## UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

## BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In the Matter of

LOUISIANA ENERGY SERVICES, L.P.

(National Enrichment Facility)

Docket No. 70-3103

ASLBP No. 04-826-01-ML

NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW IN THE MANDATORY HEARING

Lisa B. Clark Margaret J. Bupp Counsel for NRC Staff

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## I. INTRODUCTION

1.1 These findings and rulings address all uncontested issues with respect to the application filed by Louisiana Energy Services, LP ("LES" or "the applicant") for a license, under 10 C.F.R. Parts 30, 40, and 70 to possess and use byproduct, source, and special nuclear material (SNM) in a gas centrifuge uranium enrichment facility.

1.2 These findings address the mandatory hearing required by the Atomic Energy Act. 42 U.S.C. § 2239(g). The issues raised during the contested portion of the proceeding were the subject of previous evidentiary hearings, and our findings addressing those issues are the subject of two Partial Initial Decisions on the admitted environmental contentions in the contested portion of the proceeding. *Louisiana Energy Services, L.P.* (National Enrichment Facility), LBP-05-13, 61 NRC 235 (2005) (First Partial Initial Decision (Environmental Contentions)); *Louisiana Energy Services, L.P.* (National Enrichment Facility), LBP-06-08, 63 NRC (2006) (Second Partial Initial Decision (Environmental Impacts of Disposal of Depleted Uranium). Our findings addressing the technical contentions in the contested portion of the proceeding will be issued separately.

1.3 For the reasons stated below, the Atomic Safety and Licensing Board ("Board")

makes the following findings of facts and conclusions of law.

#### II. PROCEDURAL BACKGROUND

2.1 On December 12, 2003, LES submitted to the NRC an application requesting a license, under 10 C.F.R. Parts 30, 40, and 70 to possess and use byproduct, source, and special nuclear material in a gas centrifuge uranium enrichment facility known as the National Enrichment Facility ("NEF") to be located in Lea County, New Mexico. *See* Staff Exhibit 49-M at xv. Notice of the NRC's receipt and consideration of the LES NEF license application was published in the *Federal Register* on February 6, 2004. "Notice of Receipt of Application for License; Notice of Availability of Applicant's Environmental Report; Notice of Consideration of Issuance of License; and Notice of Hearing and Commission Order," CLI-04-03, 59 NRC 10, 69 Fed. Reg. 5873 (February 6, 2004) ("Notice of Hearing").

2.2 As set forth in the Notice of Hearing, the Commission directed this Board to make findings in accordance with 10 C.F.R. § 2.104(b)(2), discussed further below. The Commission also provided specific guidance on certain issues related to environmental issues, financial qualifications, and other matters. *Id.* 

2.3 On April 6, 2004, this Board was established to rule on petitions for hearing and for leave to intervene, and to preside over the adjudicatory proceeding held in connection with the LES application, "Louisiana Energy Services, L.P.; Establishment of Atomic Safety and Licensing Board," 69 Fed. Reg. 22100 (Apr. 23, 2004), with the exception of the issue of standing of the parties, over which the Commission retained jurisdiction. Notice of Hearing, CLI-04-03, 59 NRC at 13-15.

2.4 On May 20, 2004, the Commission issued an Order in which it determined that petitioners Nuclear Information Resource Service and Public Citizen (NIRS/PC) had standing to intervene in the proceeding. *Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-04-15, 59 NRC 256, 257 (2004). On July 19, 2004, the Board issued a Memorandum and

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Order admitting certain NIRS/PC contentions and, therefore, admitted NIRS/PC as a party to the proceeding. *Louisiana Energy Services, L.P.* (National Enrichment Facility), LBP-04-14, 60 NRC 40 (2004). The admitted contentions were designated as environmental or technical/safety contentions. *Id.* at 77-80.

2.5 This Board held an evidentiary hearing on the admitted environmental contentions; NIRS/PC EC-1(Impacts on Ground and Surface Water), NIRS/PC EC-2 (Impact Upon Water Supplies), NIRS/PC EC-4 (Impacts of Waste Storage), and NIRS/PC EC-7 (Need for the Facility); in Hobbs, New Mexico, from February 7-10, 2005, in accordance with a notice of hearing published in the Federal Register. *See* "Memorandum and Order; Notice of Hearing and of Opportunity to Make Oral or Written Limited Appearance Statements," 70 Fed. Reg. 2429 (Jan. 13, 2005).

2.6 On June 8, 2005, we issued a partial initial decision on the issues heard at the evidentiary hearing held February 7-10, 2005. *Louisiana Energy Services*, LBP-05-13, 61 NRC 235. In the partial initial decision, we found that the NRC Staff ("Staff") and LES had carried their respective burdens of proof and, therefore, the NIRS/PC claims regarding the sufficiency of the Environmental Report and the Environmental Impact Statement could not be sustained.

2.7 NIRS/PC appealed the partial initial decision to the Commission. Petition on Behalf of NIRS/PC for Review of First partial Initial Decision on Environmental Contentions ("Petition for Review") (June 23, 2005). Among other errors NIRS/PC alleged that it should have been permitted to challenge the adequacy of the Staff's environmental review of impacts of waste disposal. *Id.* at 14. On October 19, 2005, the Commission issued a decision remanding additional issues for consideration by this Board, including the adequacy of the

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Staff's waste impacts analysis in its environmental impact statement.<sup>1</sup> *Louisiana Energy Services*, CLI-05-20, *slip op.* at 1 (Oct. 19, 2005).

2.8 This Board held an evidentiary hearing on the remaining contested issues in Rockville, MD from Monday October 24, 2005, through Thursday October 27, 2005. The hearing encompassed three combined environmental and technical contentions; EC-3/TC-1 (Depleted Uranium Hexafluoride Storage and Disposal), EC-5/TC-2 (Decommissioning Costs), and EC-6/TC-3 (Costs of Management and Disposal of Depleted UF<sub>6</sub>); and the remanded waste impacts issues, EC-4 (Impacts of Waste Storage and Disposal). Additional evidentiary hearings took place on February 13, 2006.

2.9 On March 3, 2006, we issued a second partial initial decision on the remanded waste impacts issue. *Louisiana Energy Services*, LBP-06-08, 63 NRC \_\_\_. We found that the Staff had met its burden in proving that the Final Environmental Impact Statement for the proposed facility is adequate with respect to the analysis of impacts of near-surface waste disposal. *Id.*, *slip op.* at 2.

2.10 In preparation for the uncontested portion of the licensing hearing, this Board reviewed the application and the Staff's review documents. Based on this review, the Board asked the Staff and LES to address certain issues in their presentations to the Board. Initially, certain questions were issued orally at the close of the October hearing on contested issues. These were written by the Staff, presented to the Board, and memorialized in "Memorandum and Order" (Administrative Matters Relative to Mandatory Hearing), February 8, 2006:

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<sup>&</sup>lt;sup>1</sup> The NIRS/PC petition for review also raised additional alleged Board errors. The Commission issued a separate decision on the waste impacts issue because it related to issues that this Board expected to consider in the October 2005 hearing. *Louisiana Energy Services*, CLI-05-20 at 2 (October 19, 2005). Subsequently, the Commission denied NIRS/PC's petition for review of the additional, alleged Board errors. *Louisiana Energy Services*, CLI-05-028 (Nov. 21, 2005).

- (a) How will the financial assurance mechanism deal with the possibility that there will be an outstanding bond for X dollars and suddenly there will be an increase in the cost of one of the major elements, and the possibility that the licensee might be unable to bear the additional cost?
- (b) Provide a quantitative analysis, preferably a fault-tree diagram, of the probability of significant water vapor intrusion with respect to criticality safety.
- (c) Provide a discussion of the interaction of hot hydrofluoric acid with the aluminum fluoride layer on the aluminum tubes in the case of significant water vapor intrusion. Will the aluminum fluoride in the presence of water vapor transform to aluminum oxide plus hydrogen fluoride? Will any resulting aluminum oxide flake off or will it continue to adhere as a different type of passivating layer?
- (d) Provide a discussion of the interaction of hydrogen fluoride with the various seals that are present. Are they attacked and degraded or are they some form of fluorinated compound (e.g., Teflon) that is impervious to attack?
- (e) Are any of the optimum criticality estimates referred to in the Safety Analysis Report at low, that is, ten to one or less hydrogen to uranium ratios?
- (f) Provide a copy of the revised MONK8 validation report and put a tab in at the discussion of optimum hydrogen to uranium ratios. Provide a discussion of the bias of the MONK8 results at the low level hydrogen to uranium ratios, that include a negative as well as positive bias, and may be inadequate in that case.
- (g) How was the MONK8 code with the Jef 2.2 cross-sections validated and verified for use with unmoderated cores? Describe the treatment of the inherent randomness of the unresolved cross-section in the discussion of unmoderated volume cases. How does the MONK8 code treat unresolved cross-sections?
- (h) If there is a fire in an electrical cabinet, how is the retained heat dissipated? After a fire is extinguished by an inert gas, fires have been found to re-ignite after the cabinet is opened. What steps are taken to address re-ignition?
- 2.11 This Board posed additional questions in a later Memorandum and Order.

"Memorandum and Order" (Memorializing Board Questions/ Areas of Concern for Mandatory

Hearings), January 30, 2006; see also February 6, 2006 Order (clarifying January 30, 2006

Order). The Board posed the following technical questions:

- (1) 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.
- (2) 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.
- (3) 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.
- (4) The Commission has directed the staff to investigate whether amendment of 10 C.F.R. Part 61 is required to properly address the issue of disposal of depleted uranium from an enrichment facility. In the context of its

decommissioning funding plan, LES will be providing a surety, in the form of a bond, covering all decommissioning costs expected during the term of that bond, The size of that bond will be determined a priori upon the basis of conditions at the time of issuance or renewal. The current sizing of that bond is proposed to be based upon near-surface disposal of depleted uranium. If the Commission determines, at a future date, that nearsurface disposal of depleted uranium from an enrichment facility such as the NEF is no longer appropriate, how will the bond be modified to accommodate the accompanying change in decommissioning costs? What mechanisms will be put in place at the issuance of the license to ensure that LES, which is a "single purpose" entity with no assets outside its ownership of the NEF, has the wherewithal to, and actually provides, the increased bond amount?

- (5) From Table 7-3 of the Monk 8 Verification/Validation report, revision 1, the Board sees that the criticality calculations for the items relied on for safety (IROFS) concerning pipe works involve hydrogen to uranium (H/U) ratios from 12 to 14. How does the staff compute the bias allowance for these cases, given the spreads indicated in Figure 6.3 of that report? Is the number in the Safety Evaluation Report (SER) correct?
- (6) How does the staff justify acceptance of IROFS for depleted uranium hexafluoride (UF<sub>6</sub>) mixtures with no hydrogen (except in the reflector) when, according to the second full paragraph in section 6.1 (page 29) of the report, the H/U ratio varied between 0.102 to 1378 in the calculations used for verification?
- (7) The Staff is requested to correlate the IROFS discussed in the SER with the cases listed in Table 7-3 of the report. Are all IROFS adequately represented in the table?
- (8) The Board requests that LES provide information regarding the following three matters:
  - (a) Which cases in Table 7-3 of the Monk 8 report correspond to no hydrogen moderation, i.e., DUF<sub>6</sub> only?
  - (b) Which critical experiments were analyzed to validate the code for such cases?
  - (c) In performing such validation work, how were the unresolved resonances treated?
- 2.12 In its January 30, 2006 Order the Board also posed two environmental

questions:

- (1) The purpose and need statement in section 1.3 of the staff's Final Environmental Impact Statement (FEIS) for the NEF is insufficient. The approach taken by LES is section 1.1 of its Environmental Report (ER) is adequate; however, it is not sufficient for the staff simply to rely upon the analysis done by LES. The Board requests that the staff make a presentation addressing the topics covered by LES in section 1.1 of the ER, indicating with specificity whether and why it agrees with that presentation.
- (2) In Appendix C to the FEIS, specifically in section C.4.2.2, the staff provides a discussion of hydraulic rupture of a  $DUF_6$  cylinder in the blending and liquid sampling area, which it presents as the most severe accident with regard to the public health and safety. In that discussion, the staff indicates that LES will provide an emergency plan outlining mitigating actions that could be taken to reduce the consequences of that accident, but presents only the example of securing the heating, ventilation, and air conditioning systems in the area affected by the accident. The staff and LES should provide the Board with information regarding what other mitigating actions are potentially available to reduce the consequences of that type of accident.

2.13 The Staff and LES presented written pre-filed testimony responding to the above guestions.

2.14 In response to questions 1, 2, and 3 from the Board's January 30, 2006 Order, the Staff filed "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," February 24, 2006 ("Staff NUREG-1520 Testimony," Tr. 3520). The testimony was presented by Timothy C. Johnson, the NRC Project Manager overseeing the licensing of the proposed NEF, and William Troskoski, a Senior Technical Reviewer in the NRC's Office of Nuclear Material Safety and Safeguards (NMSS), Division of Fuel Cycle Safety and Safeguards (FCSS).<sup>2</sup> LES did not provide testimony in response to questions 1, 2, and 3.

<sup>&</sup>lt;sup>2</sup> In addition, Staff witness Brian Smith offered testimony at the hearing in Hobbs, New Mexico on the Standard Review Plan, although he had not prepared pre-filed written testimony. *See* Tr. 3550.

2.15 In response to technical question 4 from the Board's January 30, 2006 Order, the Staff filed "NRC Staff Pre-filed Mandatory Hearing Testimony Regarding Financial Assurance," February 24, 2006 ("Staff Financial Assurance Testimony," Tr. 3562). The testimony was presented by Mr. Johnson and Craig Dean, a consultant at ICF Consulting who assisted the Staff in evaluating the proposed decommissioning funding plan for the NEF under a technical assistance contract with the NRC. In response to the same question, LES filed "Applicant's Prefiled Testimony in Mandatory Hearing Concerning Financial Assurance (Safety Matter No. 4)," February 24, 2006 ("LES Financial Assurance Testimony," Tr. 3566). The testimony was provided by Rod M. Krich, Vice President of Licensing, Safety, and Nuclear Engineering for LES.

