February 24, 2006

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
LOUISIANA ENERGY SERVICES, L.P.	)	Docket No. 70-3103
	)	
(National Enrichment Facility)	)	ASLBP No. 04-826-01-ML

NRC STAFF PRE-FILED MANDATORY HEARING TESTIMONY
CONCERNING THE USE OF NUREG-1520 IN THE REVIEW OF THE LICENSE
APPLICATION FOR THE PROPOSED NATIONAL ENRICHMENT FACILITY

Q.1. Please state your name, occupation, and by whom you are employed.

A.1. (TJ) My name is Timothy Johnson. I am the U.S. Nuclear Regulatory Commission (NRC) Project Manager overseeing the licensing of the proposed Louisiana Energy Services, L.P. (LES) uranium enrichment facility near Eunice, New Mexico. I have been the PM for the project since its inception in January of 2002, when LES initiated discussions with NRC for the project.

A.1. (WT) My name is William Troskoski. I am a Senior Technical Reviewer in the Nuclear Regulatory Commission's (NRC's), Office of Nuclear Material Safety and Safeguards (NMSS), Division of Fuel Cycle Safety and Safeguards (FCSS).

Q.2. Please describe your responsibilities with regard to the NRC Staff's (Staff) preparation of the Safety Evaluation Report (SER) for the National Enrichment Facility (NEF) in Lea County, New Mexico.

A.2. (TJ) As Project Manager, my current job responsibilities include coordinating the review of the application for construction and operation of the proposed uranium enrichment facility submitted by LES and the preparation of NUREG-1827, "Safety Evaluation Report, for the National Enrichment Facility in Lea County, New Mexico", June 2005, (SER) that

documents the safety review prepared by NRC Staff.

A.2. (WT) I was the primary reviewer of the applicant's Integrated Safety Analysis (ISA) and ISA Summary. My analysis of the applicant's ISA and ISA Summary is documented in Chapter 3.0 of the SER.

Q.3. What is the purpose of your testimony today?

A.3. (TJ, WT) To provide background on the proposed NEF and to explain the guidance documents used in the process of reviewing the application for the NEF.

Q.4. Please provide a brief explanation of how the proposed gas centrifuge uranium enrichment facility is expected to operate and of the expected hazards at the proposed facility.

A.4. (TJ) The proposed National Enrichment Facility to be built in Lea County, New Mexico, will use a gas centrifuge process based on technology developed by URENCO and used in European plants for over 30 years. The gas centrifuge process is basically a mechanical process that separates the various uranium isotopes based on slight differences in their mass. The process will use natural uranium in the form of uranium hexafluoride (UF_6) as feed composed of 0.711 percent of the U^{235} isotope. The product will be UF_6 enriched to about five percent U^{235}.

The UF_6 will be shipped to the facility in ANSI N14.1 qualified cylinders that meet Department of Transportation requirements. The cylinders will be about 60 percent full by volume with solid UF_6 and be under subatmospheric pressure (about 7-8 psia). The external radiological dose rates are minimal, and the chemical toxicological effects constitute the predominate internal hazard at the level of uranium enrichment proposed for the facility. *See* NUREG-1827, "Safety Evaluation Report for the National Enrichment Facility in Lea County, NM," at 1-1 to 1-3 (2005), Staff Exhibit 49-M. *See also* Louisiana Energy Services National Enrichment Facility Safety Evaluation Report Summary, at 1-2 (Sept. 16, 2005), Staff Exhibit 50-M. However, it is the physical properties of UF_6 that are of primary importance

for the safe handling of this hazardous material.

Q.5. What guidance documents did the Staff use when evaluating LES's license application and completing the SER for the NEF?

A.5. (TJ) The Staff primarily used NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility" (SRP), attached as Staff Exhibit 51-M. In addition, for its review of the safeguards section of the license application, the Staff used "Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities," NUREG-1065 and, for the physical protection review, the Staff used Regulatory Guide 5.59, "Standard Format and Content for a Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate to Low Strategic Significance."

Q.6. Please provide a brief explanation of the purpose and use of the SRP.

A.6. (TJ) The SRP provides generic guidance for reviewing and evaluating the health, safety, and environmental protection aspects of applications for licenses to possess and use special nuclear material in nuclear fuel cycle facilities. The principal purpose of the SRP is to ensure the quality and uniformity of reviews conducted by the Staff. Because the SRP describes the scope, level of detail, and acceptance criteria for reviews, it also serves as regulatory guidance for applicants who need to determine what information to present in a license application. Because the SRP is a guidance document, the information presented in the SRP does not preclude licensees or applicants from suggesting alternative approaches to those specified in the SRP to demonstrate compliance with applicable regulations. Should a licensee or applicant suggest alternative approaches, the Staff retains the responsibility to make an independent determination concerning the adequacy of the applicant's proposed approaches. Staff Exhibit 51-M at xix-xv (*sic*). The SRP was developed after extensive communication with fuel cycle licensees to ensure that all necessary safety and environmental issues were

addressed.

Q.7. Does the SRP apply to different types of fuel facilities?

A.7. (TJ) Yes. The SRP was developed as a generic document for licensing fuel cycle facilities under 10 C.F.R. Part 70, including fuel fabrication facilities and uranium enrichment facilities like the NEF or the proposed USEC, Inc. centrifuge enrichment facility. *Id.* While it is true that there are differences among these types of plants, hazards that will exist at the proposed NEF are similar to the types of hazards at other fuel cycle facilities for which NUREG-1520 was prepared. These hazards include handling of uranium hexafluoride cylinders, processing of uranium hexafluoride as a gas and sometimes as a liquid, use of autoclaves for feeding and sampling uranium, nuclear criticality, equipment decontamination operations, and laboratory activities.

Q.8. How does the Staff adapt the generic SRP to review applications for different types of 10 CFR Part 70 facilities?

A.8. (TJ) The relative risk of the facility necessarily informs the Staff's review. Staff review of each type of license application (e.g., enrichment facility, fuel fabrication facility, or mixed-oxide [MOX] fuel fabrication facility) would focus on the specific types of hazards associated with the particular technology. The goal of the reviews is to determine whether an adequate level of safety is provided to protect the health and safety of the public and the environment. Specific regulatory requirements for each type of license are found in the applicable sections of the NRC's regulations. The Staff recognizes that the types and magnitudes of potential hazards varies greatly between the various types of licensees and even within each type. Based on the processes performed at each type of facility, the proposed LES facility has the lowest level of potential hazards, fuel fabrication facilities have the next level of hazard, and the MOX fuel fabrication facility has the highest level of hazard of all 10 C.F.R. Part 70 fuel cycle facilities.

For fuel cycle facilities, excluding a spent fuel reprocessing plant or a MOX facility that processes plutonium, the main hazard associated with a loss of material confinement is chemical. For those facilities that process low enriched uranium (i.e., gas centrifuge facilities and fuel fabrication facilities) the chemical hazards include soluble uranium compounds, which present a heavy metal toxicity concern, and hydrogen fluoride (HF), which is a reaction chemical product from UF_6 and water (moisture from the air). Qualitatively, the chemical risks posed by these facilities are far below those found at a typical chemical plant. The external radiological dose rates are minimal, and the chemical toxicological effects constitute the predominate internal hazard until about 18 percent U^{235} enrichment, at which point internal radiation dose becomes the primary internal hazard. Fuel fabrication facilities possessing enriched uranium with enrichments greater than 20 percent (category I facilities) require consideration of both chemical and radiological hazards.

As a consequence of the above, the safety evaluations for each type of facility will vary as each is tailored to the relative risks involved. The degree of rigor involved in reviewing a MOX facility would be much more intense than a gas centrifuge uranium enrichment due to the many chemical processes required for MOX purification, the possibility of inadvertent vigorous chemical reactions, and the unique hazards of handling weapons grade plutonium.

Thus, while the guidance in the SRP is applicable to a gas centrifuge uranium enrichment facility, with a few exceptions as discussed below, the Staff’s review is informed by the fact that the overall risk of this type of facility is lower than that of other types of fuel facilities licensed by the NRC.

Q.9. Please compare the safety risks associated with operation of a gas centrifuge uranium enrichment to the safety risks associated with operation of other types of Part 70 fuel cycle facilities (such as fuel fabrication facilities).

A.9. (TJ) The LES facility differs from the fuel fabrication facilities primarily in that uranium is to be enriched at the LES facility through an entirely mechanical process. There will be no licensed material other than natural uranium or uranium enriched up to five percent U^{235} present at the LES facility except sealed sources used for instrument calibration. Licensed materials at a gas centrifuge facility are mostly contained in uranium hexafluoride cylinders or in the centrifuge cascades, and open sources of uranium would be present only in the laboratories and in decontamination facilities. At a gas centrifuge facility, the only significant chemical hazard is from uranium hexafluoride. In contrast, fuel fabrication facilities use other hazardous chemicals in their processes that may present exposure hazards to workers and the public. Opportunities for criticality accidents are more limited at gas centrifuge facilities than at other fuel fabrication facilities with scrap recovery operations and where some facilities are licensed to process high enriched uranium because of the limited quantities of uranium (limited to 5 percent U^{235}) present at gas centrifuge facilities.

The gas centrifuge cascades contain only limited quantities of uranium hexafluoride in a gaseous form and operate at near-vacuum conditions. There is no intention to perform maintenance on the centrifuges at the LES facility. Gas centrifuges operate until they fail (centrifuges are expected operate continuously for periods exceeding 15 years) and only in rare cases would failed centrifuges be removed from the cascade. Thus, the only routine maintenance proposed for the LES facility will be on equipment that is to be located outside the cascade halls. Because the LES plant operates with limited quantities of uranium in the process systems and the assays will be limited to 5 percent U-235, there will also be a limited nuclear criticality hazard at the facility. The LES cascade operations strategy, therefore, presents limited hazards to workers and the public.

