculation;
- Development of site-specific spectra; and
- Surface faulting.

1.3.3.4.1.1 Seismic Source Characterization

Geological and Tectonic Settings

Section 1.3.5 of the SAR (LES, 2005a) and Section 3.2.5 of the ISA Summary (LES, 2005b) provide a description of the regional and local geological and tectonic settings. The proposed facility site is located within the Central Basin Platform area. The Central Basin Platform Area is situated between the Midland and Delaware Basins, all of which are part of the Permian Basin, a 250-million-year-old structure. The Permian Basin is a downward flexure of a large thickness of originally flat-lying bedded, sedimentary rock. The base of the Permian Basin sediments extends to approximately 1525 m (5000 ft) beneath the proposed facility site. The top of the Permian section is approximately 434 m (1425 ft) below ground surface. These sediments are overlain by sedimentary strata of the Triassic Age Dockum Group. The upper formation of the Dockum Group is the Chinle Formation, locally overlain by either the Tertiary Ogallala, Gatuña, or Antlers Formations, or Quaternary alluvium. At the proposed facility site, geotechnical borings identified up to 0.6 m (2 ft) of loose eolian sand underlain by dense to very dense, fine- to medium-grained sand and silty sand of the Gatuña Formation. The sands of the Gatuña Formation are locally cemented with caliche. Beneath the Gatuña Formation, the Chinle claystone, a hard and highly plastic clay, was encountered in geotechnical borings at depths from 10.7 to 12.2 m (35 to 40 ft).

As noted in the ISA Summary (LES, 2005b), the Southeast New Mexico–West Texas area is presently structurally stable. The Laramide Orogeny (late Cretaceous to Early Tertiary time) uplifted the region to its present elevation, and there has been no substantial tectonic activity since this early Tertiary deformation. The Permian Basin has subsided slightly since the Laramide Orogeny. However, this subsidence is believed to be a result of dissolution of the Permian evaporite layers by groundwater or possibly compaction from oil and gas extraction. As stated in the ISA Summary (LES, 2005b), no active faults have been identified at the site. Faulting consists of geologically older subsurface faults in the Permian Basin subregion related to the development of the Permian Basin and the Laramide Orogeny. The nearest evidence of Quaternary faulting is 161 km (100 mi) west of the site, in the Basin and Range tectonic province.

Historical Seismicity

Section 1.3.5.2 of the SAR (LES, 2005a) and Section 3.2.6.1 of the ISA Summary (LES, 2005b) summarizes the historical seismicity at the proposed facility site. As stated in the ISA Summary (LES, 2005b), the assessment of historical seismicity included earthquakes in the region of interest known from felt or damage records and from more recent instrumental records (since the early 1960s). The largest earthquake known to occur within 322 km (200 mi) of the site was the August 16, 1931, earthquake near Valentine, Texas. This earthquake had an estimated M_L (Local Magnitude) of 6.0 to 6.4 and produced a maximum epicentral intensity of VIII on the Modified Mercalli intensity scale. This earthquake occurred approximately 237 km (147 mi) from the proposed site location. Within 80 km (50 mi) of the site, the largest historical earthquake was a M_L 5.0 event in 1992, approximately 16 km (10 mi) southwest of the site. Other significant events between 322 km (200 mi) and 80 km (50 mi) of the proposed facility site ranged in M_L from 4.0 to 5.7.

Earthquakes in the region of the proposed facility site include isolated and small clusters of low-to-moderate-magnitude events toward the Rio Grande Valley of New Mexico and in Texas, southeast of the proposed site. According to the ISA Summary (LES, 2005b), no earthquakes in the site region are known to be correlated to specific faults. An earthquake catalog based on

the historic seismicity in the region [322-km (200-mi) radius] was presented in the ISA Summary (LES, 2005b). This catalog was composed of data from: the Advanced National Seismic System (NCEDC, 2004); University of Texas Institute for Geophysics (UTIG, 2002); New Mexico Tech Historical Catalog (NMIMT, 2003); and New Mexico Tech Regional catalogs. The catalog identified a substantial cluster of seismic activity that has occurred on and near the Central Basin Platform since the mid-1960s. It was suggested by DOE (DOE, 2003) and noted in the ISA Summary (LES, 2005b) that Central Basin Platform earthquakes are not tectonic in origin but instead are related to water injection and withdrawal resulting from secondary recovery operations in oil fields in the Central Basin Platform area. The ISA Summary (LES, 2005b) noted, however, the January 2, 1992, event was attributed to a tectonic origin because of its determined focal depth of approximately 12 km (7 mi) and is not correlated with oil or gas drilling. At the proposed facility site, postulated earthquakes that could impact safe operation of the proposed facility are associated with zones of crustal weakness in the Central Basin Platform and the Basin and Range tectonic province.