2.16 In response to technical questions 5, 6, and 7 from the Board's January 30, 2006 Order, the Staff filed "NRC Staff Pre-Filed Mandatory Hearing Testimony Concerning Criticality," February 24, 2006 ("Staff Criticality Testimony," Tr. 3588). The testimony was provided by Mr. Troskoski; Harry Felsher, Nuclear Process Engineer, NRC, NMSS, FCSS; and Kevin Morrissey, Nuclear Process Engineer, NRC, NMSS, FCSS. In response to the same questions, as well as items b, e, f, and g from the October hearings, LES filed "Applicant's Prefiled Testimony in Mandatory Hearing Concerning Matters Related to Nuclear Criticality (Safety Matter Nos. 5-8 and October Hearing Questions 6.b, 6.e, 6.f, and 6.g)," February 24, 2006 ("LES Criticality Testimony," Tr. 3596). The applicant's testimony was provided by Mr. Krich; Daniel G. Green, Senior Consulting Engineer with EXCEL Services Corporation; Allan J. Brown, Design and Licensing Consultant for Urenco (Capenhurst) Ltd and Urenco Assistant Project Manager for the NEF; Barbara Y. Hubbard, Supervisory/Advisory Engineer for Framatome ANP; and David M. Pepe, Principal Engineer for Framatome ANP.

2.17 In response to items c and d from the October hearing questions, LES filed "Applicant's Prefiled Testimony in Mandatory Hearing Concerning the Compatibility of Uranium

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Hexafluoride and Hydrogen Fluoride with Centrifuge Plant Materials," February 24, 2006 ("LES Chemical Process Testimony," Tr. 3617). The testimony was presented by Mr. Krich, Mr. Green, Mr. Brown, and Scott M. Tyler, Manager in the Fire, Safety, and Risk Services Group at AREVA (Framatome ANP). The Staff did not prepare pre-filed written testimony on this subject.<sup>3</sup>

2.18 In response to item h from the October hearing, the Staff filed "NRC Staff Pre-Filed Mandatory Hearing Testimony Concerning Electrical Cabinet Fires," February 24, 2005 ("Staff Fire Safety Testimony," Tr. 3637). The testimony was provided by Rex G. Wescott, Senior Fire Protection Engineer, NRC. In response to the same item, LES filed "Applicant's Prefiled Testimony in Mandatory Hearing Concerning Fire Protection (October Hearing Question 6.h)," February 24, 2006 ("LES Fire Safety Testimony," Tr. 3640). The testimony was provided by Mr. Krich, Mr. Green, and Mr. Brown.

2.19 In response to environmental question 1 from the January 30, 2006 Order, the Staff filed "Revised NRC Staff Pre-Filed Mandatory Hearing Testimony Concerning the Purpose and Need Statement in the Final Environmental Impact Statement for the Proposed National Enrichment Facility," March 3, 2006 ("Staff Purpose and Need Testimony," Tr. 3656). The pre-filed written testimony was prepared by James Park, NRC Project Manager for the environmental review of the LES application, and Rick Nevin, a consultant with ICF Consulting who assisted the Staff in preparing a supplemental purpose and need analysis for the environmental review of the proposed NEF under a technical assistance contract with the NRC.<sup>4</sup> LES did not prepare testimony on this subject.

<sup>&</sup>lt;sup>3</sup> At the hearing in Hobbs, New Mexico on March 6, 2006, Staff witness Mr. Troskoski responded to oral questions from the Board. *See* Tr. 3628.

<sup>&</sup>lt;sup>4</sup> Staff witness Mr. Nevin was delayed in traveling to Hobbs and did not appear at the evidentiary hearings. His pre-testimony was authenticated by affidavit filed March 20, 2006. At the hearing, Mr. Johnson and Mr. Dean were empaneled with Mr. Park. *See* Tr. 3650.

2.20 In response to environmental question 2 from the Board's January 30, 2006 Order, the Staff filed "NRC Staff Pre-Filed Mandatory Hearing Testimony Concerning Mitigation of a Cylinder Rupture Accident," February 24, 2006 ("Staff Accident Testimony," Tr. 3670). The testimony was provided by David Brown, Senior Assistant for Materials, NRC. On the same topic, LES filed "Applicant's Prefiled Testimony in Mandatory Hearing Concerning Mitigating Actions for Postulated Cylinder Rupture Accident (Environmental Matter No. 2)," February 24, 2006 ("LES Accident Testimony," Tr. 3673). The testimony was presented by Mr. Krich, Mr. Green, and Mr. Tyler.

2.21 This Board held evidentiary hearings on the uncontested portion of the application, including the matters covered in the Staff and LES pre-filed testimony, in Hobbs, New Mexico on March 6, 2006. The witnesses who prepared pre-filed testimony, as discussed above, also appeared at the evidentiary hearings.

2.22 These proposed findings of fact and conclusions of law present the Board's findings of fact with respect to the evidence presented at the March 2006 hearing concerning the uncontested portions of the application, and the Board's conclusions of law with respect thereto.

#### III. LEGAL STANDARDS AND REGULATORY GUIDANCE

## A. <u>Regulatory Requirements</u>

3.1 For license applications for uranium enrichment facilities, the NRC must hold a hearing whether or not the issuance of the application is contested. Atomic Energy Act section 189a, 42 U.S.C. § 2239(g); *see also* 10 C.F.R. §§ 70.23a and 70.31(e) (requiring a hearing for uranium enrichment facility licenses). These types of hearings are known as "uncontested" or mandatory hearings. This is in contrast to a "contested" hearing, which will take place if "(1) there is a controversy between the NRC Staff and the applicant concerning the issuance of a license or any of the terms thereof, or (2) a petition for leave to intervene in opposition to the

application has been granted or is pending before the Commission." 10 C.F.R. § 2.4. If a

license application for a type of facility subject to the mandatory hearing requirement is

contested, the hearing will be bifurcated into contested and uncontested portions on an issue-

by-issue basis. Exelon Generation Company, LLC (Early Site Permit for Clinton ESP Site),

CLI-05-17, 63 NRC \_\_\_, slip op. at 12 (2005).

3.2 For contested hearings, 10 C.F.R. § 2.104(b)(1) requires the Board to consider:

(i) Whether in accordance with the provisions of § 50.35(a) of [10 C.F.R., regarding the issuance of construction permits for nuclear power reactors]:

(a) The applicant has described the proposed design of the facility, including, but not limited to, the principal architectural and engineering criteria for the design, and has identified the major features or components incorporated therein for the protection of the health and safety of the public;

(b) Such further technical or design information as may be required to complete the safety analysis, and which can reasonably be left for later consideration will be supplied in the final safety analysis report;

(c) Safety features or components, if any, which require research and development, have been described by the applicant and the applicant has identified, and there will be conducted, a research and development program reasonably designed to resolve any safety questions associated with such features or components; and

(d) On the basis of the foregoing, there is reasonable assurance that (1) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for completion of the proposed facility; and (2) taking into consideration the site criteria contained in Part 100 of this chapter, the proposed facility can be constructed and operated at the proposed location without undue risk to the health and safety of the public;

(ii) Whether the applicant is technically qualified to design and construct the proposed facility;

(iii) Whether the applicant is financially qualified to design and construct the proposed facility;

(iv) Whether the issuance of a permit for the construction of the facility will be inimical to the common defense and security or to the health and safety of the public;

(v) If the application is for a construction permit for a nuclear power reactor, a testing facility, a fuel reprocessing plant, or other facility whose construction or operation has been determined by the Commission to have a significant impact on the environment, whether, in accordance with the requirements of Subpart A of Part 51 of this chapter, the construction permit should be issued as proposed.

3.3 For hearings on uncontested applications (or on uncontested portions of

otherwise contested applications), the Board, pursuant to 10 C.F.R. § 2.104(b)(2), must

consider the following:

(i) Without conducting a *de novo* evaluation of the application, whether the application and the record of the proceeding contain sufficient information, and the review of the application by the Commission's staff has been adequate to support affirmative findings on (b)(1)9i) through (iii) specified in [10 C.F.R. § 2.104] and a negative finding on (b)(1)(iv) specified in [§ 2.104] proposed to be made and the issuance of the construction permit proposed by the . . . Director of Nuclear Material Safeguards and Safety . . . and

(ii) If the application is for a construction permit for a nuclear reactor, a testing facility, a fuel processing plant, a uranium enrichment facility, or other facility whose construction or operation has been determined by the Commission to have a significant impact on the environment, whether the review conducted by the Commission pursuant to [NEPA] has been adequate.

3.4 In addition, pursuant to 10 C.F.R. § 51.105(a), the Board must make the

following determinations regarding NEPA issues:

- Determine whether the requirements of section 102(2)(A), (C) and (E) of [NEPA] and the regulations in [10 C.F.R. Part 51, Subpart A] have been met;
- (2) Independently consider the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken; and

(3) Determine, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, whether the construction permit . . . should be issued, denied, or appropriately conditioned to protect environmental values.

3.5 On July 28, 2005, the Commission issued a Memorandum and Order responding to six questions certified by the ASLB Panel concerning the NRC's statutory duty to conduct a "mandatory" (or uncontested) hearings for certain license applications. *Clinton ESP*, CLI-05-17, 63 NRC \_\_\_. Among the questions raised was whether in uncontested hearings the Board should conduct a "*de novo*" review of the license application or whether the Board should instead determine only whether the Staff's review of the application was sufficient. The Commission determined that a *de novo* review is not necessary for mandatory hearings. Rather,

when considering safety and environmental matters not subject to the adversarial process – so-called 'uncontested' issues – the boards should decide simply whether the safety and environmental record is 'sufficient' to support license issuance. In other words, the boards should inquire whether the NRC staff performed an adequate review and made findings with reasonable support in logic and fact.

*Id.* at 18. With respect to NEPA considerations, the Commission stated that "licensing boards must reach their own independent determination on uncontested NEPA 'baseline' questions–*i.e.*, whether the NEPA process 'has been complied with,' what is the appropriate 'final balance among conflicting factors,' and whether the construction permit should be issued, denied or appropriately conditioned.'" *Id.* at 27.

B. <u>NRC Guidance</u>

3.6 The Staff has developed generic guidance for reviewing applications for licenses

for fuel cycle facilities, including enrichment and fuel fabrication facilities, in NUREG-1520,

"Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility,"

(NUREG-1520), Staff Exhibit 51-M. Additional guidance documents applicable to material

control and accounting and physical security at fuel cycle facilities are: NUREG-1065, "Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities," and 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." NUREG-1520 Staff Testimony at 3.

3.7 The purpose of standard review plans (SRP) is to ensure that Staff reviews of license applications are complete, address all of the appropriate hazardous situations expected within a group of facilities, and are consistent among different facilities within the same group of facilities covered by an SRP. Tr. 3524. NUREG-1520 was developed for nuclear fuel cycle facilities licensed under 10 C.F.R. Part 70, and addresses the scope of the review and the level of detail required in the review and includes the acceptance criteria that must be met in order for the Staff to make a positive finding in the license review. *Id.* at 3524-25.

3.8 In order to ensure that all key areas of review for a fuel cycle facility would be covered by the SRP, NUREG-1520 was developed by the Staff after consultations with representatives of the nuclear industry and members of the public, and a draft was published in the Federal Register for public comment. Tr. 3525. The Commission also reviewed NUREG-1520 prior to its adoption by the Staff. Tr. 3556.

3.9 An SRP may also provide guidance to a license applicant on the kind of information that the Staff will expect to see during its review of the application. Tr. 3526. Applicants commonly use SRPs to define and scope out the content of applications, to make sure that all important areas are covered in their applications, and to produce high quality applications that will allow the Staff to perform its review in a timely fashion. *Id.* 

3.10 NUREG-1520 applies to a wide range of facilities licensed under 10 C.F.R. Part 70, which is a performance-based regulation designed to limit the overall risk of the

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licensed facility. Tr. 3514. The range of facilities considered by NUREG-1520 includes uranium enrichment facilities like the NEF, fuel fabrication facilities, and the mixed-oxide (MOX) fuel fabrication facility. Staff NUREG-1520 Testimony at 4. While NUREG-1520 is applicable to the various types of facilities licensed under Part 70, the Staff's review is necessarily informed by the relative risk of each type of Part 70 facility. *Id.* The Staff's review of each type of license application would focus on the specific types of hazards associated with the particular technology involved. *Id.* Thus, the rigor of the Staff's review will vary from facility to facility even though the same regulations and SRP apply to each type of facility.

3.11 Based on the processes performed at each type of facility licensed under Part 70, 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. Staff NUREG-1520 Testimony at 4.

3.12 Gas centrifuge uranium enrichment facilities such as the proposed NEF are considered to have the lowest level of potential risk for several reasons. The main hazard at the proposed NEF is not a radiological hazard, but rather a chemical hazard from uranium hexafluoride (UF<sub>6</sub>). *Id.* at 6. The only licensed material to be present at the facility other than sealed sources used for instrument calibration is natural uranium or uranium enriched up to five percent U<sup>235</sup>. *Id.* The proposed NEF will contain only limited quantities of uranium hexafluoride in a gaseous form and will operate at near vacuum conditions. *Id.* Because the proposed NEF will utilize a relatively simple process and there will not be enough material in the process for inadvertent criticality to occur, the nuclear criticality safety risk is low. *Id.* at 8.