Q.10. Please compare the safety risks associated with operation of a gas centrifuge uranium enrichment facility to the safety risks associated with the MOX fuel fabrication facility.

A.10. (WT) The MOX Fuel Fabrication Facility (MFFF) to be built on the Department of Energy's Savannah River Site is expected to convert 34 metric tons of surplus weapons grade plutonium into MOX fuel for commercial reactors. This material will come from various forms within the weapons complex. The basic process will involve purification of the plutonium to remove Americium-241, Gallium, and high-enriched uranium, among other possible constituents, through use of a modified PUREX process. The PUREX process (plutonium uranium recovery extraction) is a proven liquid-liquid solvent extraction process that can produce a product stream of highly purified plutonium by controlling the solubility of plutonium through shifts in its valence number brought about by various chemical reactions.

The actual chemistry of plutonium is complex and involves the use of hazardous chemicals. In addition, undesired chemical intermediates and possible autocatalytic chemical reactions provide additional hazards that must be carefully controlled. Since this is an aqueous process (with plutonium alternating between various aqueous and organic phases), the criticality safety hazards are more challenging then in any other part of the fuel cycle. Fire hazards must also be carefully considered due to the nature of the solvents and their degradation products (from hydrolysis and radiolysis) and combustible gas generation.

After decontamination, the plutonium dioxide is blended with depleted uranium, pelletized and sintered. The ceramic pellets are then placed in fuel rods and the final fuel assembly is fabricated in a manner very similar to normal reactor fuel.

Also, due to the unique hazards and characteristics of plutonium, radiation protection to prevent the spread of plutonium contamination must be implemented in a rigorous manner.

The gas centrifuge uranium enrichment plant has no high-enriched uranium or plutonium solution chemistry. The only liquids used to support the process that can come in

contact with special nuclear material are those used for decontamination and maintenance activities. The possession of uranium limited to 5 percent enrichment greatly simplifies criticality safety concerns to the same level as or below those encountered in the low-enriched uranium fuel fabrication plants. The centrifuge enrichment process involves no chemistry, solvents, combustible gas generation, calcination or sintering process steps. The lack of plutonium, highly enriched uranium, or fission products greatly simplifies radiation protection (on the same level as a low-enriched uranium fuel fabrication plant, but with much less contamination based on the operating history of the European plants).

Q.11. How does the NRC compare the nuclear criticality safety risk of the NEF with other 10 CFR Part 70 fuel cycle facilities?

A.11. (WT) The NCS risk of the NEF is amongst the lowest. At the relatively lowest level of NCS risk is the USEC, Inc. Lead Cascade gas centrifuge enrichment facility because there is not enough material for an inadvertent criticality to occur. At the next level of NCS risk are the Framatome-Lynchburg low-enriched uranium fuel fabrication facility and the proposed NEF gas centrifuge enrichment facility. The Framatome-Lynchburg low-enriched uranium fuel fabrication facility is at this level of NCS risk because it is a simple mechanical process of putting pellets into rods and then creating fuel assemblies at an enrichment level of five percent U^{235}. The proposed NEF enrichment facility is at this level of NCS risk because it is a relatively simple process of putting feed material in at one end and getting production material out at the other end at an enrichment level of five percent U^{235}. At the next level of NCS risk are the rest of the low-enriched uranium fuel fabrication facilities and the proposed USEC, Inc. production gas centrifuge enrichment facility. The rest of the low-enriched uranium fuel fabrication facilities are at this level of NCS risk because they contain different forms of uranium and have chemical processes at an enrichment level of five percent U^{235}. The proposed USEC, Inc. enrichment facility is at this level of NCS risk because it is proposed to operate at an enrichment level of

10 percent U^{235}. At the highest level of NCS risk are the proposed MOX fuel fabrication facility and the high-enriched uranium fuel fabrication facilities. The proposed MOX fuel fabrication facility is at this level of NCS risk because it uses plutonium, has different forms of uranium, and has chemical processes. The high-enriched uranium fuel cycle facilities are at this level of NCS risk because they use up to approximately one hundred percent U^{235} in different uranium forms and have solution processes.

Q.12. Question 1, asked by the Board in its January 30, 2006 Order states the following:

> The Board understands that the staff followed the procedures in NUREG-1520 (Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility) (SRP). The SRP is generic for Fuel Cycle Facilities, and is not directed at Enrichment Facilities. Therefore, the staff is requested to provide the Board with a written presentation describing, subsection by subsection, how the generic SRP was adapted to apply to the LES enrichment facility application. Where a subsection was directly applicable, the testimony should so indicate (i.e., with regard to subsection 3.5.2.2 - this guidance is directly applicable) and where a subsection is not directly applicable, the testimony should indicate how the guidance of the particular subsection was adapted to the National Enrichment Facility (NEF) application, and the rationale for that adaptation mechanism. For expedience, the presentation may make a general statement regarding subsections that were directly applicable, and discuss explicitly only those subsections that were not directly applicable.

Did the Staff make adaptations to the SRP in order to apply it to the LES facility?

A.12. (TJ) No. As discussed below, some sections of the SRP are not applicable to the LES facility. However, the Staff found that no modifications to the SRP were necessary for the applicable sections. This is in contrast to the review of the application for the MOX fuel fabrication facility. Due to the nature of the material present at the MOX fuel fabrication facility and the inherent risks associated with the facility, as discussed above, the Staff determined that detailed, specific guidance was needed to evaluate an application for a facility representing a much greater level of risk to the health and safety of the public than other 10 C.F.R. Part 70

facilities. Therefore, NUREG-1520 was specifically adapted for the review of the MOX fuel fabrication facility application, and the Staff developed a new Standard Review Plan specifically for the MOX facility, NUREG-1718, "Standard Review Plan for the Review of an Application for a Mixed Oxide (MOX) Fuel Fabrication Facility."

Q.13. Are all chapters of the SRP applicable to the LES facility? If not, please describe why.

A.13. (TJ) Yes. However, in some chapters of the SRP, some sections were not applicable or were modified by the license applicant. *See* Staff Exhibit 50-M ("Deviations from NRC Guidance"). These sections are set forth below:

Chapter 1

Chapter 1 is applicable to the LES facility in its entirety.

Chapter 2

Section 2.3, Areas of Review, includes areas of review for both new facility applications and applications for modifications of existing facilities. Because the NEF is a new facility, the areas of review for existing facilities are inapplicable. Similarly, Section 2.4.3, Regulatory Acceptance Criteria, lists acceptance criteria for both new facilities and existing facilities. Only the Acceptance Criteria for new facilities are applicable to the NEF application. However, LES did opt to address items for an existing facility. The remainder of Chapter 2 is applicable to the LES facility.

Chapter 3

Chapter 3 is applicable to the LES facility. However, in Section 3.4 of Chapter 3 the reviews focused on program and design commitments because final, detailed, as-procured facility designs have not been completed. As required under 10 C.F.R. § 70.32(k), the NRC will inspect the facility prior to the commencement of operations to verify that the facility has been

constructed in accordance with the requirements of the licensee.

In addition, Appendix A to Chapter 3 is applicable to the LES application, although for criticality safe-by-design components LES applied a modified method of accident sequence evaluation. The regulations in 10 CFR 70.61 require that applicants perform an integrated safety analysis that demonstrates compliance with the performance requirements for low-, intermediate-, and high-consequence events. Appendix A, "Accident Analysis," in NUREG-1520 provides guidance on a method for preparing the integrated safety analysis and for addressing the risks of low-, intermediate-, and high-consequence accidents.

In 10 C.F.R. § 70.61(d), the risk of nuclear criticality accidents must be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical, including use of an approved margin of subcriticality for safety. Preventive controls must be the primary means of protection against nuclear criticality accidents. To prevent nuclear criticality accidents, LES designed several components to be "safe-by-design" such that subcriticality will always be maintained and the failures of these components, causing a nuclear criticality reaction, would be highly unlikely.

The Staff evaluated the applicant's approach to ensuring that safe-by-design equipment provided an adequate safety margin in Section 3.3.3.2.2.2 of the SER. Staff Exhibit 49-M at 3-44 to 3-49; Staff Exhibit 50-M ("Deviations from NRC Guidance"). In Section 3.1.3.2 of the applicant's SAR, the applicant described a safe-by-design ISA method for selected equipment for NCS used to identify safe-by-design components, the failure of which would be highly unlikely. The applicant described the connection between subcriticality and the safe-by-design ISA process for NCS. Using the safe-by-design ISA process, there are no accident sequences and, hence, items relied on for safety (IROFS) are not identified because it is highly unlikely these components would fail. Those safe-by-design components are considered items which may affect IROFS.

A qualitative determination of highly unlikely can apply to passive design component features of the facility that do not rely on human interface to perform the NCS function. Safe-by-design components are those components that by their physical size or arrangement have been shown to have an effective neutron multiplication factor (k_{eff}) less than 0.95. The definition of safe-by-design components encompasses two different categories of components. The first category includes those components that are safe-by-volume, safe-by-diameter, or safe-by-slab thickness (i.e., favorable geometry components). A set of generic, conservative NCS calculations has determined the maximum volume, diameter, or slab thickness that would result in a $k_{eff} < 0.95$ (see SAR Table 5.5-1). A favorable geometry component has a volume, diameter, or slab thickness that is less than the associated value for $k_{eff} < 0.95$. The components in the second category (i.e., non-favorable geometry components) require a more detailed NCS analysis to demonstrate $k_{eff} < 0.95$. For the non-favorable geometry components, the design configuration is not bounded by the results of the generic, conservative NCS calculations for maximum volume, diameter, or slab thickness that would result in a $k_{eff} < 0.95$.