The staff concludes that information concerning seismic source characterization presented in Section 1.3.5 of the SAR (LES, 2005a) and the ISA Summary (LES, 2005b) is acceptable. The information provides a complete summary of seismicity and potential fault and tectonic sources and thereby demonstrates compliance with regulatory requirements in 10 CFR 30.33, 10 CFR 40.32, 10 CFR 70.22, and 10 CFR 70.65(b)(1).

1.3.3.4.1.2 Ground Motion Attenuation

Details of ground motion attenuation functions used to compute the hazard are described in Section 3.2.6.4.1 of the ISA Summary (LES, 2005b). Several attenuation models were used in the ISA Summary. The Nuttli attenuation model developed by the U.S. Department of the Army, Waterways Experiment Station (USDA, 1973) was primarily selected because it was used in the DOE (DOE, 2003) seismic hazard assessment. The Toro, et al. (Toro, 1997) attenuation model also was used in the hazard calculations for comparison.

The attenuation models used in the ISA Summary were applicable to locations within the Central U.S.. The proposed facility site is located at 103° west longitude, slightly east of the 105° west longitude cutoff for Central and Eastern U.S. sites, as specified in Regulatory Guide 1.165 (NRC, 1997). In addition, Frankel, et al. (Frankel, 1996) specified attenuation zones for the U.S. in its hazard mapping project. The U.S. Geological Survey (USGS) boundary separating the Western U.S. and the Central and Eastern U.S. attenuation zones also is located at approximately 105° west longitude and slightly to the west of the proposed facility site. The proposed facility site is thus situated within the area in which both the Central and Eastern U.S. attenuation models are applicable.

1.3.3.4.1.3 Surface Faulting

There is no geologic, geophysical, or seismological evidence of active surface faulting in the vicinity of the proposed facility site. As stated in the ISA Summary (LES, 2005b), the nearest

recent faulting is located more than 161 km (100 mi) west of the site. Therefore, surface faulting was not considered a credible disruptive event for the proposed facility.

Recently, a fault was discovered at the nearby Waste Control Specialists (WCS) site. However,

subsequent fault investigations revealed that the faulting is inactive because no faults exist in formations younger than Triassic age (205 to 240 million years old) (LES, 2004a).

1.3.3.4.2 Slope Stability

Section 1.3.1.2 of the SAR (LES, 2005a), and Section 3.2.1.1 of the ISA Summary (LES, 2005b) describe the topography at the proposed facility site. The SAR (LES, 2005a) and ISA Summary (LES, 2005b) indicated the site topography is relatively flat, with a gradual elevation increase from southwest to northeast. The staff site visit on May 27–28, 2004 (NRC, 2004), confirmed the area at the proposed facility is relatively flat. Consequently, slope stability is not a safety concern for this proposed facility.

1.3.3.4.3 Liquefaction

Liquefaction potential of soils beneath the proposed facility is discussed in Section 3.2.7.1 of the ISA Summary (LES, 2005b). According to the ISA Summary (LES, 2005b), except for a top layer of loose sand [up to 0.6m (2ft)], the soils at the proposed facility site are dense to very dense and the groundwater level is at least 30 m (98 ft) below ground surface. In Section 3.3.2.1 of the ER, the applicant (LES, 2005c) indicates the groundwater table at the site is 65 to 68 m (214 to 222 ft) below ground surface. Consequently, the applicant concluded the potential for liquefaction was remote (LES, 2005b, c).

Geotechnical investigation indicated the soil beneath the proposed facility site is a layer of loose eolian sand underlain by the Gatuña Formation (dense to very dense sand and silty sand). Below the Gatuña Formation is the Chinle claystone, a very hard, highly plastic clay. The Chinle claystone was encountered at depths approximately 10.7 to 12.2 m (35 to 40 ft). For the top 7.6 m (25 ft) of soils, the blow-count values ranged from 20 to 76. Beneath the 7.6-m (25-ft) horizon, typical blow-count values were more than 60, with even larger blow-count values for the Chinle claystone.

The staff reviewed the geotechnical investigation information presented in the ISA Summary (LES, 2005b, c) and concurs with the applicant that the potential for liquefaction of soils at the site may not be a safety concern for the proposed facility. The applicant committed in Section 3.3.9 of the SAR (LES, 2005a) to perform additional geotechnical investigations at the site to confirm that liquefaction is not a safety concern for the proposed facility. Additional site testing will be evaluated in accordance with NRC Regulatory Guide 1.198, "Procedures and Criteria for Assessing Seismic Soil Liquefaction at Nuclear Power Plant Sites" (NRC, 2003).