3.13 In contrast, the proposed MOX fuel fabrication facility (MFFF) is considered to have the highest level of risk among Part 70 facilities. The MFFF will convert surplus weapons grade plutonium into fuel for commercial reactors. Staff NUREG-1520 Testimony at 7. The process involves purification of the plutonium to remove Americium-241, Gallium, and

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high-enriched uranium using a liquid-solvent extraction process involving the use of hazardous chemicals. *Id.* The MOX process carries increased concerns about chemical safety, nuclear criticality safety, fire risks, and radiation protection. *Id.* 

3.14 LES's application follows NUREG-1520. In addition, LES used other standard guidance documents in preparing its application, such as regulatory guides, branch technical positions, NUREG documents, interim staff guidance, and industry standards published by the American National Standards Institute, the American Nuclear Society, the American Society of Mechanical Engineers, and other professional organizations. Staff NUREG-1520 Testimony at 33. Many of these documents are referenced in NUREG-1520. *Id.* LES also followed some additional guidance documents not referenced in NUREG-1520, some of which were not referenced in NUREG-1520 because they were developed for commercial power reactors. Tr. 3540-41. During its review of the LES application, the Staff evaluated guidance documents used by LES but not referenced in NUREG-1520 and determined whether each document was applicable to the proposed NEF. Tr. 3542.

#### IV. FINDINGS OF FACT

## A. <u>SER, Chapter 1, "General Information"</u>

4.1 Chapter 1 of the Safety Evaluation Report (SER), Staff Exhibit 51-M, evaluates information provided in the license application related to the facility and process description, institutional information, and the site description. Staff Exhibit 49-M, Chapter 1. The Staff's review is guided by Chapter 1 of NUREG-1520, which outlines acceptance criteria for the above information based on applicable regulatory requirements. The guidance contained in Chapter 1 is applicable to the proposed NEF in its entirety. Staff NUREG-1520 Testimony at 10.

4.2 The application's facility and process description must conform with 10 C.F.R.
§ 70.22, "Contents of Applications," and 10 C.F.R. § 70.65(b)(1)-(3), "Additional Content of Applications." Staff Exhibit 51-M at 1-1. NUREG-1520 lists the following acceptance criteria for

determining whether an application conforms with these regulatory requirements: (1) The application presents information at a level of detail that is appropriate for general familiarization and understanding of the proposed facility and processes; (2) The application summarizes the facility information contained in the ISA Summary, including descriptions of the overall facility layout on scaled drawings, the site's geographical features and facility structural features and transportation right-of-ways, and the relationship of specific facility features to the major processes that will be ongoing at the facility; (3) The major chemical or mechanical processes involving licensable quantities of SNM are described in summary form, based in part on information in the ISA Summary, and including reference to the building locations of major process components, brief descriptions of process steps, the chemical forms and maximum amounts of SNM in process, and the types, amounts and discharge points of waste materials; and (4) The application presents a summary identification of the raw materials, by-products, wastes, and finished products of the facility. *Id.* at 1-2.

4.3 Because LES followed the guidance in Chapter 1 of NUREG-1520, the Staff reviewed the information provided by LES against the acceptance criteria listed above. *See* Staff Exhibit 49-M at 1-1.The review confirmed that LES provided a summary description of the proposed gas centrifuge uranium enrichment plant and processes, a summary of the information contained in the ISA summary, described the major chemical and mechanical processes involving licensable quantities of SNM, and identified the raw-materials, by-products, wastes, and finished products expected at the facility. *Id.* at 1-1 to 1-3.

4.4 Based on its review pursuant to NUREG-1520 of the information provided by LES, the Staff found that LES met all regulatory requirements and acceptance criteria applicable to the facility and process description. Staff Exhibit 49-M at 1-3, 1-11, and 1-24. The Staff also found that LES adequately described the proposed facility and process so that the Staff had an overall understanding of the relationships of the facility features and the

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function of each feature. Id. at 1-3.

4.5 The applicant's institutional information must comply with 10 C.F.R. § 70.22,

"Contents of Applications"; 10 C.F.R. § 70.65(b)(1)-(3), "Additional Contents of Applications";

10 C.F.R. § 70.33, "Renewal of Licenses"; and 10 C.F.R. Part 95, "Security Facility Approval

and Safeguarding of National Security Information and Restricted Data." NUREG-1520 lists

acceptance criteria for gauging whether or not an application complies with the applicable

regulations. Staff Exhibit 51-M at 1-3. These acceptance criteria are:

- (1) Corporate Identity. The applicant will furnish its name and address and the address of the facility, along with a full description of the site location. If the application is a corporation or other entity, the names and citizenship of its principal officers are provided, along with any information concerning the control or ownership of the applicant by any alien, foreign corporation or foreign government. Primary ownership and relationships to other components of the same relationship are explicitly described, as are the presence and operations of any other company on the site to be licensed.
- (2) Financial Qualifications. A description of financial qualifications demonstrates the applicant's current and continuing access to the financial resources necessary to engage in the proposed activity in accordance with 10 C.F.R. §§ 70.22(a)(8) and 70.23(a)(5).
- (3) Type, Quantity, and Form of Licensed Material. An identification of the elemental name, maximum quantity, and specifications, including the chemical and physical form(s), isotopic content and amount of enrichment by weight percent, of the SNM that the applicant proposes to acquire, deliver, receive, possess, produce, use, transfer, or store.
- (4) Authorized Uses. A summary, non-technical narrative description consisted with the Atomic Energy Act of 1954 and more detailed process descriptions submitted as part of the ISA summary is provided for each activity or process in which the applicant proposes to acquire, deliver, receive, possess, produce, use, transfer, or store SNM.
- (5) Special Exemptions or Special Authorizations. Specific requests for exemptions or authorizations of an unusual nature should be listed in this section and justified in the appropriate technical section of the application.

(6) Security of Classified Information. If applicable, the applicant has requested and received a facility security clearance in accordance with 10 C.F.R. Part 95.

4.6 The Staff reviewed the portions of the application related to institutional information against the acceptance criteria listed above. Staff Exhibit 49-M at 1-3 to 1-11. All areas referred to in the acceptance criteria were described. *Id.* 

4.7 Based on its review of the application pursuant to NUREG-1520, with regard to the institutional information in the application, the Staff found that LES adequately described and documented the corporate identity, structure, and financial information, and had adequately described the types, forms, and quantities and proposed purpose and authorized uses of licensed materials to be permitted at the facility. *Id.* at 1-11. With regard to the information provided on liability insurance, the Staff found that the information meets the requirements of 10 C.F.R. § 140.13b, but, because full liability insurance coverage will not be provided until prior to receipt of licensed material, imposed the following license condition:

The licensee shall provide proof of full liability insurance as required under 10 C.F.R. § 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.

*Id.* The Staff also found that the applicant, in accordance with 10 C.F.R. §§ 30.32, 40.31, and 70.22(a)(2) and (4), has adequately described the types, forms, quantities and proposed purpose and authorized uses of licensed materials to be permitted at the facility. The Staff found that the applicant provided information on an exemption request related to decommissioning funding, described further below, that meets the requirements of 10 C.F.R. §§ 40.14 and 70.17. Finally, the Staff found that the application adequately described information related to security of classified information and its plans to secure classified matter

for a facility clearance under 10 C.F.R. Parts 25 and 95. Therefore, the Staff concluded that the applicant had met the requirements and acceptance criteria applicable to institutional information.

4.8 Information related to the site description must comply with 10 C.F.R. § 70.22, "Contents of Applications." Staff Exhibit 51-M at 1-7. NUREG–1520 lists acceptance criteria for gauging whether or not an application provides sufficient information in the site description. These are whether the description: (1) briefly describes site geography, including its location relative to prominent natural and man-made features and the site boundary and controlled area; (2) provides population information based on the most current available census data to show population distribution as a function of distance from the facility; (3) addresses appropriate meteorologic data, including a summary of design-basis values for accident analysis of maximum snow or ice load, probable maximum precipitation, and severe weather conditions that are applicable to the site; (4) includes a summary description of the hydrology and geology for the area, cites the design-basis flood event for which the facility may safely be shut down, and provides earthquake accelerations for the site associated with a 250-year and 500-year earthquake; and (5) are consisted with the more detailed information presented within the ISA Summary, the environmental report, and the emergency plan.

4.9 The Staff reviewed the site description information provided by the applicant against the acceptance criteria listed above. Staff Exhibit 49-M at 1-11 to 1-24. The applicant provided complete information related to each of the acceptance criteria. *Id.* 

4.10 Based on its review pursuant to NUREG-1520, the Staff found that the applicant had adequately described and summarized general information pertaining to: (1) the site geography; (2) population information; (3) meteorology, hydrology, and geology for the site; and (4) applicable design basis events. The Staff also verified that the site description is consistent with the information used as a basis for the ER, emergency plan, and ISA summary. Thus, the

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Staff found the information related to the site description complied with 10 C.F.R. § 70.22.

4.11 Based on the above, we find that the Staff had a reasonable basis for its conclusions, and that the record is sufficient with respect to the descriptions of the proposed facility, the process, and the site of the proposed facility to support license issuance.

B. <u>SER, Chapter 2, "Organization and Administration"</u>

4.12 Chapter 2 of the SER evaluates information related to the applicant's organization and administration. Staff Exhibit 49-M at 2-1. Review of this information ensures that the applicant's proposed management policies will provide reasonable assurance that the licensee will plan, implement, and control site activities in a manner that ensures the safety of workers, the public, and the environment. *Id.* Guidance for this review is provided by NUREG-1520 Chapter 2. All portions of NUREG-1520, Chapter 2 applicable to new facility applications in general were also applicable to the proposed NEF. Staff NUREG-1520 Testimony at 10.

4.13 The information provided by the applicant in connection with the proposed facility's organization and administration must comply with 10 C.F.R. §§ 70.22, 70.23, and 70.62(d). Staff Exhibit 51-M at 2-2. Acceptance criteria for new facility applications include whether: (1) the applicant has identified and functionally described the specific organizational groups that are responsible for managing the design, construction, and operation of the facility and has included organizational charts; (2) clear, unambiguous management controls and communications exist among the organizational units that are responsible for managing the design and construction of the facility; (3) the personnel responsible for managing the design, construction, and operation of the facility have substantive breadth and level of experience and are appropriately available, and their qualifications, responsibilities, and authorities are clearly defined; and (4) the applicant has described specific plans to commission the facility's startup and operation.

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4.14 Guided by the acceptance criteria described above, the Staff reviewed the information provided by the applicant in relation to the organization and administration of the proposed facility. Staff Exhibit 49-M at 2-1 to 2-11. The review indicated that the applicant provided all required information, including descriptions of organizational responsibilities and qualifications and management controls related to the following: the configuration management program, the maintenance program, a planned formal training program, operational procedures for all operations involving licensed material, a quality assurance program that requires periodic audits and assessments of activities affecting quality, a safety review committee, a corrective action program, a "stop-work" process for any employee who feels that safety or quality could be compromised in any work activity, and a records management program. *Id.* The review also showed that LES has described the transition from the design and construction phase to the operational phase of the proposed facility.

4.15 Based upon the Staff's review, the Staff found that the applicant had described the following organizational and administrative elements: (1) clear responsibilities and associated resources for the design, construction, and operation of the facility; and (2) its plans for managing and operating the project. Staff Exhibit 49-M at 2-11. The staff concluded that the described organizational and administrative elements provide reasonable assurance that an acceptable organization, administrative policies, and sufficient competent resources have been established or are committed to satisfy the applicant's commitments for the design, construction, and operation fo the facility. Therefore, the Staff found that the application complies with 10 C.F.R. §§ 30.33, 40.32, 70.22, 70.23, 70.62(d).

4.16 Based on the above, we find that the Staff had a reasonable basis for its conclusions, and that the record is sufficient with respect to proposed facility's organizational and administrative elements to support license issuance.

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## C. <u>SER, Chapter 3, "Integrated Safety Analysis (ISA) and ISA Summary"</u>

4.17 Chapter 3 of the SER, Staff Exhibit 49-M, documents the Staff's review of the Integrated Safety Analysis (ISA) and the Integrated Safety Analysis Summary (ISA Summary). The ISA is required by 10 C.F.R. § 70.62( c), which provides that each applicant shall conduct and maintain an integrated safety analysis that identifies (i) radiological hazards related to possessing or processing licensed materia at its facility, (ii) chemical hazards of licensed material and hazardous chemicals produced from licensed material, (iii) facility hazards that could affect the safety of licensed materials and thus present an increased radiological risk, (iv) potential accident sequences caused by process deviations or other events internal to the facility and credible external events, including natural phenomena, (v) the consequence and likelihood of occurrence of each potential accident sequence and the methods used to determine the consequences and likelihoods, and (vi) each item relied on for safety (IROFS) identified pursuant to § 70.61(e), the characteristics of its preventive, mitigative, or other safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of § 70.61.

4.18 The applicant must submit an ISA Summary with the license application, which is not incorporated into the license. 10 C.F.R. § 70.65(b). The ISA Summary is required to contain (1) a general description of the site with emphasis on those factors that could affect safety, (2) a general description of the facility with emphasis on those areas that could affect safety, (3) a description of each process analyzed in the ISA is sufficient detail to understand the theory of operation and, for each process, the hazards identified in the ISA and a general description of the types of accident sequences, (4) information demonstrating compliance with the performance requirements of § 70.61, (5) a description of the team, qualifications, and the methods used to perform the ISA, (6) a list briefly describing each IROFS in sufficient detail to understand their functions in relation to the performance requirements of § 70.61, (7) a

description of the proposed quantitative standards used to assess consequences to an individual from acute chemical exposure to licensed material or chemicals produced from licensed material, (8) a descriptive list that identifies all IROFS that are the sole item preventing or mitigating an accident sequence that exceeds the performance requirements of § 70.61, and (9) a description of the definitions of unlikely, highly unlikely, and credible.