For failures of these passive safe-by-design components (i.e., both favorable geometry components and non-favorable geometry components) to be considered highly unlikely, those components must also meet the criterion that the only potential means to effect a change that might result in a failure to function would be to implement a design change (i.e., no potential failure mode exists). The evaluation of the potential to adversely impact the safety function of these design features includes consideration of potential mechanisms to cause bulging, corrosion, or breach of confinement/leakage and the subsequent accumulation of material. The evaluation further includes consideration of adequate controls to ensure that the double contingency principle is met. For each of these passive design components (i.e., both favorable geometry components and non-favorable geometry components), it must be concluded that there is no credible means to effect a geometry change that might result in a failure of the

safety function and that significant margin exists.

For favorable geometry components, significant margin is defined as a margin of at least 10 percent, during both normal and upset conditions, between the actual design parameter value of the component and the value of the corresponding critical design attribute. For non-favorable geometry components, significant margin is defined as $k_{eff} < 0.95$, where $k_{eff} = k_{calc} + 3\sigma calc$. This calculation of k_{eff} conservatively assumes the components are full of uranic breakdown material at maximum enrichment, with worst credible moderation, and with worst credible reflection.

These passive, safe-by-design features (i.e., both favorable geometry components and non-favorable geometry components) are considered items that may affect IROFS. As a result, Quality Level 1 requirements apply to these features. Also, the configuration management program required by 10 C.F.R. § 70.72 ensures the maintenance of the safety function of these features and assures compliance with both the double contingency principle and the defense-in-depth criterion of 10 C.F.R. § 70.64(b).

In Section 3.1.2 of the ISA Summary, the applicant provided a demonstration of meeting "highly unlikely" for NCS when using the safe-by-design ISA method to meet 10 C.F.R. § 70.65(b)(4). The demonstration of significant margin to meet "highly unlikely" was provided for each of the components listed in Tables 3.7-6 through 3.7-21 of the ISA Summary in the following classified documents: ETC4009554 through ETC4009559, ETC40009561, ETC4009565 through ETC4009567, ETC4009609, ETC4009614, ETC4009677, ETC4009679, ETC4009723, and ETC4009730. These classified documents are incorporated by reference into the ISA Summary. Also, the configuration management system required by 10 C.F.R. § 70.72, which is implemented by the facility Configuration Management Program, will ensure the maintenance of the safety function of these components and will assure compliance with both the double contingency principle and the defense-in-depth criterion of 10 C.F.R.

§ 70.64(b).

Staff reviewed classified information for all the applicant-identified safe-by-design components. For each piece of favorable geometry equipment, staff reviewed the dimensions provided to determine that it would meet the geometry criteria for significant margin. For each piece non-favorable geometry equipment, the Staff reviewed the appropriateness of the conservative assumption(s) and compared the calculated k_{eff} value versus the k_{eff} limit to determine that it would meet the criteria for significant margin. Based on this review, the NRC determined that the safe-by-design components met the criteria for significant margin. The applicant slightly revised the classified information and then confirmed that all the information in the new classified documents met the criteria for using the safe-by-design ISA method for those components.

Based on the above review, the staff has reasonable assurance that: (1) the applicant used the safe-by-design ISA method appropriately; and (2) it is highly unlikely for an inadvertent criticality to occur with those safe-by-design components.

Chapter 4

Chapter 4 is applicable to the LES facility in its entirety.

Chapter 5

Chapter 5 is applicable to the LES facility. However, in Section 5.4 of Chapter 5 LES deviated from the American National Standards Institute/American Nuclear Society (ANSI/ANS) Series-8 standards specified in that section.

As discussed in Section 5.3.2 of the SER, LES took exception to the American National Standards Institute/American Nuclear Society (ANSI/ANS)-8.9 standard, in that piping configurations containing aqueous solutions of fissile material will be evaluated in accordance with the 1998 version of ANSI/ANS-8.1 using validated methods to determine subcritical limits.

In addition, the applicant used a newer version of the ANSI/ANS-8.1 standard (the 1998 version) than the version of the ANSI/ANS-8.1 standard (the 1988 version) that the NRC endorsed, with exception, in NRC Regulatory Guide 3.71, "Nuclear Criticality Safety Standards for Fuel and Material Facilities." Staff Exhibit 49-M at 5-3; Staff Exhibit 50-M ("Deviations from NRC Guidance"). The Staff reviewed the differences between the two versions of ANSI/ANS-8.1, along with the NRC endorsement with exception. Since NRC's intent did not change, but the standard did change, the applicant also committed to the following, concerning validation using ANSI/ANS-8.1-1998: "In addition, the details of validation should state computer codes used, operations, recipes for choosing code options (where applicable), cross-section sets, and any numerical parameters necessary to describe the input."

The applicant also used a newer version of ANSI/ANS-8.7 (1998 version) than the version of the standard endorsed by NRC in Regulatory Guide. The Staff reviewed the differences between the two versions of ANSI/ANS-8.7 and determined that it was acceptable for the applicant to use the newer version without exception.

Based on the review of the information provided, the Staff found the applicant has identified appropriate ANSI/ANS Series-8 standards and NRC Regulatory Guides relating to NCS.

Chapter 6

Chapter 6 is applicable to the LES facility in its entirety.

Chapter 7

Section 7.4.3.4, Process Fire Safety, addresses hazards associated with chemicals and processes used by fuel cycle facilities that may contribute to fire hazards. Among the chemicals and hazardous material discussed in Section 7.4.3.4 are: anhydrous ammonia, fluorine, hydrogen, hydrogen peroxide, nitric acid and nitrates, sulfuric acid, and zirconium. Of

these, only fluorine will be present at the LES facility (in the form of UF_6). Thus, LES did not provide information related to other hazardous materials. The remainder of Chapter 7 is applicable to the LES facility.

Chapter 8

Section 8.3.2 lists the areas of review for an application that demonstrates that an emergency plan is not required by including an evaluation or references the ISA Summary. Section 8.6.2.2 outlines the review procedures to be used if such an application is submitted. Since LES submitted an emergency plan, neither section is applicable to the LES application.

The remainder of Chapter 8 is applicable to the LES facility.

Chapter 9

Section 9.3.1, Environmental Report, outlines the information to be included in the applicant’s environmental report and discusses environmental assessments, environmental impact statements, and categorical exclusions from reviews under NEPA. To the extent that Section 9.3.1 discusses categorical exclusions and environmental assessments, it does not apply because an environmental impact statement is required for the proposed NEF under 10 C.F.R. § 51.20(a)(10). The remainder of Chapter 9 is applicable to the LES facility.

Chapter 10

Chapter 10 is applicable to the LES facility. However, with regard to Section 10.4, because depleted uranium deconversion services are not currently available in the United States, depleted uranium generated in the operation of the LES facility is considered as a potential decommissioning obligation in the decommissioning funding plan. In addition, LES requested an exemption to the decommissioning funding requirements to incrementally fund their financial assurance instrument as depleted uranium is generated. Staff Exhibit 50-M (“Deviations from NRC Guidance”).

In Sections 1.2.5 and 10.2.2 of the applicant's SAR, the applicant addressed an exemption request to 10 C.F.R. § 40.36 and 10 C.F.R. § 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. The applicant stated that it would initially provide funding for the projected cost of facility decontamination and decommissioning, assuming operation at full capacity, and for the projected cost to disposition the tails generated during the first three years of operation. Thereafter, the applicant will provide the Staff 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 C.F.R. § 40.36 and 10 C.F.R. § 70.25 could reflect a corresponding reduction in the anticipated facility decommissioning costs based on the actual number of modules used. The Staff will review revisions to the cost estimate and the financial instrument, which are presented in Section 10.2.2 of the SAR, before the applicant takes possession of licensed material. The Staff will also review all subsequent revisions to the cost estimate and financial instruments.

Under 10 C.F.R. § 40.14 and 10 C.F.R. § 70.17, the Commission may grant exemptions from the requirements of the regulations if it determines the exemptions are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest. The Staff evaluated the exemption request and determined that such exemption is not prohibited by law. The Staff also determined that, because the incremental funding approach proposed by the applicant will provide funding for the all the applicant's decommissioning obligations at any point in 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 will grant 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 the Safety Evaluation Report (SER). Staff Exhibit 49-M at 10-13 to 10-15.

Chapter 11

Chapter 11 is applicable to the LES facility in its entirety.

Q.14. Question 2 from the Board's January 30, 2006, Order asked the following:

> The Board understands there are few, if any, Regulatory Guides that are directly applicable for an enrichment facility license application. The staff is requested to identify each Regulatory Guide used by LES, the subsections of the SRP toward which that Regulatory Guide was applied, and the rationale of the staff in indicating to LES, or in finding, that such Regulatory Guide was applicable.

Are there any Regulatory Guides that are directly applicable to an enrichment facility license application?

A.14. (TJ) Yes. There are a number of Regulatory Guides directly applicable to an enrichment facility license application. These Regulatory Guides are referenced in the SRP. In addition, LES used some additional Regulatory Guides that are not referenced in the SRP. While these additional Regulatory Guides were not developed specifically for an enrichment facility license application, these guides do contain information that can be applied to an enrichment facility license application.