1.3.3.4.4 Settlement

Settlement of foundations for the proposed facility is discussed in Section 3.2.7 of the ISA Summary (LES, 2005b). In its ISA Summary, the applicant stated that only five borings were drilled at the proposed facility site to determine the suitability of the site. The applicant recognized the geotechnical results obtained from the five borings were not sufficient for final design purposes. The applicant committed in Section 3.3.9 of the SAR (LES, 2005a) that the settlement and differential settlement for the design of the proposed facility will be determined based on the information that will be obtained from the additional geotechnical investigations. Allowable soil bearing pressures will be evaluated in accordance with Naval Facilities Engineering Command Design Manual NAVFAC DM-7.02, "Foundations and Earth Structures"

(NAVFAC, 1996). Building settlement analyses will be performed in accordance with Naval Facilities Engineering Command Design Manual NAVFAC DM-7.01, "Soil Mechanics" (NAVFAC, 1986) and Winterkorn and Fang, "Foundation Engineering Handbook" (Winterkorn, 1975).

The staff reviewed the information presented concerning differential settlements and find the applicant's commitment to perform additional geotechnical investigations using acceptable geotechnical standards for final facility design to be acceptable.

1.3.3.5 Hydrology

Site surface water and groundwater hydrology is discussed in Sections 1.3.4 of the SAR (LES, 2005a) and 3.2.4 of the ISA Summary (LES, 2005b). The applicant obtained hydrological data principally from previous investigations conducted by WCS, which is located 1.6 km (1 mi) east of the proposed site. WCS operates a hazardous chemical treatment and disposal facility. The applicant performed a limited number of geotechnical studies that demonstrate that the WCS data are applicable to the proposed site.

The proposed site contains no surface water and/or surface water drainage features, with essentially all precipitation subject to either infiltration or evapotranspiration.

The applicant performed subsurface studies of the alluvial material that overlies the Chinle red bed clays. These alluvial deposits are 9 to 18 m (30 to 60 ft) thick. The Chinle formation consists of a low-permeability clay unit having a thickness of 323 to 333 m (1060 to 1092 ft) and is the upper formation within the Triassic Age Dockum Group. No perched water systems in the alluvial deposits were found, although one well produced water samples, because of a limited groundwater occurrence.

The low permeability Chinle formation essentially isolates the deep and shallow groundwater systems. Within the Chinle formation are two distinct groundwater systems, with no interconnections. The first is a siltstone or silty sandstone unit with some saturation at 65 to 68 m (214 to 222 ft) below the surface. This unit is a low-permeability formation that does not yield groundwater easily. The second unit is a saturated siltstone layer approximately 30.5 m (100 ft) thick, at an elevation of 183 m (600 ft) below the surface. The Santa Rosa formation lies below the Chinle Unit, but within the Dockum Group, at 340 m (1115 ft) below the surface. The Santa Rosa unit is the first occurrence of a well-defined aquifer system. However, this system is considered non-potable because of high concentrations of dissolved solids.

At the quarry site, north of the proposed site, there are shallow groundwater occurrences. These shallow perched systems, however, are intermittent and limited and caused by a layer caliche or caprock at the surface that in places is fractured and can lead to rapid infiltration of precipitation forming the perched water system. Caprock, however, is not present at the proposed site, and, therefore, it is not expected that significant perched water systems would be produced.

Baker Spring is located about 1.6 km (1 mi) northeast of the proposed site. However, this spring is intermittent and flows only after precipitation events.

Several localized shallow perched groundwater systems exist to the east of the proposed site

and are used to supply water pumped by windmills to tanks for grazing livestock. These perched systems are located above the Chinle clays, but the volume of water produced is limited.

Because of the lack of sufficient surface and groundwater supplies, the applicant will not make withdrawals of groundwater at the site. Instead, the applicant is proposing to obtain water for plant use using Eunice and Hobbs municipal supplies. These water supplies are obtained from well fields near Hobbs, New Mexico. The applicant is also not proposing to inject water into groundwater systems at the site.

Since there are no surface water bodies in the immediate vicinity of the site, flooding is not a design objective. The only potential flooding at the plant would occur from intense local precipitation events. Flood protection is provided by establishing building floor levels above the calculated depth of ponded water caused by intense precipitation events (see Sections 1.3.3.3.4 and 1.3.3.3.5 of this SER).

The staff reviewed the applicant's hydrological data and finds that it provides sufficient information to assess site flooding hazards and ground- and surface water impacts, and is consistent with information in the ISA Summary.

1.3.4 EVALUATION FINDINGS

The staff has reviewed the site description for the proposed LES uranium enrichment facility according to Section 1.3 of the Standard Review Plan. The applicant has adequately described and summarized general information pertaining to: (1) the site geography, including its location relative to prominent natural and man-made features such as mountains, rivers, airports, population centers, schools, and commercial and manufacturing facilities; (2) population information on the basis of the most current available census data to show population distribution as a function of distance from the facility; (3) meteorology, hydrology, and geology for the site; and (4) applicable design basis events. The reviewer verified that the site description is consistent with the information used as a basis for the ER, emergency management plan, and ISA Summary; and that it demonstrates compliance with regulatory requirements in 10 CFR 30.33, 10 CFR 40.32, 10 CFR 70.22, and 10 CFR 70.65(b)(1).

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