4.19 Thus, one purpose of the ISA and the ISA Summary is to demonstrate the applicant's compliance with the performance requirements of § 70.61. That regulation provides that the risk of events that could have significant impacts to workers or the public to be limited. Specifically, § 70.61(b) requires that high consequence events be highly unlikely and § 70.61(c) requires that intermediate consequence events be unlikely. In addition, § 70.61(d) provides that 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. Additionally, that provision requires that preventive controls be the primary means of protection against nuclear criticality accidents.

4.20 The regulations in 10 C.F.R. § 70.64(a)(9), also require that the design of new facilities and processes provide for criticality control, including adherence to the double contingency principle, which means that process designs should incorporate sufficient factors of safety to require at least two unlikely, independent and concurrent changes in process conditions before a criticality accident is possible. Staff Criticality Testimony at 6.

4.21 The SRP, Staff Exhibit 51-M, sets forth acceptance criteria designed to demonstrate compliance with the regulations relating to the ISA and ISA Summary in Chapter 3. The acceptance criteria in that chapter are generally applicable to the uranium enrichment facility proposed in the application submitted by LES. Staff SRP Testimony at 10. In applying those criteria to a license application, the focus of the applicant and the Staff is on

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program and design commitments because LES had not completed the final, detailed facility design. Staff SRP Testimony at 10-11. The implementation of those commitments will be confirmed by the Staff when it conducts its operational readiness review. *Id.* 

4.22 LES utilized the approach outlined in SRP Chapter 3 to demonstrate compliance with regulatory requirements regarding the ISA and ISA Summary with the exception of a safeby-design approach for components related to nuclear criticality safety for which the only possible means of failure would be to incorrectly alter the component by replacement or physical alteration. The Staff presented pre-filed testimony regarding this approach and documented its review and acceptance of the safe-by-design approach in SER Chapter 3. Staff SRP Testimony at 11-14; Staff Criticality Testimony at 8-9; Staff Exhibit 49-M at 3-48 to 49 and 5-35. For those components, LES proposed an alternative means to demonstrate regulatory compliance, which was approved by the Staff. *Id.* at 8-9. First, LES defined safe-by-design components as those that are demonstrably safe by physical size or arrangement and have been determined to be safe by analysis. *Id.* 

4.23 For those components that are safe by volume, diameter or slab thickness (favorable geometry components), LES demonstrated that the parameter values were less than those of a set of generic, conservative values for criticality from NRC-approved sources. *Id.* For the remaining components, LES performed a detailed analysis and calculations to demonstrate an approved safety margin for criticality (defined as 10% between the actual parameter value of the component and the design value of the critical attribute). *Id.* 

4.24 LES designated all safe-by-design components as items that may affect IROFS, and therefore placed them subject to Quality Level 1 requirements, which are the same requirements that apply to IROFS. *Id.* 

4.25 The Staff criticality reviewer reviewed the methodology proposed by LES and determined that it was a reasonable approach for demonstrating regulatory compliance. Staff

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Criticality Testimony at 24-25; Staff Exhibit 49-M at 5-35. In addition, the Staff reviewed the LES documentation supporting its safe-by-design demonstration for each of the identified safeby design components. Staff Exhibit 49-M at 5-35. The Staff reviewed the dimensions of each component provided, calculated the geometry percentages, and compared the percentage to the appropriate criteria. *Id.* For non-favorable geometry components, the Staff reviewed the assumptions used by LES and compared the calculated  $k_{eff}$  value to  $k_{eff}$  limit criteria. *Id.* 

4.26 Based on this review, the Staff concluded that LES had appropriately applied the safe-by-design criteria proposed and that, therefore, it was highly unlikely that the safety-by design components would fail. *Id.* 

4.27 Based on the information provided regarding the application and the Staff review documents, the Board finds that the safe-by-design methodology used by LES for certain components constitutes an appropriate means to satisfy the applicable regulatory requirements and was adequately reviewed by the Staff. Therefore, we uphold the Staff's finding that LES has provided a sufficient demonstration that for these safe-by-design components, the performance requirements of 10 C.F.R. § 70.61 have been satisfied.

4.28 For components not designated as safe-by-design, LES used the approach outlined in Chapter 3, including Appendix A of the SRP. Staff Criticality Testimony at 9-12; Staff Exhibit 49-M at 3-43 to 3-53. Using that approach, LES identified (1) the radiological hazards related to possessing or processing licensed material, (2) the chemical hazards of licensed material and hazardous chemicals produced from licensed material, (3) facility hazards that could affect the safety of licensed materials and present an increased radiological risk by conducting a hazard analysis, (4) the potential accident sequences caused by process deviations or other events internal to the facility as well as credible external events, (5) the consequences and likelihood of occurrences of each potential accident sequence and the

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methods used to determine consequences and likelihoods, and (6) the IROFS for each accident sequence and the characteristics of its preventive or mitigative safety function. *Id.* 

4.29 LES utilized a method known as the HAZOP method to identify potential radiological, chemical and other facility hazards and accidents. This method is one which has been accepted by the Staff. Staff Criticality Testimony at 10. This analysis was conducted by a team of individuals with diverse technical disciplines and led by an individual qualified in the HAZOP method. *Id*.

4.30 To determine risk associated with postulated accidents, LES assumed that every credible inadvertent criticality would have high consequences. *Id.* Because every potential criticality would therefore be required to be highly unlikely to satisfy 10 C.F.R. § 70.61(b), this is a conservative assumption. Additionally, LES used only preventive measures to reduce the risk of potential criticality accidents, consistent with § 70.61(d). *Id.* 

4.31 LES documented its analysis in the ISA and summarized the results in the ISA Summary. *Id;* Staff Exhibit 49-M at 3-50 to 3-53. The ISA Summary includes a description of all accident sequences that could exceed the performance requirements of 10 C.F.R. § 70.61, IROFS, and the management measures that allow the IROFS to be available and reliable to perform their intended function. *Id.* These are presented in the ISA summary in a risk matrix which presents the consequences and likelihood to calculate a qualitative risk index. *Id.* LES also described the manner in which the terms "highly unlikely," "unlikely" and "not unlikely" were defined according to probability of occurrence. *Id.* 

4.32 The Staff reviewed the ISA Summary using two basic approaches. First, the ISA methodology and program commitments were reviewed to determine whether LES had properly applied the approach described in Chapter 3 of the SRP and Appendix A. Staff Criticality Testimony at 16-18. Secondly, selected accident sequences were reviewed to confirm that the applicant adequately implemented its methodology. *Id.* Based on this review, the Staff

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determined that the approach in the SRP for evaluating accident sequences had been properly implemented. *Id.* 

4.33 The Staff also reviewed the ISA Summary for completeness and accuracy. The Staff reviewed all of the chemical and all of the criticality accident sequences and determined with reasonable certainty that all hazards and accidents that could exceed the performance requirements were identified. *Id.* 

4.34 The Staff's ISA review also included all of the IROFS that had been identified and confirmed that LES has appropriately assigned values in the risk matrix that would reduce the likelihood of consequences to an appropriate level. *Id.* The accident sequences were also determined to be adequately described and that the corresponding IROFS were adequately described and reasonable for the intended function. *Id.* 

4.35 Based on its review, the Staff determined that the applicant had identified and evaluated the hazards and potential accidents in the ISA Summary. Further, the Staff determined that the ISA Summary and supporting information reviewed provided reasonable assurance that LES had identified IROFS to ensure compliance with the performance requirements of 10 C.F.R. § 70.61. *Id.* at 16-22.

4.36 In addition to the demonstration of compliance with the performance criteria in § 70.61, the Staff reviewed LES's general description of the site, facility, processes and baseline design criteria. The Staff's review of the site description included all elements which could affect safety as set forth in § 3.3.2(1) of the SRP, including geography, meteorology, seismology, demography and nearby industrial facilities and transportation routes. Staff Exhibit 49-M at 3-5 to 3-25. The Staff's review is complete and provides a sufficient description to support its conclusion that the application's site description is sufficient.

4.37 The Staff's review of the facility description included examples of features that could affect potential accidents and their consequences as provided in § 3.3.2(2) of the SRP.

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Specifically, the Staff considered the available information regarding the facility arrangement, buildings and major components, as well as the structural design criteria. The structures determined to be safety significant are to be built to withstand design-basis natural phenomena hazards and external hazards. Staff Exhibit 49-M at 3-25 to 3-32. The Staff determined that the design loads used by LES and the approaches used to develop seismic design loads for these structures and components were developed based on site characteristics, followed acceptable codes and standards, and contained adequate conservatism and satisfied the regulatory criteria in 10 C.F. R. §§ 70.64(a)(2), 70.64(a)(4), and 70.65(b)(2). Staff Exhibit 49-M at 3-32.

4.38 Based on the information contained in the Staff review documentation, we conclude that the Staff's review was sufficiently thorough to support the conclusion that there is reasonable assurance that the regulatory requirements concerning the ISA and the ISA Summary have been satisfied.

#### D <u>SER, Chapter 4, "Radiation Protection"</u>

4.39 Chapter 4 of the SER reviews information related to the applicant's radiation protection program. Staff Exhibit 49-M at 4-1. The purpose of the Staff's review is to determine whether the radiation protection program is adequate to protect the radiological health and safety of the workers and to comply with the applicable regulatory requirements. *Id.* The Staff's review of the adequacy of the applicant's radiation protection program is guided by Chapter 4 of NUREG-1520, which is applicable to the LES facility in its entirety. Staff NUREG-1520 Testimony at 14.

4.40 The applicant's radiation protection program must address the occupational radiation protection measures in 10 C.F.R. Parts 19, 20, 30, 40, and 70. Specifically, the applicant must develop, document, and implement a radiation protection program in accordance with 10 C.F.R. § 20.1101, which requires that:

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(a) Each licensee shall develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of [10 C.F.R. Part 20].

(b) The licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as reasonably achievable (ALARA).

(c) The licensee shall periodically (at least annually) review the radiation protection program content and implementation.

(d) To implement the ALARA requirement . . . and notwithstanding the requirements in § 20.1301 . . . a constraint on air emissions of radioactive material to the environment, excluding Radon-222 and its daughters, shall be established by licensees . . . such that the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of 10 mrem (0.1 mSv) per year from these emissions. If a licensee subject to this requirement exceeds this dose constraint, the licensee shall report the exceedance as provided in § 20.2203 and promptly take appropriate corrective action to ensure against recurrence.

4.41 Acceptance criteria used by the Staff in determining whether the licensee's radiation protection program provides adequate protection are listed in Chapter 4 of NUREG-1520. Staff Exhibit 51-M at 4-2 to 4-12. The Staff has developed separate acceptance criteria for each portion of the radiation protection program.

4.42 Acceptance criteria related to radiation protection program implementation guide

the Staff in determining whether the applicant has complied with 10 C.F.R. Part 20, subpart B,

"Radiation Protection Programs." Staff Exhibit 51-M at 4-2. Under these criteria, the

applicant's radiation protection program is acceptable if the applicant provides data and

information in the application that meets each of the following commitments to: (1) design and

implement a radiation protection program that meets the regulatory requirements of 10 C.F.R.

Part 20, subpart B; (2) outline the radiation protection program structure and define the

responsibilities of key program personnel; (3) staff the radiation protection program with suitably

trained people, provide sufficient resources, and implement the program; (4) commit to the independence of the radiation protection function from the facility's operations; and (5) review, at least annually, the content and implementation of the radiation protection program as required by 10 C.F.R. § 20.1101(c). *Id.* 

4.43 In Chapter 4 of the SER, the Staff reviewed the information provided in the application regarding radiation protection program implementation against the acceptance criteria listed above. Staff Exhibit 49-M at 4-2 to 4-4. The review showed that the applicant describes the proposed radiation protection program for the proposed facility and outlines its organizational structure and the responsibilities of key program personnel, as well as the proposed training and qualification program for the radiation protection program personnel. According to the applicant, the radiation protection program will be independent of regular operations. The program will be reviewed at least annually in accordance with 10 C.F.R. § 20.1101(c), and the program will adhere to constraints on atmospheric releases in accordance with 10 C.F.R. § 20.1101(d).

4.44 The applicant's ALARA program must conform to 10 C.F.R. § 20.1101, described above, by maintaining occupational exposures and environmental releases as far below regulatory limits as is reasonable achievable. *See* Staff Exhibit 49-M at 4-4. Chapter 4 of NUREG-1520 lists acceptance criteria that guide the Staff in determining whether or not the applicant's ALARA program is acceptable. Under these criteria, the program is acceptable if the applicant makes and provides data and information related to the following commitments to: (1) establish a comprehensive, effective, and written ALARA program; (2) prepare policies and procedures to ensure occupational radiation exposures are maintained ALARA and that such exposures are consistent with applicable regulations; (3) outline specific program goals, establish a program organization, and have written implementation procedures; (4) establish an ALARA Committee or equivalent organization to ensure that the occupational dose limits of

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10 C.F.R. Part 20 are not exceeded under normal operations; (5) use the program as a mechanism to facilitate interaction between radiation protection and operations personnel; and (6) regularly review and revise the program goals and objectives and incorporate changes that could reduce radiation exposure at a reasonable cost. Staff Exhibit 51-M at 4-3 to 4-4.

4.45 The Staff reviewed the applicant's proposed ALARA program against the acceptance criteria listed above. Staff Exhibit 49-M at 4-4 to 4-5. Accordingly the applicant will maintain an ALARA program in accordance with the acceptance criteria outlined in Chapter 4 of NUREG-1520. *Id.* at 4-5. The review showed that the ALARA program and its goals have been described in the application. The program will be implemented through written policies and procedures. The radiation protection manager will be responsible for implementing the ALARA program and for preparing the annual program evaluation report. The applicant will establish a Safety Review Committee, which will fulfill the duties of the ALARA Committee and will review and revise the program goals and objectives when appropriate.