Note that Safety Evaluation Report (SER) Chapter 12, "Material Control and Accounting," Chapter 13, "Physical Protection," and Chapter 14, "Physical Security of the Transportation of Special Nuclear Material of Low Strategic Significance," do not have

analogous Chapters in the SRP. Review criteria applicable to safeguards sections of license applications are published separately in “Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities,” NUREG-1065. Guidance on physical security is provided in Regulatory Guide 5.59, “Standard Format and Content for a Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate to Low Strategic Significance.”

Q.15. Which specific Regulatory Guides did LES use in completing its license application?

A.15. (TJ) The Regulatory Guides used by LES, along with any reference to each guide in the SRP and the rationale for the guide’s applicability to an enrichment facility license application, are listed below:

SRP Chapter 1, General Information

- Regulatory Guide 1.165, “Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion,” 1997.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Section 1.3, provides guidance on the information the NRC staff will review including geology and seismic hazards. The evaluation of the seismic hazard was based on the seismic source characterization, historical seismicity, ground motion attenuation, and surface faulting. The guidance provided in Regulatory Guide 1.165 includes, but is not limited to, conducting geological, geophysical, seismological, and geotechnical investigations; and identifying and characterizing seismic sources. While this guide was developed for nuclear power plants, the seismic characterization information can also be applied to other nuclear facilities.

- Regulatory Guide 1.198, "Procedures and Criteria for Assessing Seismic Soil Liquefaction at Nuclear Power Plant Sites," 2003.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Section 1.3, identifies the information the NRC staff will review, including geology and seismic hazards. Regulatory Guide 1.198 provides information for evaluating the potential for earthquake-induced instability of soils resulting from liquefaction and strength degradation. While this guide was developed for nuclear power plants, the soil liquefaction information can also be applied to other nuclear facilities.

SRP Chapter 2, Organization and Administration

No regulatory guides applicable to organization and administration were used by LES.

SRP Chapter 3, Integrated Safety Analysis (ISA) and ISA Summary

- Regulatory Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants," 1973.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Sections 3.3.2, 3.4.3.1, and 3.4.3.2, identify the detailed acceptance criteria for the ISA Summary, including the characterization of natural phenomena (e.g., earthquakes) and design basis for natural events for the facility. Regulatory Guide 1.60 provides acceptable procedures for defining response spectra for the seismic design. While this guide was developed for nuclear power plants, the seismic design information can also be applied to other nuclear facilities.

- Regulatory Guide 1.91, "Evaluation of Explosions Postulated to Occur on Transportation Routes Near Nuclear Power Plants," Revision 1, 1978.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Sections 3.3.2, 3.4.3.1, and 3.4.3.2, identify the detailed acceptance criteria for the ISA Summary, including design information regarding the resistance of the facility to failures caused by credible external events, when the events may result in consequences exceeding the performance criteria. While this guide was developed for nuclear power plants, the information on evaluating explosion hazards can also be applied to other nuclear facilities.

- Regulatory Guide 1.165, "Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion," 1997.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Sections 3.3.2, 3.4.3.1, and 3.4.3.2, identify the detailed acceptance criteria for the ISA Summary, including the characterization of natural phenomena (e.g., earthquakes). The guidance provided in Regulatory Guide 1.165 includes, but is not limited to, conducting geological, geophysical, seismological, and geotechnical investigations; and identifying and characterizing seismic sources. While this guide was developed for nuclear power plants, the seismic characterization information can also be applied to other nuclear facilities.

- Regulatory Guide 1.105, "Setpoints for Safety-Related Instrumentation," Revision 3, December 1999.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Sections 3.3.2, 3.4.3.1, and 3.4.3.2, identify the detailed acceptance criteria for the ISA Summary, including the primary function the items relied on for safety (IROFS) and the sufficient detail about items within a hardware

IROFS. Regulatory Guide 1.105 indicates that instrument setpoint uncertainty allowances and setpoint discrepancies have led to a number of operational problems. This guide describes a method acceptable to the NRC staff for complying with NRC's regulations for ensuring that setpoints for safety-related instrumentation are initially within and remain within operational limits. While this guide was developed for nuclear power plants, the information on instrumentation setpoints can also be applied to other nuclear facilities.

- Regulatory Guide 1.140, “Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units for Normal Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants, Revision 2, 2001.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: This guide provides guidance and criteria acceptable to the NRC staff with regard to the design, inspection, and testing of air filtration units installed in the normal atmosphere cleanup systems. These systems may consist of prefilters, high-efficiency particulate air (HEPA) filters, fans, associated ductwork, dampers, and instrumentation. While this guide was developed for nuclear power plants, the information on ventilation filtration systems can also be applied to other nuclear facilities.

- Regulatory Guide 1.145, “Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants,” Revision 1, November 1982.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Sections 3.3.1, 3.3.2, and 3.4.3.2, identify the acceptance criteria for the ISA Summary, including consequences and likelihoods of events (e.g., chemical accidents sequences). Regulatory Guide 1.145 provides guidance on atmospheric dispersion models for assessing potential accident consequence. While this guide was developed for nuclear power plants, the information

on atmospheric dispersion modeling can also be applied to other nuclear facilities.

- Regulatory Guide 1.180, “Guidelines for Evaluating Electromagnetic and Radio-Frequency Interference in Safety-Related Instrumentation and Control Systems,” Revision 1, 2003.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Sections 3.3.2, 3.4.3.1, and 3.4.3.2, identify the acceptance criteria for the ISA Summary, including a description of the accident sequences for which the consequences could exceed the performance requirement. This regulatory guide provides guidance on methods acceptable to the NRC staff on design, installation, and testing practices for addressing the effects of electromagnetic and radio-frequency interference and power surges on safety-related instrumentation and control systems. While this guide was developed for nuclear power plants, the information on instrumentation can also be applied to other nuclear facilities.

- Regulatory Guide 1.198, “Procedures and Criteria for Assessing Seismic Soil Liquefaction at Nuclear Power Plant Sites,” 2003.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Sections 3.3.2, 3.4.3.1, and 3.4.3.2, identify the detailed acceptance criteria for the ISA Summary, including the characterization of natural phenomena (e.g., earthquakes). Regulatory Guide 1.198 provides information for evaluating the potential for earthquake-induced instability of soils resulting from liquefaction and strength degradation. While this guide was developed for nuclear power plants, the soil liquefaction information can also be applied to other nuclear facilities.

- Regulatory Guide 3.71, "Nuclear Criticality Safety Standards for Fuels and Materials Facilities," 1998.

  SRP Reference: This regulatory guide is not referenced in Chapter 3 of the SRP.

  Rationale for Applicability: This guide describes procedures for preventing nuclear criticality accidents in operations that involve handling, processing, storing, or transporting special nuclear material at fuel and material facilities and for complying with regulatory requirements in 10 C.F.R. Part 70.

- Regulatory Guide 4.16, "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," Revision 1, 1985.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: This guide provides methods acceptable to the NRC staff for developing effluent monitoring programs and for monitoring and reporting effluent data by licensees to comply with the regulatory requirements regarding environmental protection in 10 CFR Parts 20, 51, and 70. This guide applies to all fuel cycle facilities.

SRP Chapter 4, Radiation Protection

- Regulatory Guide 8.2, "Guide for Administrative Practice in Radiation Monitoring," 1973.

  SRP Reference: Sections 4.4.1.2, 4.4.2.2, 4.4.3.2, and 4.4.7.2

  Rationale for Applicability: This guide provides information on radiation monitoring programs for administrative personnel to comply with the applicable regulatory requirements in 10 CFR Part 20, Subpart B and 10 C.F.R. 70.22. This guide applies to all nuclear facilities.

- Regulatory Guide 8.4, “Direct-Reading and Indirect-Reading Pocket Dosimeters,” 1973.

  SRP Reference: Section 4.4.7.2

  Rationale for Applicability: This guide provides standards for direct readings and indirect reading pocket dosimeter to comply with the applicable regulatory requirements in 10 CFR Part 20 that are applicable to radiation surveys and monitoring programs. This guide applies to all nuclear facilities.

- Regulatory Guide 8.7, “Instructions for Recording and Reporting Occupational Radiation Exposure Data,” 1992.

  SRP Reference: Section 4.4.7.2

  Rationale for Applicability: This guide describes an acceptable program for the preparation, retention, and reporting of records of occupational radiation doses to comply with the regulatory requirements in 10 CFR Part 20 that are applicable to radiation surveys and monitoring programs. This guide applies to all nuclear facilities.

- Regulatory Guide 8.9, “Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program,” 1993.

  SRP Reference: Section 4.4.7.2

  Rationale for Applicability: This guide describes practical and consistent methods acceptable to the Staff for estimating intake of radionuclides using bioassay measurements to comply with the regulatory requirements in 10 CFR Part 20 that are applicable to radiation surveys and monitoring programs. This guide applies to all nuclear facilities.

- Regulatory Guide 8.10, “Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable,” Revision 1-R, 1977.

  SRP Reference: Sections 4.4.3.2, 4.4.4.2, and 4.4.5.2

Rationale for Applicability: This guide identifies the information relevant to the "as low as reasonably achievable" principle that should be included in the license application. This guide is applicable to all license applicants and is used to determine compliance with the regulatory requirements in 10 CFR Part 20 and 10 CFR 70.22.

- Regulatory Guide 8.13, "Instructions Concerning Prenatal Radiation Exposure," Revision 3, 1994.

  SRP Reference: Sections 4.4.2.2 and 4.4.5.2

  Rationale for Applicability: This guide provides information to licensees regarding a program for providing information to declared pregnant workers and other personnel, to help them make decisions regarding radiation exposure during pregnancy. This guide is applicable to all nuclear facilities and is used to determine compliance with the regulatory requirements in 10 CFR 19.12 and 20.1101.

- Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection," 1999.

  SRP Reference: Section 4.4.6.2

  Rationale for Applicability: This regulatory guide describes a respiratory protection program that is acceptable to the NRC staff. This guide is applicable to all nuclear facilities that have respiratory protection programs and is used to determine compliance with the regulatory requirements in 10 CFR Part 20, Subpart H.

- Regulatory Guide 8.24, "Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication," Revision 1, 1979.

  SRP Reference: Sections 4.4.6.2 and 4.4.7.2

  Rationale for Applicability: This guide specifies the types and frequencies of surveys that are acceptable to the Staff for protection of workers in plants for processing enriched uranium and for the fabrication of uranium fuel and is applicable to a gas centrifuge uranium enrichment facility. This guide is used to determine compliance with

the regulatory requirements in 10 CFR Part 20, Subparts C, F, H, and L.

- Regulatory Guide 8.25, "Air Sampling in the Workplace," 1992.

  SRP Reference: Section 4.4.7.2

  Rationale for Applicability: This guide provides information on air sampling in the workplace. This guide is applicable to all nuclear facilities and is used to determine compliance with the regulatory requirements in 10 CFR Part 20, Subparts C, F, L, and M.

- Regulatory Guide 8.29, "Instructions Concerning Risks From Occupational Radiation Exposure," 1996.

  SRP Reference: Sections 4.4.2.2 and 4.4.5.2

  Rationale for Applicability: This guide describes the information that should be provided to workers by licensees about health risks from occupational exposure. This guide is applicable to all nuclear facilities and is used to determine compliance with the regulatory requirements in 10 CFR 19.12 and 20.1101.

- Regulatory Guide 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses," 1992.

  SRP Reference: Section 4.4.7.2

  Rationale for Applicability: This guide provides criteria acceptable to the NRC staff to determine when monitoring is required and how to calculate occupational doses when the intakes occur. This guide is applicable to all nuclear facilities and is used to determine compliance with the regulatory requirements in 10 CFR Part 20.

- Regulatory Guide 8.37, "ALARA Levels for Effluents From Materials Facilities," 1993.

  SRP Reference: This regulatory guide is not referenced in Chapter 4 of the SRP.

  Rationale for Applicability: This guide provides information to develop an acceptable program for establishing and maintaining ALARA levels for gaseous and liquid effluents

at materials facilities. This guide is applicable to all materials and fuel cycle facilities and is used to determine compliance with the regulatory requirements in 10 CFR Parts 20 and 70.

SRP Chapter 5, Nuclear Criticality Safety

- NRC Regulatory Guide 3.71, “Nuclear Criticality Safety Standards for Fuels and Material Facilities," 1998.

  SRP Reference: Section 5.4.2

  Rationale for Applicability: This guide describes procedures for preventing nuclear criticality accidents in operations that involve handling, processing, storing, or transporting special nuclear material at fuel cycle and material facilities, and for complying with regulatory requirements in 10 CFR Part 70.

SRP Chapter 6, Chemical Process Safety

- Regulatory Guide 1.145, “Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants,” Revision 1, 1982.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: NUREG-1520, Section 6.4, identifies the acceptance criteria to design a facility that will provide adequate protection against chemical hazards related to storage, handling, and processing of licensed materials. Regulatory Guide 1.145 provides guidance on atmospheric dispersion models for assessing potential accident consequences. While this guide was developed for nuclear power plants, the accident analysis information can also be applied to other nuclear facilities.

SRP Chapter 7, Fire Safety

No regulatory guides applicable to fire safety were used by LES.

SRP Chapter 8, Emergency Management

- Regulatory Guide 3.67, “Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities,” 1992.

  SRP Reference: Section 8.4.2

  Rationale for Applicability: This guide provides guidance acceptable to the NRC staff on the information to be included in emergency plans for all fuel cycle and materials facilities to comply with the regulatory requirements 10 CFR 70.22(i)(3) and 70.64(a)(6).

SRP Chapter 9, Environmental Protection

- Regulatory Guide 4.16, “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,” 1985.

  SRP Reference: Sections 9.4.2

  Rationale for Applicability: The guide provides methods acceptable to the Staff for developing effluent monitoring programs and for monitoring and reporting effluent data by licensees to comply with the regulatory requirements regarding environmental protection in 10 CFR Parts 20, 51, and 70. This guide is applicable to all fuel cycle facilities.

- Regulatory Guide 8.34, “Monitoring Criteria and Methods to Calculate Occupational Radiation Doses,” 1992.

  SRP Reference: This regulatory guide is not referenced in Chapter 9 of the SRP.

  Rationale for Applicability: This guide provides criteria acceptable to the Staff to determine when monitoring is required and how to calculate occupational doses when the intakes occur. This guide is applicable to all nuclear facilities and is used to determine compliance with the regulatory requirements in 10 CFR Parts 20.

- Regulatory Guide 8.37, "ALARA Levels for Effluents From Materials Facilities," 1993.

  SRP Reference: Section 9.4.2 and 9.4.3.2.1

  Rationale for Applicability: This guide provides information to develop an acceptable program for establishing and maintaining ALARA levels for gaseous and liquid effluents at materials facilities. This guide is applicable to all materials and fuel cycle facilities and is used to determine compliance with the regulatory requirements in 10 CFR Parts 20, and 70.

SRP Chapter 10, Decommissioning

- Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors," 1990.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: This guide provides guidance to applicants and licensees of nuclear power, research, and test reactors concerning methods acceptable to the NRC staff for complying with requirements regarding the amount of funds for decommissioning. This guide is not normally applicable to non-reactor facilities, but was referenced by LES in a generic discussion of what costs are normally included in decommissioning funding plans.

SRP Chapter 11, Management Measures

No regulatory guides applicable to management measures were used by LES.

Q.16. SER Chapters 12, 13, and 14 do not appear to correspond to any SRP chapters. Did the Staff use the SRP as guidance in preparing these chapters of the SER? If not, what guidance documents were used?

A.16. (TJ) As discussed above, Safety Evaluation Report (SER) Chapter 12, "Material Control and Accounting," Chapter 13, "Physical Protection," and Chapter 14, "Physical Security

of the Transportation of Special Nuclear Material of Low Strategic Significance," do not have analogous Chapters in the SRP. The regulatory guids used by LES to prepare the information evaluated in these chapters of the SER are listed below:

SER Chapter 12, Material Control and Accounting

- Regulatory Guide 5.4, "Standard Analytical Methods for the Measurement of Uranium Tetrafluoride (UF_4) and Uranium Hexafluoride (UF_6)," 1973.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: This guide identifies acceptable methods for sampling and chemical and isotopic analysis of uranium tetrafluoride and uranium hexafluoride that an applicant may specify as part of his procedures for accounting for special nuclear material. This guide is can be applied to all facilities possessing uranium hexafluoride.

- Regulatory Guide 5.15, "Tamper-Indicating Seals for the Protection and Control of Special Nuclear Material," 1997.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: This guide describes features of security seal systems and types of seals that are acceptable for containers of special nuclear material. This guide applies to all facilities shipping or receiving special nuclear material.

- Regulatory Guide 5.67, "Material Control and Accounting Requirements for Uranium Enrichment Facilities Authorized to Produce Special Nuclear Material of Low Strategic Significance," 1993.

  SRP Reference: This regulatory guide is not referenced in the SRP.

  Rationale for Applicability: This guide discusses each important component of a uranium enrichment facility material control and accounting program and describes methods that may be used to satisfy the regulatory requirements in 10 CFR Part 74.

SER Chapter 13, Physical Protection

- Regulatory Guide 5.59, "Standard Format and Content for a Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate to Low Strategic Significance," 1982.

  SRP Reference: This regulatory guide is not referenced in the SRP, but is the applicable guidance for reviewing physical security plans for fuel cycle facilities having special nuclear material of low to moderate strategic significance.

  Rationale for Applicability: This guide describes the information required in the physical security plan submitted as part of an application for a license to possess, use, or transport special nuclear material. This guide is applicable to fuel cycle facilities possessing special nuclear material of low to moderate strategic significance.

SER Chapter 14, Physical Security of the Transportation of Special Nuclear Material of Low Strategic Significance

- Regulatory Guide 5.15, "Tamper-Indicating Seals for the Protection and Control of Special Nuclear Material," 1997.

  SRP Reference: This regulatory guide is not referenced in the SRP, but is referenced in Regulatory Guide 5.59, "Standard Format and Content for a Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate to Low Strategic Significance," Section 5.3. Regulatory Guide 5.59 is the applicable guidance for preparing physical security plans and for transportation of special nuclear material of low to moderate strategic significance.

  Rationale for Applicability: This guide describes features of security seal systems and types of seals that are acceptable for containers of special nuclear material. This guide applies to all facilities shipping or receiving special nuclear material.

Q.17. Question 3 from the Board's January 30, 2006 Order asked the following:

> In addition, the staff is requested to indicate each subsection for which a Regulatory Guide would, in a customary fuel cycle facility application (such as an application for a fuel fabrication facility) have been applicable, but for the NEF no Regulatory Guide was appropriate, and how the staff addressed (and directed LES to address) the matters covered by that subsection.

Does each subsection of the SRP have a corresponding Regulatory Guide? If not, what guidance is available to license applicants?

A.17. (TJ) As noted below, some subsections of the SRP do not have corresponding Regulatory Guides. The SRP itself provides guidance to license applicants, and also references other forms of guidance such as NUREGs and industry standards. While regulations are mandatory requirements, guidance represents non-mandatory recommendations for implementing regulatory requirements. The Staff uses a variety of mechanisms for publishing guidance. These include regulatory guides, branch technical positions, NUREG documents, and interim staff guidance. NRC guidance often refers to or endorses specific industry standards published by the American National Standards Institute, the American Nuclear Society, the American Society of Mechanical Engineers, and other professional organizations. For reviewing a license application for a fuel cycle facility, the SRP refers to the wide range of existing guidance applicable for the review.