4.46 Information related to the organization and qualifications of the radiation protection staff must comply with 10 C.F.R. § 70.22, "Contents of Applications." Acceptance criteria in NUREG-1520 related to the organization and qualifications of the radiation protection staff state that the applicant's program is acceptable if the application provides data and information that meet each of the following commitments to: (1) appoint suitably trained radiation protection personnel and identify their authority and responsibilities; (2) establish clear organizational relationships among the individual positions responsible for the radiation protection program and other line managers; (3) appoint a suitably trained radiation protection program director; (4) assign responsibility to the radiation protection program staff for implementation of the radiation protection program functions; and (5) describe the minimum training requirements and qualifications for the radiation protection staff. Staff Exhibit 51-M at 4-4 to 4-5.

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4.47 The Staff reviewed the applicant's organization and personnel qualifications against the acceptance criteria listed above. Staff Exhibit 49-M at 4-5. According to the SER, the radiation protection program will be organized and staffed in accordance with the acceptance criteria. The review found that the applicant will employ suitably trained radiation protection personnel at the facility who will have the responsibility of implementing the radiation protection program. The application also indicated that LES will employ a suitably qualified radiation protection manager who will be responsible for establishing and implementing the radiation protection program.

4.48 Regulatory requirements applicable to radiation protection procedures are presented in 10 C.F.R. § 70.22(a)(8), which requires that applications contain "proposed procedures to protect health and minimize danger to life or property." In order to determine compliance with § 70.22(a)(8), the Staff reviews the information provided in the application related to radiation protection procedures against the acceptance criteria listed in NUREG-1520. Staff Exhibit 51-M at 4-5. Under these criteria, the application is acceptable if it includes information and data that meet each of the following commitments to: (1) prepare written, approved procedures to carry out activities related to the radiation protection program; (2) specify how the procedures will be prepared, authorized, approved, and distributed; and (3) specify written, approved radiation work permits for activities involving licensed material that are not covered by the radiation protection procedures. *Id.* 

4.49 The Staff reviewed the application against the above acceptance criteria. Staff Exhibit 49-M at 4-5 to 4-6. LES has committed to prepare written procedures and radiation work permits in accordance with the acceptance criteria. *Id.* at 4-6. The Staff's review showed that the application included data and information related to each commitment in the acceptance criteria.

4.50 The applicant's commitments to employee training are governed by 10 C.F.R.

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§§ 19.12, "Instructions to workers" and 20.2110, "Form of records." The Staff reviews compliance with these regulations against acceptance criteria which state that the application is acceptable if it includes data and information that commits to: (1) design and implement an employee radiation protection training program that complies with the requirements of 10 C.F.R. Parts 19 and 20; (2) provide training, to all personnel and visitors entering restricted areas, that is commensurate with the health risk to which they may be exposed, or to provide trained escorts; (3) provide a level of training based on the potential radiological health risks associated with that employee's work responsibilities; (4) incorporate, in the radiation protection training program, the provisions in 10 C.F.R. § 19.12 and topics such as correct handling of radioactive materials, minimization of exposures to radiation, access and egress controls and escort procedures, radiation safety principles, policies, and procedures, monitoring for internal and external exposures, monitoring instruments, contamination control, ALARA and exposure limits, radiation hazards and health risks, and emergency response; (5) review the radiation protection training programs and conduct refresher training at least every 3 years; and (6) evaluate the effectiveness and adequacy of the training program curriculum and instructors. Staff Exhibit 51-M at 4-6 to 4-7.

4.51 In Chapter 4 of the SER, the Staff reviewed LES's training commitments against the acceptance criteria listed above. Staff Exhibit 49-M at 4-6 to 4-7. The review showed that the applicant's radiation protection training program will conform to the acceptance criteria. In particular, the applicant has incorporated the provisions of 10 C.F.R. § 19.12 into the radiation protection training program. All other data and information necessary to meet the acceptance criteria is present.

4.52 The applicant's ventilation and respiratory protection programs must conform to 10 C.F.R. Part 20, Subpart H, "Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Areas." Subpart H includes regulations pertaining to the use of process

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or other engineering controls to control the concentration of radioactive material in the air; the use of other controls, such as control of access, limitation of exposure times, or use of respiratory protection equipment, to limit workers' intakes of radioactive materials; the use of individual respiratory protection equipment to limit the intake of radioactive material; restrictions on the use of respiratory protection equipment; and application for use of higher assigned protection factors. The Staff gauges compliance with Part 20, Subpart H against acceptance criteria that state that the application is acceptable if information and data are presented in relation to ventilation and respiratory protection programs that meet commitments detailed in NUREG-1520. Staff Exhibit 51-M at 4-8.

4.53 The Staff reviewed the application's ventilation and respiratory protection programs against the acceptance criteria in NUREG-1520. Staff Exhibit 49-M at 4-7. The Staff's review showed that LES has established ventilation and respiratory protection programs in accordance with the acceptance criteria and satisfies the regulatory requirements of Part 20, Subpart H. *Id.* 

4.54 The application must provide information related to radiation surveys and monitoring programs, as required by 10 C.F.R. Part 20, Subpart F, "Surveys and Monitoring," Subpart C "Occupational Dose Limits," Subpart L, "Records," and Subpart M, "Reports." The Staff's review of the application for compliance with these regulations is guided by the related acceptance criteria listed in Chapter 4 of NUREG-1520. Staff Exhibit 51-M at 4-10.

4.55 The Staff reviewed the application with respect to radiation surveys and monitoring programs. Staff Exhibit 49-M at 4-8 to 4-10. The review showed that LES has established radiation survey and monitoring programs in accordance with the acceptance criteria. *Id.* at 4-10. The application includes the necessary programs that comply with all applicable regulatory guidance documents. *Id.* at 4-8 to 4-10; *see also* Staff NUREG-1520 Testimony at 24-28; 34-36.

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4.56 LES also committed to additional program commitments in accordance with 10 C.F.R. Part 20, Subpart L, "Records" and Subpart M, "Reports," in addition to 10 C.F.R. § 70.61, "Performance Requirements," and § 70.74, "Additional Reporting Requirements." Acceptance criteria for the Staff's review of additional program requirements are listed in NUREG-1520.

4.57 The Staff reviewed the application's additional program requirements against the acceptance criteria. Staff Exhibit 49-M at 4-10. The review found that the applicant has established a records program for the radiation protection program, survey results, and results of corrective action program referrals, radiation work permits, and planned special exposures. The program will require the applicant to report to the NRC any event that results in an occupational exposure to radiation exceeding the dose limits in Part 20 and will prepare and submit to the NRC an annual report of the results of individual monitoring. LES will refer to the NEF's corrective action program any radiation incident that results in an occupational exposure to taken and the proposed schedule to achieve compliance. The Staff also reviewed both the ISA Summary and the ISA and, as a result, agreed with the applicant that the hazards from radioactivity were evaluated in the ISA and found to be low consequence. *Id.* 

4.58 As a result of the Staff's review of the applicant's radiation protection program, the Staff made the following findings. The Staff found that LES has established and will maintain an acceptable radiation protection program that includes: (1) an effective documented program to ensure that occupational radiological exposures are ALARA; (2) an organization with adequate qualification requirements for radiation protection personnel; (3) approved written radiation procedures; (4) radiation protection training for all personnel who have access to restricted areas; (5) a program to control airborne concentrations of radioactive material with engineering controls and respiratory protection; (6) a radiation survey and monitoring program;

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and (7) other programs to maintain records, report to the NRC in accordance with Parts 20 and 70, and correct for upsets at the facility. Therefore, the applicant's radiation protection program meets the requirements of Parts 19, 20, 30, 40, and 70, and conformance to the license application will ensure safe operation.

4.59 Based on the above, we find that the Staff had a reasonable basis for its conclusions, and that the record is sufficient with respect to the applicant's radiation protection program to support license issuance.

# E. <u>SER, Chapter 5, "Nuclear Criticality Safety"</u>

4.60 Chapter 5 of the SER documents the Staff's review of LES's nuclear criticality safety (NCS) program. The purpose of the Staff's review was to determine whether the NCS program was sufficient to support safe design, construction and operation of the proposed NEF. Staff Exhibit 49-M at 5-1. In addition, the criticality review was conducted to determine whether the ISA and ISA Summary satisfied the performance requirements of 10 C.F.R. § 70.61. *Id.* 

4.61 The acceptance criteria in SRP Chapter 5 are generally applicable to the type of uranium enrichment facility subject to the LES application. Staff SRP Testimony at 14-15. LES relied on the regulatory guidance set forth in § 5.4.2 of the SRP with the exception of the American National Standards Institute/American Nuclear Society (ANSI/ANS)-8.9 standard, relying instead on the 1998 version of ANSI/ANS-8.1 using validated methods to determine subcritical limits. *Id.* LES also used a newer version of ANSI/ANS-8.7 than the one referenced in the SRP. The Staff determined that the use of the alternate ANSI/ANS standards (instead of the versions listed in the SRP) was acceptable. Staff SRP Testimony at 15.

4.62 The Staff reviewed the NCS program using the acceptance criteria in the SRP. Staff Exhibit 50-M at 5-1. The key areas of the Staff review included the commitments for the management program, NCS organization and administration to determine the adequacy of the technical qualifications of responsible LES individuals as required by 10 C.F.R. § 70.22(a)(6),

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management measures to determine whether IROFS would be reliable and available as required by 10 C.F.R. § 70.62(d), and means by which criticality will be prevented. *Id.* at 5-2. The NCS criticality accident alarm system was reviewed to determine whether the requirements of 10 C.F.R. §§ 70.24 and 70.65(b)(4) were satisfied.

4.63 The Staff also reviewed the NCS methods and technical practices proposed by LES. *Id.* at 5-3. This included the Staff's review of LES's commitment to apply the double contingency principle as stated in ANSI/ANS 8.1, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," and the means by which LES established NCS limits, performed NCS calculations and established safety parameters for enrichment, geometry and volume, moderation, mass, reflection and interactions with other components. *Id.* at 5-3.

4.64 The Staff's review of the appropriateness of the LES's technical practices included a review of LES's critical and safe values for these safety parameters, as documented in the SER. Staff Exhibit 49-M at 5-13 to 5-17. The Staff found these appropriate by comparing them to accepted industry values (found in ANSI/ANS 8.1) and based on the fact that LES had conservatively assumed enrichment of 6.0 wt. % U. *Id.* These safety criteria are applied to buildings, systems and components to determine the safety criteria for the means by which criticality is controlled. *Id.* 

4.65 The Staff also reviewed the method by which LES identified the margin of subcriticality, including the k<sub>eff</sub> calculation and found that the means by which subcriticality would be assured was adequately described. *Id.* This finding was predicated upon LES's commitment to provide additional verification information regarding the computer code used for its NCS analysis (MONK8A Monte Carlo code).

4.66 Additional information regarding LES's criticality analysis was presented in prefiled written testimony and oral testimony during the mandatory hearing. The Staff criticality reviewer testified that he reviewed the underlying assumptions for  $k_{eff}$  calculations in the ISA as

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well as the calculational methods and results and based on that review concluded that the calculations were reasonable. Staff Criticality Testimony at 25-26. Additionally, three validation reports relating to the computer code utilized by LES were reviewed. The final report submitted by LES was determined to satisfy all Staff concerns and provide reasonable assurance that the NCS was appropriate. Staff Criticality Testimony at 26. The Staff also determined that the final report submitted by LES was appropriate and satisfied all Staff concerns. *Id.* at 26-27.

4.67 LES explained that validation of the MONK 8A Monte Carlo computer code to verify the criticality calculations for the NEF involved the following steps: (1) identification of the general NEF design applications, (2) selection of applicable benchmark experiments, (3) modeling and calculation of the  $k_{eff}$  values of selected critical benchmark experiments, and (4) statistical analysis of the results to determine the computational bias and upper safety limit (USL). The verification methodology included, among other things, running the code for certain scenarios by Urenco and LES contractor AREVA repeatedly and comparing the results. LES Criticality Testimony at 7-9. These results were presented in Table 7-3 of the verification report. *Id.*, LES Exhibit 127-M at 40.

4.68 Because each of the calculations used to develop Table 7-3 were derived from the NEF NCS supporting analysis, LES was able to draw a relationship between each of the scenarios listed in Table 7-3 and IROFS developed for the NEF. LES Criticality Testimony at 9. LES prepared a table showing the relationship between *all* criticality IROFS and the associated parameter safe values, safety criteria and NCS supporting analyses in LES Exhibit 129-M. LES Criticality Testimony at 9-10. LES also presented a table showing the relationship between passive safe-by-design components and the parameter safe values and the NCS supporting analyses in LES Exhibit 130-M. *Id*.

4.69 LES provided additional information in pre-filed testimony addressing questions raised by the Board regarding the range of H/U ratios in the validation report and the impact on

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the computational bias in the MONK 8A computer code. LES Criticality Testimony at 11-12. LES explained that the revised validation report, Revision 3, incorporated additional critical experiments to better cover the range of H/U ratios that will be present at the NEF by including experiments that cover the area of applicability and deleting experiments involving high enriched uranium. LES Criticality Testimony at 12-13. LES undertook these revisions in response to Staff concerns, which the Staff found had been satisfactorily resolved in Revision 3 of the validation report. Staff Criticality Testimony at 26.