The Staff has recently issued several Fuel Cycle Safety and Safeguards (FCSS) Interim Staff Guidance (ISG) documents relating to meeting the performance requirements in 10 CFR Part 70, Subpart H. Specifically, FCSS ISG-01, "Qualitative Criteria for the Evaluation of Likelihood," FCSS ISG-04, "Clarification of Design Basis Criteria," FCSS ISG-08, "Natural Phenomena Hazards," and FCSS ISG-09, "Initiating Event Frequency," were issued in June 2005 and were not available during the review of the LES application. The approaches taken by LES in these areas, however, is consistent with NRC guidance in NUREG-1520. FCSS

ISG-03, "Nuclear Criticality Safety Performance Requirements and Double Contingency Principle," was issued in February 2005, and it applies to special cases where applicants desire to use the same analyses for complying with 10 CFR 70.61(b) and (d). This ISG, however, is not applicable to the LES application since LES demonstrated compliance with 10 CFR 70.61 (b) and (d) separately.

Q.18. What regulatory guides are referenced in the SRP? If LES did not use any of the guides referenced in the SRP, how did the Staff address (and direct LES to address) the matters covered by that subsection?

A.18. (TJ) The Regulatory Guides referenced in the SRP are listed below:

SRP Chapter 1, General Information

There are no regulatory guides applicable to the General Information area referenced in the SRP.

SRP Chapter 2, Organization and Administration

There are no regulatory guides applicable to the Organization and Administration area referenced in the SRP.

SRP Chapter 3, Integrated Safety Analysis (ISA) and ISA Summary

There are no regulatory guides applicable to the Integrated Safety Analysis area referenced in the SRP.

SRP Chapter 4, Radiation Protection

- Regulatory Guide 8.2, "Guide for Administrative Practice in Radiation Monitoring," 1973.

  <u>SRP Reference:</u> Sections 4.4.1.2, 4.4.2.2, 4.4.3.2, and 4.4.7.2

  <u>Used by LES:</u> Yes

- Regulatory Guide 8.4, “Direct-Reading and Indirect-Reading Pocket Dosimeters,” 1973.

  SRP Reference: Section 4.4.7.2

  Used by LES: Yes

- Regulatory Guide 8.7, “Instructions for Recording and Reporting Occupational Radiation Exposure Data,” 1992.

  SRP Reference: Section 4.4.7.2

  Used by LES: Yes

- Regulatory Guide 8.9, “Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program,” 1993.

  SRP Reference: Section 4.4.7.2

  Used by LES: Yes

- Regulatory Guide 8.10, “Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable,” Revision 1-R, 1977.

  SRP Reference: Sections 4.4.3.2, 4.4.4.2, and 4.4.5.2

  Used by LES: Yes

- Regulatory Guide 8.13, “Instructions Concerning Prenatal Radiation Exposure,” 1994.

  SRP Reference: Sections 4.4.2.2 and 4.4.5.2

  Used by LES: Yes

- Regulatory Guide 8.15, “Acceptable Programs for Respiratory Protection,” 1999.

  SRP Reference: Section 4.4.6.2

  Used by LES: Yes

- Regulatory Guide 8.24, “Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication,” 1979.

  SRP Reference: Sections 4.4.6.2 and 4.4.7.2

  Used by LES: Yes

- Regulatory Guide 8.25, “Air Sampling in the Workplace,” Revision 1, 1992.

  SRP Reference: Section 4.4.7.2

  Used by LES: Yes

- Regulatory Guide 8.29, “Instructions Concerning Risks From Occupational Radiation Exposure, 1996.

  SRP Reference: Section 4.4.2.2 and 4.4.5.2

  Used by LES: Yes

- Regulatory Guide 8.34, “Monitoring Criteria and Methods to Calculate Occupational Radiation Doses,” 1992.

  SRP Reference: Sections 4.4.7.2

  Used by LES: Yes

SRP Chapter 5, Nuclear Criticality Safety

- Regulatory Guide 3.71, “Nuclear Criticality Safety Standards for Fuels and Materials Facilities,” 1998.

  SRP Reference: Sections 5.4.2

  Used by LES: Yes

SRP Chapter 6, Chemical Process Safety

There are no regulatory guides applicable to the Chemical Process Safety area referenced in the SRP.

SRP Chapter 7, Fire Safety

There are no regulatory guides applicable to the Fire Safety area referenced in the SRP.

SRP Chapter 8, Emergency Management

- Regulatory Guide 3.67, “Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities,” 1992.

SRP Reference: Sections 8.4.2

Used by LES: Yes

SRP Chapter 9, Environmental Protection

- Regulatory Guide 4.5, "Measurement of Radionuclides in the Environment - Sampling and Analysis of Plutonium in Soil," 1974.

  SRP Reference: Sections 9.4.2

  Used by LES: No

  How NRC Addressed: Plutonium not expected at LES facility. Therefore, Regulatory Guide 4.5 is not applicable.

- Regulatory Guide 4.15, "Quality Assurance for Radionuclide Monitoring Programs (Normal Operations) - Effluent Streams and the Environment," Revision 2, 1979.

  SRP Reference: Sections 9.4.2

  Used by LES: Yes

  How NRC Addressed: LES environmental protection quality assurance program includes the effluent monitoring program and the radiological environmental monitoring program. These programs are described in Sections 6.1.1, "Effluent Monitoring," and 6.1.2, "Radiological Environmental Monitoring Program" of the LES Environmental Report and include commitments to use Regulatory Guide 4.15.

- Regulatory Guide 4.16, "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," Revision 2, 1985.

  SRP Reference: Sections 9.4.2

  Used by LES: Yes

- Regulatory Guide 4.20, “Constraint on Releases of Airborne Radioactive Materials to the Environment for Licensees Other Than Power Reactors,” 1996.

  SRP Reference: Sections 9.4.2 and 9.4.3.2.1

  Used by LES: No

  How NRC Addressed: Regulatory Guide 4.20 provides guidance on methods acceptable for compliance with the constraint on air emissions to the environment as required by 10 CFR 20.1101(d). The LES Environmental Report provides a discussion of the applicant’s airborne emissions constraint approach that meets the intent of the regulatory requirement and is consistent with Regulatory Guide 4.20.

- Regulatory Guide 8.37, “ALARA Levels for Effluents from Materials Facilities,” 1993.

  SRP Reference: Sections 9.4.2 and 9.4.3.2.1

  Used by LES: Yes

SRP Chapter 10, Decommissioning

There are no regulatory guides applicable to the Decommissioning area referenced in the SRP.

SRP Chapter 11, Management Measures

There are no regulatory guides applicable to the Management Measures area referenced in the SRP.

Q.19. Does this conclude your testimony?

A.19. (TJ, WT) Yes.

TIMOTHY C. JOHNSON

Professional Qualifications

I am currently the Licensing Project Manager of the Louisiana Energy Services (LES) uranium enrichment plant project in the Gas Centrifuge Facility Licensing Section, Special Projects Branch, Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission.

I received a Bachelor of Science degree in Mechanical Engineering from Worcester Polytechnic Institute in Worcester, Massachusetts, in 1971 and a Master of Science degree in Nuclear Engineering from Ohio State University, in Columbus, Ohio, in 1973.

Courses I have taken that are pertinent to my present discipline are in the areas of advanced mathematics, engineering design, mass and heat transport, thermodynamics, reactor theory, nuclear physics, nuclear power plant engineering, and health physics. I was elected to membership in Pi Mu Epsilon, the mathematics honorary society.

From January 1973 to August 1977, I was employed by Stone & Webster Engineering Corporation in Boston, Massachusetts. As the offgas and ventilation filter system specialist, I was responsible for the technical adequacy of offgas and ventilation filter systems for pressurized water reactor, boiling water reactor, high temperature gas cooled reactor, and liquid metal fast breeder reactor projects. My responsibilities included ensuring that equipment met both applicable regulatory and equipment code requirements. I prepared master specifications for offgas and ventilation filter systems for use by project staff. I reviewed project specifications and performed technical reviews of vendor proposals. I also reviewed vendor procedures for qualification and testing of offgas and ventilation system components.

Since September 1977, I have been employed by the U.S. Nuclear Regulatory Commission in the areas of radioactive waste management, decommissioning, and fuel cycle facility licensing.

From September 1977 to April 1984, I had lead responsibility for the waste form performance aspects of low-level radioactive wastes to include radwaste processing, solidification, high integrity containers, and volume reduction systems. In this capacity, I developed programs for analyzing, evaluating, coordinating, and recommending licensing actions related to the waste form and waste classification areas of 10 CFR Part 61. These responsibilities have specifically included coordinating the development of the waste form and waste classification requirements and preparing the appropriate sections for: (1) the low-level waste management regulation, 10 CFR Part 61; (2) the draft and final environmental impact statements that support 10 CFR Part 61; and (3) the technical positions on waste form and waste classification that provide guidance to waste generators for complying with the 10 CFR Part 61 requirements. I also acted as lead for an intra-agency task group for implementation for the 10 CFR Part 61 requirements at nuclear power plants.

During this time, I also participated on a Task Force responsible for Three Mile Island Unit 2 (TMI-2) waste disposal issue resolution to include the evaluation of EPICOR-II, Submerged Demineralizer System, and decontamination solution wastes. I also prepared and coordinated waste disposal section for the TMI-2 Programmatic Environmental Impact Statement. For other nuclear power facilities, I prepared and coordinated waste disposal sections for the Dresden Unit 1 Decontamination and the Turkey Point Steam Generator Replacement Environmental Impact Statements.