4.70 To address the question of bias, LES performed additional analysis of the impact of extrapolation of results from the lowest Hydrogen to Uranium (H/U) ratio, 0.787, to 102.613. LES Criticality Testimony at 13-18. This involved calculating hypothetical USLs and comparing them to USLs in the validation report. *Id.* LES determined that the change in bias varied substantially with changes in the range of H/U ratios and attributed this to (1) large experimental uncertainties in some of the groupings of benchmark experiments, (2) the small number of cases represented in some of the groupings of benchmark cases for the varied ranges, and (3) the lack of sufficient applicable benchmark cases in certain H/U ratio ranges. *Id.* To provide further information, LES demonstrated a strong correlation between the H/U ratio and neutron energy spectrum to demonstrate that the true impact of the variance of H/U ratio ranges, for the ranges covered by the NEF NCS support calculation cases, should be insignificant. *Id.* 

4.71 LES also prepared pre-filed testimony to address a question from the Board as to how the MONK 8A code treats unresolved resonances, or the inherent randomness of the nuclear data used in the code. LES Criticality Testimony at 20-22. LES obtained information from the MONK code vendor confirming that the data library used for the code had been validated and the manner in which data in the unresolved resonance range was processed. *Id.* 

4.72 Another issue addressed by LES in the pre-filed testimony in response to a question by the Board was the potential impact of significant water vapor intrusion on criticality

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safety. LES Criticality Testimony at 22-27. Initially, LES noted that the NEF is designed to preclude water vapor intrusion, which would occur with air in-leakage, and that in the event of excessive air in-leakage, the centrifuges will abruptly stop. *Id.* at 22. LES also explained that if water vapor intrusion were assumed to occur, it would not have criticality impact on facility centrifuges, product pipework, product pumps, product cylinders, product UF<sub>6</sub> cold traps or product vacuum pump/chemical trap sets. *Id.* at 23-27.

4.73 Based on our review of the Staff review documents, the criticality portions of the NEF license application, and the testimony presented in response to the Board's questions, we find that the record is sufficient to support the Staff's conclusion that LES's NCS program meets the requirements of 10 C.F.R. Part 70.

# F. <u>SER, Chapter 6, "Chemical Process Safety"</u>

4.74 Under 10 C.F.R. §§ 70.22 and 70.65, "Contents of Applications" and "Additional Content of Applications," respectively, an applicant must include information on chemical process safety at the proposed facility. This information must comply with 10 C.F.R. §§ 70.61, 70. 62, and 70.64. 10 C.F.R. § 70.61 sets out the performance requirements for facilities, with respect to limiting the risks of credible high-consequence events, credible intermediate-consequence events, and nuclear criticality accidents under normal and credible abnormal conditions. 10 C.F.R. § 70.62(a) requires that each licensee or applicant: (1) establish and maintain a safety program that demonstrates compliance with the performance requirements of § 70.61, (2) establish and maintain records that demonstrate compliance with § 70.62(b)-(d); and (3) maintain records available for inspection by the NRC that document each discovery that an IROFS or management measure has failed to perform its function or degraded so that the performance requirements of § 70.61 are not satisfied. 10 C.F.R. §70.62(b) requires the applicant to maintain process safety information, including information pertaining to the hazards of the materials used or produced in the process, the technology of the process, and the

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equipment in the process, to enable the performance and maintenance of an ISA, which is required to be conducted according to the guidelines of § 70.62(c). 10 C.F.R. § 70.62(d) requires the applicant to establish management measures to ensure compliance with § 70.61. 10 C.F.R. § 70.64 establishes baseline design criteria for new facilities and requires that the facility and system design and facility layout be based on defense-in-depth practices.

4.75 The Staff's review of the application for compliance with the above criteria is guided by Chapter 6 of NUREG-1520, which provides the applicable acceptance criteria. Staff Exhibit 51-M at 6-3 to 6-7. Chapter 6 of NUREG-1520 is applicable to the proposed NEF in its entirety. Staff NUREG-1520 Testimony at 15.

4.76 The Staff's review considered the following areas: (1) chemical process description; (2) chemical accident sequences; (3) chemical accident consequences; (4) chemical -process IROFS; (5) management measures; and (6) baseline design criteria and defense-in-depth requirements. Staff Exhibit 49-M at 6-1. The review encompassed the SAR, the ISA and ISA Summary, and the applicant's responses to requests for additional information, and included an on-site visit to inspect ISA documents. *Id.* 

4.77 Through its review of the chemical process description, the Staff determined that all aspects of the process were described, including the gas centrifuge process, the applicant's chemical screening and classification process, hazardous chemicals to be present in the facility, and potential chemical interactions. Staff Exhibit 49-M at 6-2 to 6-4. Among the potential chemical interactions in the facility are the interactions of process chemicals with confinement vessels, process equipment, and facility personnel during potential accident sequences. One potential interaction is between uranium hexafluoride (UF<sub>6</sub>) and the aluminum piping and components in the facility. Aluminum is used as a piping material because it is especially resistant to corrosion in the presence of UF<sub>6</sub>. LES Chemical Process Testimony at 6. Under normal conditions, UF<sub>6</sub> will slowly interact with aluminum to form aluminum fluoride. *Id.* at 7.

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Because the aluminum fluoride is non-reactive, it forms a coating on the interior surface of the aluminum piping known as the passivation layer that inhibits further aluminum/UF<sub>6</sub> reactions. *Id.*; LES Exhibit 134-M at 14.

4.78 In the event of air in-leakage and resulting water intrusion, hydrogen fluoride (HF) and uranyl fluoride  $(UO_2F_2)$  would form as a consequence of the reaction of  $UF_6$  and water. See LES Chemical Process Testimony at 7. In such an event, the process would shutdown, and the in-process  $UF_6$  would be confined to pipe sections between isolation valves, resulting in a  $UF_6$  inventory of a few hundred grams within about 200 feet of pipe. *Id.* Under these circumstances, less than 100 grams of anhydrous HF would be produced, resulting in no impact to the integrity of the aluminum pipes. *Id.* 

4.79 Assuming that the HF produced was aqueous rather than anhydrous, there would, nevertheless, still be only a small amount of HF present in each section of pipe relative to the amount of aluminum in the pipe. LES Chemical Process Testimony at 9. Therefore, according to the applicant, while the aqueous HF might impact the passivation layer, the integrity of the aluminum piping would be maintained. *Id.* 

4.80 Based on the above, although there would be some HF interaction with the piping system as a result of an air in-leakage accident, because the integrity of the piping itself would be maintained, there would be no effect on the public. Tr. 3620-21.

4.81 The accident sequence based on a significant water vapor intrusion event discussed above was found to be highly unlikely by the applicant and the Staff. See LES Chemical Process Testimony at 8-10. The applicant's determination that significant water vapor intrusion is unlikely is based on qualitative information regarding Urenco's operating experience. *Id.* Urenco's European enrichment facilities have operated for 30 years without significant HF corrosion and without loss of vacuum. *Id.* at 8.

4.82 The applicant's qualitative approach is acceptable. Tr. 3628. Neither the

regulations nor the guidance in NUREG-1520 require a probabilistic risk assessment or a quantitative analysis. *Id.* 

4.83 An additional potential interaction is between HF and seals to be used in various NEF systems or equipment. It is not expected that the seals will degrade as a result of exposure to HF. LES Chemical Process Testimony at 11.

4.84 Seals at the NEF will be similar to those used in Urenco's operating enrichment plants. *Id.* Urenco seals specifications require the use of materials compatible with  $UF_6$ , which is more reactive than HF under vacuum conditions. *Id.* Also, the materials used for the seals are accepted for use with anhydrous HF by HF industry trade group documents. *See*, LES Exhibit 135-M. As explained above, aqueous HF is not expected to be present in plant systems. LES Chemical Process Testimony at 11. Prior to constructing its European enrichment facilities, Urenco evaluated seal materials for UF<sub>6</sub> resistance in order to qualify the materials for use. *Id.* at 11-12. The uneventful operating history of Urenco's European enrichment facilities further demonstrates the resistance of plant seals to corrosion or degradation.

4.85 The Staff's review of the applicant's chemical accident sequence information determined that the ISA Summary identifies the chemical accident sequences and provides a narrative description of the sequences which cover the range of events that could result in a loss of containment of  $UF_6$  and the hazardous chemicals produced from  $UF_6$  and address both intermediate and high-consequence events. Staff Exhibit 49-M at 6-7. The Staff did not identify any chemical accident sequences overlooked by LES. *Id.* Thus, the Staff concluded that there was reasonable assurance that the applicant identified the appropriate chemical accident sequences. *Id.* 

4.86 The Staff's review of chemical accident consequences information evaluated

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LES's proposed chemical exposure limits and proposed worker-exposure strategy. Staff Exhibit 49-M at 6-7. The limits are based on guidance documents cited in NUREG-1520. Thus, the Staff found the applicant's approach regarding the above to be acceptable for compliance with the performance criteria listed in 10 C.F.R. § 70.61. The Staff also reviewed the applicant's methods to determine the consequences, which are based on methods prescribed in guidance documents cited in NUREG-1520, and found the proposed methodology acceptable. *Id*.

4.87 The information in the application related to IROFS and management measures was reviewed by the Staff to determine compliance with 10 C.F.R. § 70.62(c) and (d). The Staff reviewed the chemical-process IROFS listed in the ISA Summary to identify where each IROFS would be used and how the IROFS would function to prevent or mitigate the consequences of the identified accident sequences. Staff Exhibit 49-M at 6-7 to 6-8. Based on this review, the Staff concluded that there was reasonable assurance that LES had identified chemical-process IROFS to prevent the consequences of accident sequences involving chemical hazards of licensed material. *Id.* at 6-8. The applicant identified, and the Staff reviewed, management measures to ensure the availability and reliability of chemical safety IROFS in the following areas: configuration management, maintenance, training, procedures, audits and assessments, emergency planning, and incident investigation and corrective actions. *Id.* at 6-8 to 6-11.

4.88 Finally, the Staff reviewed LES's design basis information for chemical-processsafety IROFS against 10 C.F.R. § 70.64(a)(5), which states: "The design must provide for adequate protection against chemical risks produced from licensed material, facility conditions which affect the safety of licensed material, and hazardous chemicals produced from licensed materials." The Staff determined that, because the process will need to operate at and maintain a significant vacuum and there will be limited inventories of licensed materials in the gaseous process, the design basis provides for adequate protection against chemical risks.

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Staff Exhibit 49-M at 6-12. In reviewing the design basis for the liquid portion of the process (product homogenizing and sampling), the Staff noted that the system utilizes an ANSI N14.1 qualified cylinder as the primary confinement vessel and an ASME code pressure vessel as the secondary confinement, and found the approach acceptable because it uses internationally recognized industry codes and standards. *Id.* The applicant's HAZOP analysis, a method widely-used in the chemical industry and identified as an acceptable method in NRC guidance, was presented in the ISA Summary. The Staff's review of the HAZOP results and selected high-consequence accident scenarios confirmed that the applicant had identified those chemical events that could exceed the performance requirements of 10 C.F.R. § 70.61 and identified appropriate IROFS and management measures to reduce the risk to acceptable levels. *Id.* Based on the above review, the Staff concluded that LES's design for the proposed facility meets the requirements of 10 C.F.R. § 70.64(a)(5). *Id.* at 6-13.

4.89 Based on the above review of LES's application, the Staff found that LES described and assessed accident scenarios that can result from the handling, storage, or processing of licensed materials and that can potentially have significant chemical processes and effects. Staff Exhibit 49-M at 6-13. The Staff also found that LES prepared a hazard analysis that identifies and evaluates those chemical process hazards and potential accidents and established safety controls providing reasonable assurance of safe operation. *Id.* 

4.90 Based on its review, the Staff concluded that LES's plan for managing chemicalprocess safety and chemical-process-safety controls meets the requirements of 10 C.F.R. Parts 30, 40, and 70 and provides reasonable assurance that the public health and safety and the environment will be protected. *Id.* 

4.91 Based on the above, we find that the Staff had a reasonable basis for its conclusions, and that the record is sufficient with respect to chemical process safety to support license issuance.

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### G. <u>SER, Chapter 7, "Fire Safety"</u>

4.93 10 C.F.R. §70.62(a) requires licensees to develop a safety program that will reasonably protect the health and safety of the public and the environment. *See* Staff Exhibit 51-M at 7-1. The safety program should provide reasonable protection against fire and explosive hazards associated with processing, handling, and storing licensed materials during normal operations, anticipated operational occurrences, and credible accidents. *Id.* The fire safety program should conform to the requirements for general and additional contents of the application in 10 C.F.R. §§ 70.22 and 70.65, as well as providing reasonable assurance with the requirements of 10 C.F.R. §§ 70.61, 70.62, and 70.64, as discussed in more detail above. *Id.* at 7-2.

4.93 The fire safety program is reviewed for regulatory compliance against the acceptance criteria listed in Chapter 7 of NUREG-1520. Staff Exhibit 51-M at 7-2 to 7-5. This includes criteria for measuring the adequacy of: fire safety management measures, the applicant's fire hazards analysis, the proposed facility's fire safety design, information related to process fire safety, and the applicant's fire protection and emergency response plan. *Id.* 

4.94 The acceptance criteria Chapter 7 of NUREG-1520 addresses, among other fire hazard issues, fire hazards associated with chemicals and hazardous materials. 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<sub>6</sub>). Thus, LES did not provide information related to other hazardous materials. The remainder of the acceptance criteria in Chapter 7 are applicable to the LES facility. Staff NUREG-1520 Testimony at 15-16.