As Project Officer, I coordinated with contractors and managed the following technical assistance studies:

1. Alternative Methods for the Disposal of Low-Level Waste;
2. Chemical Toxicity of Low-Level Waste;
3. Volume Reduction Techniques for Low-Level Wastes;
4. TMI Resin Solidification Test Program; and
5. Assay of Long-Lived Radionuclides in Low-Level Waste from Power Reactors.

From April 1984 to April 1987, I was Section Leader of the Materials Engineering Section in the Division of Waste Management. In this capacity, I supervised a section that performed technical and engineering evaluations of low-level and high-level radioactive waste packages. This included planning and executing section programs, providing technical direction and integration of materials concerns into NRC low-level and high-level waste licensing activities, and supervising the management of technical assistance programs.

In the low-level waste area, my responsibilities included planning and supervising: (1) the reviews of topical reports on solidification agents, high integrity containers, and waste classification computer codes; and (2) the reviews of licensee specific requests for packaging unique waste materials.

In the high-level waste area, my responsibilities included planning and supervising: (1) the reviews of DOE waste package programs; (2) the reviews of draft and final Repository Site Environmental Assessments in the materials and waste package areas; (3) the direct interactions with DOE in formal waste package and waste glass program meetings; (4) the development of five-year plans for waste package activities; (5) the development of a capability to review the DOE Site Characterization Plans; and (6) the development of technical positions in the areas of waste package reliability and extrapolation of test data to long time frames.

From April 1987 to May 1992, I was Section Leader of the Special Projects Section in the Division of Waste Management. In this capacity, I supervised a section responsible for mixed wastes, decommissioning of materials licensee facilities and power reactors, financial assurance for decommissioning materials licensees and low-level waste disposal facilities, greater than Class C wastes, low-level waste disposal site quality assurance, and the low-level waste data base.

In these areas, the Special Projects Section issued three joint NRC/U.S. Environmental Protection Agency guidance documents on mixed wastes, a Standard Review Plan and a Standard Format and Content Guide on financial assurance mechanisms for materials licensee decommissioning , and a guidance document on quality assurance for low-level waste disposal facilities. The section was also responsible for coordinating the storage and disposal of greater than Class C wastes with DOE, reviewing decommissioning plans for the Pathfinder, Shoreham, Rancho Seco, and Fort St. Vrain nuclear power facilities, and developing a financial assurance program for materials licensees.

From May 1992 to November 1999, I was Section Chief of decommissioning sections in the Division of Waste Management responsible for developing and executing the Site Decommissioning Management Plan (SDMP), an agency effort to ensure that 17 decommissioning policy issues were resolved and over 40 non-routine decommissioning sites would be properly decommissioned. During this time, I acted as Project Manager for the decommissioning of the Chemetron site in Cleveland, Ohio, a controversial contaminated site located in a residential neighborhood. The site was remediated and the license terminated in 1998.

From November 1999 to the present, I was a Senior Mechanical Systems Engineer in the Division of Fuel Cycle Safety and Safeguards. In this position, I acted as deputy project manager for the Mixed Oxide Fuel Fabrication Facility licensing and project manager for the licensing of gas centrifuge uranium enrichment facilities. I am currently Project Manager for the Louisiana Energy Services gas centrifuge enrichment plant.

At the NRC, I have participated as the NRC and Division of Waste Management representative on the following industry, government, and international committees:

1. American Nuclear Society Subcommittee 16.1, Leach Testing Standard;
2. American Nuclear Society Subcommittee 40.35, Volume Reduction Systems Standard;
3. American National Standards Institute Subcommittee N14.9.2, Packaging for Transportation Standard;
4. American Society of Mechanical Engineers Radwaste Committee;
5. American Society for Testing and Materials Subcommittee C26.07, Waste Management Committee;
6. International Atomic Energy Agency Committee to prepare a Code of Practice for Low-Level Waste Management at Nuclear Power Plants;
7. International Atomic Energy Agency Committee to prepare a document “National Policies and Regulations for Decommissioning Nuclear Facilities;”
8. Interagency Review Board for the Chemical Waste Incinerator Ship Program;
9. Interagency Review Group for Disposal of Low-Level Wastes at Sea;
10. American Society of Mechanical Engineers Mixed Waste Committee.

I also served as a member of the Nuclear Engineering Program Advisory Board at Worcester Polytechnic Institute.

I am a member of the following professional societies:

American Nuclear Society
American Society of Mechanical Engineers
American Society for Testing and Materials

Publications and Presentations

T.C. Johnson, M.J. Bell, “Volume Reduction of Low-Level Wastes,” Ninth Biennial Conference of Reactor Operating Experience, Arlington, Texas, August 1979.

T.C. Johnson, P.H. Lohaus, R.D. Smith, “10 CFR 61 Waste Form Requirements,” Atomic Industrial Forum Conference on NEPA and Nuclear Regulation, Washington, DC, October 1981.

T.C. Johnson, P.H. Lohaus, R.D. Smith, “10 CFR Part 61 Waste Classification Requirements,” Electric Power Research Institute Radwaste Workshop, Charlotte, NC, October 1981.

T.C. Johnson, P.H. Lohaus, R.D. Smith, “10 CFR Part 61 Requirements,” American Society of Mechanical Engineers/Electric Power Research Institute Radwaste Workshop, Augusta, GA, February 1982.

T.C. Johnson, H. Lowenberg, “Classification of TMI Wastes,” Waste Management ‘82, Tucson, AZ, March 1982.

T.C. Johnson, P.H. Lohaus, R.D. Smith, “10 CFR 61 Waste Form Requirements,” American Nuclear Society Topical Meeting on Radioactive Waste Management, Richland, WA, April 1982.

T.C. Johnson, P.H. Lohaus, G.W. Roles, “Implementation of 10 CFR 61 Part Waste Classification and Waste Form Requirements,” Waste Management ‘83, Tucson, AZ, March 1983.

R.E. Browning, Et al.,”Status Report on NRC Regulation for Land Disposal of Low-Level Radioactive Wastes and Geologic Disposal of High-Level Wastes,” International Atomic Energy Agency Radioactive Waste Management Conference, Seattle, WA, May 1983.

P.H. Lohaus, T.C. Johnson, “NRC Approach to Dealing with Hazardous Substances in Low-Level Radioactive Wastes,” American Nuclear Society Summer Meeting, Detroit, MI, June 1983.

T.C. Johnson, P.H. Lohaus, G.W. Roles, “Implementation of 10 CFR 61 Part Waste Classification and Waste Form Requirements,” ERM-Midwest Workshop, Columbus, OH, June 1983.

T.C. Johnson, P.H. Lohaus, G.W. Roles, “Implementation of 10 CFR 61 Part Waste Classification and Waste Form Requirements,” Electric Power Research Institute Radwaste

Workshop, Washington, DC, July 1983.

T.C. Johnson, P.H. Lohaus, G.W. Roles, “Implementation of 10 CFR 61 Part Waste Classification and Waste Form Requirements,” Test, Research, and Training Reactor Conference, Boston, MA, October 1983.

T.C. Johnson, P.H. Lohaus, G.W. Roles, “Implementation of 10 CFR 61 Part Waste Classification and Waste Form Requirements,” Pennsylvania Low-Level Radioactive Waste Symposium, Harrisburg, PA, October 1983.

T.C. Johnson, et al., “Economics of 10 CFR Part 61,” Waste Management ‘84, Tucson, AZ, March 1984.

M. Tokar, et al., “NRC Licensing Requirements for High-Level Radioactive Waste Packages,” Waste Management ‘85, Tucson, AZ, March 1985.

T.C. Johnson, et al., “Current Regulatory Issues,” American Society of Mechanical Engineers/Electric Power Research Institute Radwaste Workshop, Savannah, GA, February 1986.

T.C. Johnson, et al., “High-Level Waste Package Licensing Considerations for Extrapolating Test Data,” Materials Research Society Symposium, Boston, MA, December 1986.

T.C. Johnson, et al., “Update on LLW Regulatory Guides and Topical Reports,” Waste Management ‘87, Tucson, AZ, March 1987.

E.A. Wick, et al., “NRC Staff Perspective on Performance of Vitrified HLW and How It Relates to Other Components,” Waste Management ‘87, Tucson, AZ, March 1987.

T.C. Johnson, G.W. Roles, “Data Requirements for Waste Classification and Manifesting,” Department of Energy Low-Level Waste Management Conference, Denver, CO, August 1988.

T.C. Johnson, D.E. Martin, “Decommissioning Rule Overview,” NRC Region III State Liaison Meeting, Glen Ellyn, IL, September, 1988.

T.C. Johnson, D.E. Martin, “Decommissioning Rule Overview,” NRC All Agreement States Meeting, Potomac, MD, October 1988.

T.C. Johnson, D.E, Martin, “NRC Perspective on Mixed Wastes,” California Mixed Waste Workshop, Davis, CA, October 1988.

T.C. Johnson, “NRC Regulatory Initiatives,” DOE Low-Level Waste Management Conference, Pittsburgh, PA, August 1989.

T.C. Johnson, “NRC Residual Contamination Criteria,” Environmental Protection Agency/Japanese Atomic Energy Research Institute Residual Contamination Workshop, St. Michaels, MD, September 1989.

T.C. Johnson, G.W. Roles, "Decommissioning Waste Characteristics," Environmental Protection Agency/Japanese Atomic Energy Research Institute Residual Contamination Workshop, St. Michaels, MD, September 1989.

T.C. Johnson, "Air Treatment Issues Associated with a Mixed Oxide Fuel Fabrication Facility," 27^{th} Nuclear Air Cleaning and Treatment Conference, Nashville, TN, September 2002.

Instructor: American Society of Mechanical Engineers Radwaste Course, 1982, 1984-1989;
NRC Transportation and Low-Level Waste Course, NRC Technical Training Center, Chattanooga, TN, 1988, 1989.
Harvard School of Public Health Waste Disposal Course, Boston, MA, 1990.

Resume for Mr. William Troskoski

QUALIFICATION PROFILE

EXPERIENCE/SKILLS

Mr. Troskoski has 30-years of nuclear experience ranging from reactor operations through the fuel cycle front end. He was a shift supervisor for a DOE heavy water production reactor, an NRC inspector qualified on both the BWR and PWR series reactors, and a Senior Resident Inspector at a duel unit PWR site. His experience includes pre-operational, startup testing and plant operations. He served as a Regional Coordinator in the Deputy EDO's Office and a Senior Enforcement Specialist in the Office of Enforcement. During the last eleven years, Mr. Troskoski has been involved in all phases of fuel cycle inspection and licensing process.

EDUCATION

Bachelor of Science Degree in Chemical Engineering under the Cooperative Program, University of Maryland, 1973.

ACCOMPLISHMENTS/STRENGTHS

Certified Reactor Shift Supervisor at Savannah River Plant 1974-1980.

Senior Resident Inspector 1981-1987.

Meritorious Service Award 1998.

PROFESSIONAL EXPERIENCE

2002 to present — Senior Chemical Safety Technical Reviewer

Responsible for the conduct of license application acceptance reviews and in-depth license application safety reviews in the areas of chemical safety, management measures, quality assurance and integrated safety analysis for the Mixed Oxide Fuel Fabrication Facility, the USEC Lead Cascade, the LES National Enrichment Facility, and the USEC American Centrifuge Plant.

Provided chemical engineering technical assistance to the Office of Investigations and other Federal agencies for a potential wrong doing case involving Hunt valves used on UF_6 cylinders.

Developed and taught several NRC internal fuel cycle training courses.

1993 to 2002	<u>Senior Chemical Safety Fuel Cycle Inspector</u>
	Responsible for the development of the Chemical Safety Inspection Program for NRC licensed fuel cycle facilities, including low enriched uranium fuel fabricators, high enriched uranium fuel fabricators, the USEC Gaseous Diffusion Plants (enrichment), and uranium conversion.
	Served as the lead chemical safety inspector responsible for scheduling and implementation of the routine inspection program in coordination with the Regional Offices.
	Developed Operational Readiness Review Inspection plans and served as the team leader for the restart of the Nuclear Fuel Services high enriched fuel facility and the initial certification of the USEC Gaseous Diffusion Plants at Portsmouth, Ohio and Paducah, Kentucky.
1988 to 1993	<u>Senior Enforcement Specialist</u>
	Responsible for the processing and coordination of reactor and fuel cycle escalated enforcement actions, including Proposed Civil Penalties, Imposition of Civil Penalties, and other related Orders. Coordinated actions with the Regional Offices, Program Office, OGC, and OI, when applicable.
1987 to 1988	<u>Regional Coordinator - Deputy EDO's Office</u>
	Monitored issues and emerging safety problems for licensees in Region II. Briefed the Deputy EDO as necessary.
1981 to 1987	<u>Senior Resident Inspector</u>
	Conducted safety inspections at a duel unit PWR. One unit conducted an extended outage to perform TMI-related modifications and return to power operations. The second unit completed construction, pre-operational testing and initiated startup testing prior to commercial operations. Supervised other resident inspectors.
1980 to 1981	<u>Reactor Inspector - Region I</u>
	Performed pre-operational and startup testing inspections at both BWRs and PWRs.
1974-1980	<u>Reactor Shift Supervisor - Savannah River Plant</u>
	Supervised reactor operations for a heavy water moderated production reactor.

Louisiana Energy Services, L.P., Docket No. 70-3103-ML
March 2006 Mandatory Hearing on Uncontested Issues
<u>Prefiled Hearing Exhibits</u>

Party Exh. #	Witness/ Panel	Description
Staff 49-M	Safety Evaluation Report	NUREG-1827, “Safety Evaluation Report for the Proposed National Enrichment Facility in Lea County, New Mexico,” (2005)
Staff 50-M	Standard Review Plan	“Louisiana Energy Services National Enrichment Facility Safety Evaluation Report Executive Summary,” (Sept. 16, 2005).
Staff 51-M	Standard Review Plan	NUREG-1520, “Standard Review Plan for Review of License Applications for Fuel Cycle Facilities,” (2002).
Staff 52-M	Decommissioning Funding	SECY-03-0161, “2003 Annual Update - Status of Decommissioning Program,” (Sept. 15, 2003).
Staff 53-M	Decommissioning Funding	NUREG-0586, “Draft Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities,” (1981).
Staff 54-M	Decommissioning Funding	NUREG-0586, “Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities,” (1988).
Staff 55-M	Decommissioning Funding	NUREG-0584, “Assuring the Availability of Funds for Decommissioning Nuclear Facilities,” (1982).
Staff 56-M	Decommissioning Funding	NUREG-CR-1481, “Financing Strategies for Nuclear Power Plant Decommissioning,” (1980).
Staff 57-M	Decommissioning Funding	57 Fed. Reg. 30,383-30,387 (July 9, 1992)

Party Exh. #	Witness/ Panel	Description
Staff 58-M	Criticality	"National Enrichment Facility Integrated Safety Analysis Summary," (2004).
Staff 59-M	Criticality	Interim Staff Guidance (ISG)-03, "Nuclear Criticality Safety Performance Requirements and Double Contingency Principle," (Feb. 17, 2005).
Staff 60-M	FEIS Purpose and Need	NUREG-1790, "Final Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico," (2005).
Staff 61-M	FEIS Purpose and Need	Louisiana Energy Services Environmental Report, Section 1.0, "Purpose and Need for the Proposed Action," (2004).
Staff 62-M	FEIS Purpose and Need	Council on Environmental Quality Regulations, 40 CFR 1500.1 and 1502.13.
Staff 63-M	FEIS Purpose and Need	Natural Resources Conservation Service, U.S. Dept. of Agriculture, "Writing a Purpose and Need Statement," (2003).
Staff 64-M	FEIS Purpose and Need	Letter from J.L. Connaughton, Executive Director, Council on Environmental Quality, to N.Y. Mineta, Secretary, U.S. Dept. of Transportation (May 12, 2003).
Staff 65-M	FEIS Purpose and Need	Maeda, H. 2005. "The Global Nuclear Fuel Market – Supply and Demand 2005-2030: WNA Market Report", World Nuclear Association Annual Symposium
Staff 66-M	FEIS Purpose and Need	Combs, J. 2004. "Fueling the Future: A New Paradigm Assuring Uranium Supplies in an Abnormal Market", World Nuclear Association Annual Symposium
Staff 67-M	FEIS Purpose and Need	Cornell, J. 2005. Secondary Supplies: Future Friend or Foe?, World Nuclear Association Annual Symposium

Party Exh. #	Witness/ Panel	Description
Staff 68-M	FEIS Purpose and Need	Van Namen, R. (2005) "Uranium Enrichment: Contributing to the Growth of Nuclear Energy", USEC Presentation to Platts Nuclear Fuel Strategies Conference.
Staff 69-M	FEIS Purpose and Need	Euratom (2005) "Analysis of the Nuclear Fuel Availability at EU Level from a Security of Supply Perspective", Euratom Supply Agency – Advisory Committee Task Force on Security of Supply.
Staff 70-M	FEIS Purpose and Need	International Energy Outlook (2000-2005)
Staff 71-M	FEIS Purpose and Need	EIA, "Uranium Marketing Annual Report," (2004), available at http://www.eia.doe.gov/cneaf/nuclear/page/forecast/projection.html.
Staff 72-M	FEIS Purpose and Need	Letter from W.D. Magwood, U.S. Dept. of Energy, to M. Virgilio, U.S. Nuclear Regulatory Commission, "Uranium Enrichment," (July 25, 2002).
Staff 73-M	FEIS Purpose and Need	U.S. Dept. of Energy, "The Global Nuclear Energy Partnership," (2006), available at http://www.gnep.energy.gov/default.html.
Staff 74-M	FEIS Purpose and Need	U.S. Dept. of Energy, "GNEP Element: Expand Domestic Use of Nuclear Power," (2006), available at http://www.gnep.energy.gov/pdfs/06-GA50035c_2-col.pdf.
Staff 75-M	FEIS Purpose and Need	U.S. Dept. of Energy, "GNEP Element: Establish Reliable Fuel Services," (2006), available at http://www.gnep.energy.gov/pdfs/06-GA50035g_2-col.pdf.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
LOUISIANA ENERGY SERVICES, L.P.	)	Docket No. 70-3103
	)	
(National Enrichment Facility)	)	ASLBP No. 04-826-01-ML
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF PRE-FILED MANDATORY HEARING TESTIMONY CONCERNING THE USE OF NUREG-1520 IN THE REVIEW OF THE LICENSE APPLICATION FOR THE PROPOSED NATIONAL ENRICHMENT FACILITY" in the above-captioned proceedings have been served on the following by deposit in the United States mail; through deposit in the Nuclear Regulatory Commission's internal system as indicated by an asterisk (*), and by electronic mail as indicated by a double asterisk (**) on this 24th day of February, 2006.

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