4.95 The Staff reviewed LES's fire safety information against the acceptance criteria listed in Chapter 7 of NUREG-1520. *See* Staff Exhibit 49-M at 7-1 to 7-15. The review

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encompassed the following areas: process fire hazards and special hazards, accident scenarios, IROFS related to fire safety, and facility fire protection. *Id.* 

4.96 The Staff's review of process fire hazards and special hazards encompassed the key fire hazards and risks associated with the proposed facility and the gas centrifuge process. The review included the following hazards:  $UF_6$ , hydrogen fluoride, uranyl fluoride, centrifuge machines and components, the control room, storage and handling of  $UF_6$ , hydrogen control, and combustible material hazards. With respect to these hazards, the application presented information explaining each hazard, the associated risks, and any mitigating measures at the facility. Staff Exhibit 49-M at 7-1 to 7-3. The Staff's review of the information took into account the potential presence of fire hazards on the various accident scenarios associated with the facility. *Id.* at 7-3. Based on its review, the Staff concluded that it has reasonable assurance that LES adequately identified all fire and explosion hazards and reasonably identified and evaluated the facility and process hazards and risks associated with the proposed operations. *Id.* 

4.97 The NRC Staff reviewed the applicant's ISA Summary, which describes, qualitatively, the potential credible fire-accident scenarios and associated risks for the facility. Staff Exhibit 49-M at 7-4. The review encompassed information on the following key fireaccident scenarios: fire in the Centrifuge Test Facility, fire in the Cylinder Receipt and Dispatch Building, fire involving Cylinder Transporters/Movers, fire inside the Cascade Halls, fire in the Process-Services Area, fire inside the UF<sub>6</sub> handling area/Blending and Liquid Sampling Area, fire inside the Technical Services Building, and fire affecting the UBC Storage Pad. *Id.* Based on its review, the Staff determined that the accident sequences identified by the applicant were sufficient to encompass all credible fire-related accident scenarios. *Id.* at 7-9; *see also* Staff Exhibit 50-M at 7-3.

4.98 The Staff reviewed the applicant's identification of the required IROFS for

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preventing or mitigating fire accident scenarios that could lead to unacceptable performance in accordance with the requirements in 10 C.F.R. 70.61. Staff Exhibit 49-M at 7-10;

Staff Exhibit 50-M at 7-3 to 7-4. The Staff's review showed that the applicant identified a set of IROFS that would ensure that the likelihood of a fire causing high consequence events is highly unlikely and the likelihood of a fire causing intermediate consequence events is unlikely. Most of the IROFS for fire protection are administrative controls, such as for combustible loading control, or passive controls, such as fire barriers. The remaining fire protection features described in the Safety Analysis Report, such as the fire brigade, are measures that provide overall defense-in-depth protection. *Id.* Based on its review, the Staff determined that applicant's evaluation of accidents resulting from exterior and interior building explosions was acceptable and its conclusions that initiating events for these accident sequences would be highly unlikely, without the need for IROFS. *Id.* 

4.99 Finally, the Staff reviewed information in the application related to facility fire protection. Staff Exhibit 49-M at 7-10 to 15. The review encompassed the management measures and administrative controls to be in place at the facility; the construction of the buildings containing  $UF_6$  at the proposed facility; the robustness of facility active-engineered fire-protection systems such as the fire alarm system, portable fire extinguishers, the fire-water supply, and engineered automatic fire-suppression systems; and the fire safety and emergency response plans, including the on-site fire brigade and coordination with off-site assistance groups.

4.100 Of concern in relation to fire protection is the potential for insufficiently suppressed electrical cabinet fires to reignite. If re-ignition occurs, the fire brigade at the LES facility will be rapidly available because a fire watch will be monitoring the fire for a sufficient period of time after the fire is extinguished to detect and suppress re-ignition. Staff Fire Testimony at 2. In addition, any electrical cabinet fire would not impact safety at the facility

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because electrical power is not required for the plant to go into a safe configuration. *Id.* at 2-3. There are also other controls, IROFS, and defense-in-depth measures, evaluated by the Staff, present at the facility to limit the impact of a fire. *Id.* 

4.101 Based on the above review of the application's fire protection information, the Staff found that the application provides sufficient information, in accordance with the applicable regulatory requirements, regarding potential fire hazards, consequences, and required controls for the proposed processes. Staff Exhibit 49-M at 7-15. The Staff determined that the applicant demonstrated compliance with the performance requirements of 10 C.F.R. § 70.61 for fire protection related to postulated accident scenarios. *Id.* The applicant has identified a reasonable set of IROFS and defense-in-depth protection to ensure acceptable risks within the performance requirements. Based on its review of the design of the facility, the Staff concluded with reasonable assurance that the facility also meets the requirements of 10 C.F.R. § 70.64(a)(3), regarding baseline design criteria for protection against fires and explosions, and 10 C.F.R. § 70.64(b), regarding defense-in-depth.

4.102 Based on the above, we find that the Staff had a reasonable basis for its conclusions, and that the record is sufficient with respect to fire safety to support license issuance.

### H. <u>SER, Chapter 8, "Emergency Management"</u>

4.103 Chapter 8 of the Safety Evaluation Report documents the Staff's review of the applicant's emergency plan. Staff Exhibit 49-M at 8-1. LES was required to submit an emergency plan for the proposed NEF under 10 C.F.R. §§ 30.32(i)(1)(ii), 40.31(j)(1)(ii), and 70.22(i)(1)(ii). The emergency plan must contain the following information: (1) a brief description of the facility and the surrounding area; (2) an identification of each type of radioactive materials accident for which protective actions may be needed; (3) a classification system for classifying accidents as alerts or site area emergencies; (4) an identification of the

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means of detecting each type of accident in a timely manner; (5) a brief description of the means and equipment for mitigating each type of accident; (6) a brief description of the methods and equipment to assess releases of radioactive materials; (7) a brief description of the responsibilities of licensee personnel should an accident occur and responsibilities for developing, maintaining, and updating the plan; (8) a commitment to and brief description of offsite notification plans; (9) a brief description of the types of information to be given to offsite response organizations and the NRC; (10) a brief description of the frequency, performance objectives, and plans for employee emergency training; (11) a brief description of the means of restoring the facility to a safe condition after an accident; (12) provisions for conducting quarterly communication checks with offsite response organizations and biennial onsite emergency exercise; and (13) a certification that the applicant has met its responsibilities under the Emergency Planning and Community Right-to-Know Act of 1986. 10 C.F.R. § 70.22(i)(3); *see also* 10 C.F.R. §§ 30.32(i)(3) and 40.31(j)(3). 10 C.F.R. § 70.64(a)(6) also requires applicants to address the control of licensed material, evacuation of personnel, and the availability of emergency facilities for the design of new facilities.

4.104 In order to determine whether the applicant's emergency plan complies with the above regulatory requirements, it is evaluated against acceptance criteria in Chapter 8 of NUREG-1520. Staff Exhibit 51-M at 8-2 to 8-13. The acceptance criteria related to the evaluation of an emergency plan submitted by an applicant are applicable to the proposed NEF. Staff NUREG-1520 Testimony at 16. The Staff reviewed LES's emergency plan against these acceptance criteria. Staff Exhibit 49-M at 8-1 to 8-9.

4.105 With respect to the facility description, the Staff's review showed that the EP contains descriptions of the licensed activity, the facility and site, and the area near the site. Staff Exhibit 49-M at 8-1 to 8-2. These descriptions fulfill the requirements of 10 C.F.R. § 30.32(i)(3)(i), 10 C.F.R. § 40.31(j)(3)(i), and 10 C.F.R. § 70.22(i)(3)(i). In addition, the review

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shows that LES will maintain compliance with the *Emergency Planning and Community Rightto-Know Act of 1986*, in accordance with 10 C.F.R. § 30.32(i)(3)(xiii), 10 C.F.R. § 40(j)(3)(xiii), and 10 C.F.R. § 70(i)(3)(xiii). The Staff also reviewed the descriptions of the applicant's onsite and offsite emergency facilities provided in the EP. *Id.* 

4.106 The Staff reviewed the information in the emergency plan regarding the types, classification, and detection of accidents. Staff Exhibit 49-M at 8-3. In the applicant's description of types of accidents, both postulated high- and intermediate-consequence events are identified, and accident sequences, as well as mitigating and preventive measures, are described. Id. Based on its review, the Staff concluded that this information meets the requirements of 10 C.F.R. § 30.32(i)(3)(ii), 10 C.F.R. § 40.31(i)(3)(ii), and 10 C.F.R. § 70.22(i)(3)(ii). The Emergency Plan also explains the system used to classify an emergency as either an Alert or a Site-Area Emergency, and defines both types of incidents. Id. The Staff reviewed the system for classifying events and, based on the review, determined that it is acceptable to the Staff and meets the requirements of 10 C.F.R. § 30.32(i)(3)(iii), 10 C.F.R. § 40.31(j)(3)(iii), and 10 C.F.R. § 70.22(i)(3)(iii). Id. Finally, the Staff reviewed the information in the Emergency Plan that explains the methods and systems available to detect accidents at the facility. The Emergency Plan states that actions in response to accidents are outlined in the Emergency Plan Implementing Procedures (EPIPs) and directed by the Shift Manager. Based on its review, the Staff determined that the methods and systems for detecting accidents at the facility fulfill the requirements of 10 C.F.R. § 30.32(i)(3)(iv), 10 C.F.R. § 40.31(j)(3)(iv), and 10 C.F.R. § 70.22(i)(3)(iv).

4.107 The Staff reviewed LES's planned actions and equipment for mitigation of consequences in order to determine whether they comply with 10 C.F.R. § 30.32(i)(3)(iii), 10 C.F.R. § 40.31(j)(3)(iii), and 10 C.F.R. § 70.22(i)(3)(iii). Staff Exhibit 49-M at 8-4. The review showed that the EP describes actions and equipment that will be used to mitigate the

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consequences of accidents at the facility. The major hazard would be the chemical hazard caused by a release of  $UF_6$ . The main features used at the facility to mitigate the consequences of accidents include automatic interruption or termination of specific operations, fire detection and suppression systems, operator response to abnormal conditions/alarms, and shutdown of the ventilation system, in case of a UF<sub>6</sub> release or a criticality. Thus, the Staff's review showed that the information regarding mitigation of consequences fulfilled the relevant regulations. *Id.* 

4.108 The EP explains the actions that will be taken to assess the extent of an accident at the facility. The Staff reviewed these actions. Staff Exhibit 49-M at 8-4. This review showed that, in case of an Alert, dose projections of offsite radiation and hazardous material exposures will be made and provided to offsite response agencies. In addition, during a Site-Area Emergency, radiation or chemical surveys of the assembly area(s), the Emergency Operations Center, and the facility will be performed. Environmental sampling will be performed offsite, if necessary. These actions meet the requirements of 10 C.F.R. §§ 30.32(i)(3)(vi), 40.31(j)(3)(vi), and 70.22(i)(3)(vi). Id.

4.109 The EP describes the responsibilities of facility personnel during normal operations and during emergency situations. Staff Exhibit 49-M at 8-4 to 8-5. The Staff reviewed this description and determined that the description of the responsibilities in the EP fulfills the requirements of 10 C.F.R. § 30.32(i)(3)(vii), 10 C.F.R. § 40.31(j)(3)(vii), and 10 C.F.R. § 70.22(i)(3)(vii). *Id.* at 8-5.

4.110 The Staff reviewed LES's proposed notification and coordination plans and information to be communicated to offsite response organizations in order to determine whether or not this information complies with 10 C.F.R. §§ 30.32(i)(3)(viii), 40.31(j)(3)(viii), and 70.22(i)(3)(viii), and 10 C.F.R. §§ 30.32(i)(3)(ix), 40.31(j)(3)(ix), and 70.22(i)(3)(ix), respectively. Staff Exhibit 49-M at 8-5. The EP provides a clear commitment to promptly notify offsite

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response organizations of an emergency, including notification to the NRC Operations Center, and it provides an adequate description of provisions for assistance from offsite response organizations. *Id.* at 8-5. The EP also provides an adequate description of the type of information to be given to offsite response organizations during an emergency. In the event of a Site Area Emergency, a standard recommendation will be provided to offsite assistance organizations with more specific data. *Id.* at 8-6. Based on its review, the Staff found that the information in the EP related to notification and offsite communication meets the relevant regulations.

4.111 The Staff reviewed the information in the EP related to emergency response training for workers in order to determine whether the information complies with 10 C.F.R. §§ 30.32(i)(3)(x), 40.31(j)(3)(x), and 70.22(i)(3)(x). Staff Exhibit 49-M at 8-6 to 8-7. According to the EP, employees will be provided training on how to respond in a emergency. The Staff review confirmed that emergency response personnel receive additional annual training that is required before being assigned to an emergency organization and includes specific information on how the emergency organization responds during emergency conditions, including staffing; determining and estimating potential offsite releases of radiation and chemicals; and interface with offsite assistance organizations. *Id.* at 8-6. The review also confirmed that facility tours and classroom training are also provided to offsite response organizations, who will meet with facility personnel at least annually to review items of mutual interest, including relevant changes to the program. *Id.* at 8-7. The Staff's review determined that the applicant's information related to training fulfills the relevant regulatory requirements.

4.112 The Staff reviewed LES's plans for safe shutdown of the proposed facility. Staff Exhibit 49-M at 8-7. The EP states that during an emergency, immediate actions will be directed toward limiting the consequences of the incident to afford maximum protection to facility personnel and the general public. Once control of the facility has been reestablished, a

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systematic and planned approach to full facility recovery will be taken. The EP also describes the methods to be used for assessing the extent of the event and the status of the facility, and the mitigative actions necessary to reduce or stop any ongoing releases of radioactive material or hazardous chemicals. LES presented information regarding the staffing of the facility during the recovery phase of an event. After its review, the Staff determined that the above information fulfills the requirements of 10 C.F.R. §§ 30.32(i)(3)(xi), 40.31(j)(3)(xi), and 70.22(i)(3)(xi). *Id*.

4.113 The Staff reviewed the information regarding exercises and drills presented in the EP. Staff Exhibit 8-7 to 8-8. The Staff's review confirmed that the EP provides adequate provisions for drills, exercises, and biennial exercises to test the adequacy of emergency procedures, equipment, instrumentation, and to ensure all emergency response personnel are familiar and proficient with their duties. Offsite organizations are invited to participate in the biennial exercise, and NRC is invited to participate or observe. As a result of its review, the Staff determined that the information regarding exercises and drills meets the requirements of 10 C.F.R. §§ 30.32(i)(3)(xii), 40.31(j)(3)(xii), and 70.22(i)(3)(xii). *Id.* at 8-8.

4.114 As a final part of its emergency plan review, the Staff confirmed that there will be procedures in place for maintaining the EP and procedures. Staff Exhibit 49-M at 8-9. Proposed changes to the EP affecting an offsite organization will be provided to that organization for review and comment at least 60 days prior to the change. In accordance with 10 C.F.R. §§ 30.34(f), 40.35(f), and 70.32(i), the applicant may incorporate changes to the EP without receiving prior NRC approval, provided those changes do not decrease the effectiveness of the EP, and the NRC and affected offsite response organizations receive copies of the revised EP or procedures within 6 months of the changes. *Id.* 

4.115 Based on the Staff's review, as described above, the Staff found that LES has established an EP for responding to the radiological hazards resulting from release of

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radioactive material or hazardous chemicals incident to the processing of licensed material. The Staff found that the EP is adequate to demonstrate compliance with the requirements of 10 C.F.R. §§ 30.32(i), 40.31(j), and 70.22(i). Staff Exhibit 49-M at 8-9.

4.116 Based on the above, we find that the Staff had a reasonable basis for its conclusions, and that the record is sufficient with respect to emergency planning to support license issuance.

## I. <u>SER, Chapter 9, "Environmental Protection" and Final Environmental Impact Statement</u>

4.117 Chapter 9 of the SER documents the Staff's review of the NEF Safety Analysis Report, Integrated Safety Analysis Summary and Environmental Report in order to determine whether the facility design features and program will be adequate to protect the environment and public health and safety in accordance with the regulatory requirements. Staff Exhibit 49-M at 9-1. The Staff also prepared a Final Environmental Impact Statement (FEIS), Staff Exhibit 47, to comply with the requirements of the National Environmental Policy Act (NEPA) and the NRC regulations implementing NEPA. We first address the key areas of the Staff's SER review and then focus on the key findings in the FEIS.

4.118 The Staff reviewed the goals set by LES for air and liquid releases. These goals were established to ensure that effluents would be as low as reasonably achievable (ALARA), and well below the regulatory limits established in 10 C.F.R. Part 20. Staff Exhibit 49-M at 9-2 to 9-6; 50-M at 9-1 to 9-2. Based on a determination that the goals set by LES are a small fraction of the regulatory limits, the Staff found them to be reasonable ALARA goals. *Id.* The Staff's review encompassed the elements set forth the SRP. Staff Exhibit 51-M at 9-2 to 9-4.

4.119 The Staff also reviewed the air and liquid effluent controls proposed by LES and found that the proposed controls will adequately assure protection of the environment and of the public health and safety. Staff Exhibit 49-M at 9-5 to 9-6; 51-M at 9-2. The Staff's review

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encompassed all of the elements in the SRP, including the establishment by LES of an annual review of the ALARA effluent control program and reporting the results to LES senior management. *Id.*, Staff Exhibit 51-M at 9-4 to 9-6.

4.120 LES's procedures for waste minimization were also reviewed and found adequate by the Staff, consistent with the guidance in the SRP. Staff Exhibit 49-M at 9-6 to 9-7; Staff Exhibit 50-M at 9-11 to 9-12. Design features and procedures for the safe handling of solid radiological and nonradiological wastes from construction and operation of the facility were reviewed by the Staff in accordance with the guidance in the SRP and found to be adequate. Staff Exhibit 49-M at 9-7 to 9-8.

4.121 LES's proposed monitoring program for air and liquid effluents was reviewed by the Staff and found to be adequate to ensure that release of radioactive material would remain below the regulatory limits in 10 C.F.R. Part 20. Staff Exhibit 49-M at 9-8 to 9-13; 50-M at 9-3. The Staff's review included the elements set forth in the SRP, including a description of the quality assurance program for laboratory quality control. *Id.*; Staff Exhibit 51-M at 9-12 to 9-14.

4.122 The Staff also reviewed the description of the Radiological Environmental Monitoring Program (REMP) for the NEF, the means by which the effectiveness of the effluent controls will be confirmed. Staff Exhibit 49-M at 9-13 to 9-14; Staff Exhibit 50-M at 9-3. The Staff's review determined that implementation of the REMP will ensure that the baseline concentrations of radionuclides are known before the NEF begins operating, and that LES will conduct the necessary environmental monitoring during operation of the NEF such that LES will have an adequate basis to determine ongoing compliance with radiation protection standards, consistent with the monitoring criteria set forth in the SRP. *Id.*; Staff Exhibit 51-M at 9-14 to 9-15.

4.123 The Staff concluded that facility design features and programs at the NEF will be

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adequate to protect the environmental and the public health and safety. Staff Exhibit 49-M at 9-15 to 9-16.

4.124 Based on a review of the LES application and the Staff's review documents, we conclude that the Staff's review of LES's environmental protection measures was adequate to support the evaluation findings.

4.125 The FEIS describes the purpose and need for the NEF to be the provision of an additional, reliable and economical domestic source of enrichment services. Additionally, it was noted that operation of the NEF would contribute to the attainment of national energy security policy objectives given the Administration's energy policy to expand nuclear energy independence. Staff Exhibit 47 at 1-2 to 1-3.

4.126 The Staff provided further explanation of the purpose and need for the NEF in pre-filed testimony. As the Staff testified, NEPA requires an agency to define the general goal of a proposed action in order to ascertain the alternatives which must be considered. Staff Purpose and Need Testimony at 3-4. With regard to the analysis underlying the Staff's purpose and need statement, the Staff testified that it had examined the current and projected domestic supply and demand for uranium enrichment services as well as global supply and demand. *Id.* at 4-5. The Staff's analysis included a comparison of projections of uranium enrichment demand prepared by LES and the Energy Information Administration and the Staff concluded that both indicated a need for additional enrichment capability. *Id.* The Staff also took into account the fact that domestic supply would be particularly vulnerable to a global shortfall if the gaseous diffusion plant in Paducah, Ky closes as expected without an offsetting increase in supply from the NEF. *Id.* 

4.127 In its pre-filed testimony, the Staff also presented a supplemental analysis of the purpose and need for the NEF, independently analyzing the need for global enrichment supply to satisfy global nuclear generating requirements, the need for an economical and secure

supply of enriched uranium to fulfill U.S. electricity requirements, and the need for domestic uranium enrichment to achieve energy security and national security goals. *Id.* At 8-10. The Staff also prepared an independent market analysis of uranium enrichment supply and demand for the U.S. and globally. *Id.* At 11-16.

4.128 Based on the above-stated purpose and need, the Staff considered alternatives to the construction and operation of the NEF. The Staff considered the no-action alternative, under which the NEF would not be constructed and two alternative sources to satisfy domestic enriched uranium needs: (1) reactivation of the Portsmouth gaseous diffusion facility and (2) purchase of enriched uranium from foreign sources. Staff Exhibit 47 at 2-39 to 2-42. The Staff determined that re-activation of the Portsmouth facility was not likely, and that reliance on foreign suppliers would not meet the need for domestic sources of enriched uranium; therefore, the Staff eliminated both of these alternatives from further consideration. *Id.* The Staff also evaluated alternative technologies for producing enriched uranium but determined that these were either not commercially viable or were found to be only at the developmental research stage. *Id.* 

4.129 In comparing the feasible alternatives, the Staff found that under the no action alternative foreign enrichment sources would continue to supply most (85%) of the domestic demand. Staff Exhibit 47 at 2-33 to 2-34. The Staff's market analysis considered the need for the NEF indicated a tight balance of global enrichment supply and demand and a risk of a shortfall of supply after 2013 even if the NEF and the proposed uranium facility by USEC are both producing at or above capacity. Staff Purpose and Need Testimony at 8-10. Given the stated need for enrichment services, the Staff concluded that the preferred market scenario is that these enrichment services be supplied by a domestic rather than foreign producer. *Id.* 

4.130 The FEIS contains a description of the regional and local environmental characteristics at the proposed site for the NEF. This included a description of land use, water

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resources, historic and cultural resources, visual and scenic resources, climatology, meteorology, air quality, geology, minerals and soils, ecology, noise, socioeconomics, public health, transportation and waste disposal. Staff Exhibit 47 at 3-1 to 3-71.

4.131 The FEIS also discusses the potential environmental impacts of the NEF, defining the impacts as small, moderate or large. Staff Exhibit 47 at xxv. The Staff determined that the impact on land use would be small as construction would occur on about 200 acres of a 543 acre fenced site and there is sufficient surrounding land to relocate an existing carbon dioxide pipeline and cattle grazing. *Id.* at xxv, 4-2 to 4-3.

4.132 With respect to historical and cultural resources at the site, which includes seven archaeological site (two of the which would be impacted by construction activities and a third site which is located along the access road) the Staff determined that the impact would be small based on the terms and conditions of a Memorandum of Agreement under which a historic properties treatment plan would be fully implemented prior to construction of the proposed NEF. *Id.* at xxv, 4-3 to 44-4.

4.133 The Staff determined that the impact on visual and scenic resources would be small because fugitive dust emissions during construction would be controlled through dust-suppression techniques, the cooling towers could contribute to the creation of fog less than 44 hours per year, and the site received the lowest scenic-quality rating under the U.S. Bureau of Land Management visual resource inventory process. *Id.* at xxv, 4-4 to 4-6.

4.134 Based on projections of air concentrations of pollutants expected from emissions from vehicles and fugitive dust during construction and the monitoring of stack emissions, the Staff concluded that the impacts on air quality from the NEF would be small. *Id.* at xxv, 4-7 to 4-9.

4.135 The Staff determined that impacts on geology and soil would be small based on

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the use of onsite soils during construction except for the possible use of clay and gravel from a nearby site and the existence of a plan to address any possible spills. No impacts on unique mineral deposits or geological resources was anticipated. *Id.* at xxv, 4-10 to 4-11.

4.136 With regard to water resources, the Staff's assessment was that impacts would be small given that there are no existing surface water resources, retention basins would be lined to minimize infiltration, and discharge permits would be required to manage stormwater during construction and operation of the NEF. In addition, the Staff considered that the water used by the NEF would come from the excess capacity in the Hobbs and Eunice, N.M. water supply systems, and that the NEF would use a small portion of the Ogallala aquifer serves in the State of New Mexico. *Id.* at xxvi, 4-11 to 4-16.

4.137 The Staff determined that the impact on ecological resources would be small given the absence of wetlands or unique habitats for threatened or endangered plant or animal species, the use of animal-friendly fencing and netting to minimize animal intrusion, the revegetation of disturbed areas, and the design of transmission lines to protect birds from electric shock. *Id.* at xxvi, 4-17 to 4-19.

4.138 The Staff determined that a moderate socioeconomic impact would be expected due to the construction jobs created, spending on goods services and wages, and the additional residency from the NEF workforce. The increase in demand for public services and decommissioning and decontamination activities would be expected to be small. *Id.* at xxvi, 4-21 to 4-24.

4.139 Based on an analysis of demographic data on minority and low income populations within 50 miles of the proposed NEF site, the Staff's assessment of environmental justice was that the impact would be small based on a determination that no disproportionately high impacts from construction, operation or decommissioning would occur to those

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populations. Id. at xxvi-vii, 4-24 to 4-28.

4.140 Impacts from noise were determined to be small. Noise from the facility was determined to be predominantly from traffic and construction would be limited to normal daytime working hours. In terms of impact, the nearest residence is 2.6 miles from the proposed site and noise from construction was considered to be negligible at that distance. *Id.* at xxvii, 4-29 to 4-31.

4.141 The transportation impacts were considered from construction and decommissioning and as a result of accidents. During construction, traffic would be expected to almost double, resulting in small to moderate impact. During normal operations, the impacts were expected to be small. For potential accidents the impacts were determined to be small to moderate considering the adverse, but temporary, health effects to the affected population due to chemical impacts. The impacts during decommissioning were determined to be small based on the expected truck and railway transportation. *Id.* at xxvii, 4-32 to 4-44.

4.142 The impacts on public and occupational health and safety were also considered. The Staff determined that the impacts during construction and normal operations would be small given the expected radiological exposures to workers and members of the general public. For accidents, the Staff determined that the impacts would be small to moderate after accounting for the potential consequences of a severe accident, i.e., a release from the rupture of an overfilled and/or overheated cylinder. *Id.* at xxvii-xxviii, 4-45 to 4-51. The Staff provided additional information regarding the potential consequences of this accident in pre-filed testimony. As the Staff explained, in the event of such a rupture uranium hexafluoride would be released inside the facility and potentially outside the facility by means of the building's ventilation system. Staff Accident Testimony at 3-4. The Staff also evaluated the measures that would be expected to be taken by workers at the facility and by the public in accordance with the emergency plan that would be in place to mitigate the consequences of the postulated

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accident. Id. at 4-6.

4.143 The Staff also accounted for the impacts of the management of waste generated by the NEF. For the solid wastes which will be generated during construction and operation the Staff determined that the impacts will be small given the waste management programs that will be implemented to minimize waste generation and promote recycling. With respect to the depleted uranium tails that will be generated, the Staff found that impacts would be small to moderate based on the fact that exposures will be controlled at the NEF during storage and after considering the impacts of disposal at a private facility licensed to accept the quantities which would be generated by NEF during the operations. *Id.* at xxvii, 4-55 to 4-64.

4.144 The Staff also accounted for the impacts of decontamination and decommissioning of the proposed NEF, and determined that such impacts would be small to moderate based on impacts on land use, historical and cultural resources, visual and scenic resources, air quality, geology and soils, water resources, ecological resources, socioeconomics, environmental justice, noise, transportation, public and occupational health and waste management. *Id.* at 4-64 to 4-70.

4.145 Cumulative impacts, the potential irreversible and irretrievable commitment of resources, the unavoidable adverse environmental impacts, the relationship between short-term uses of the environment and the maintenance and enhancement of long term productivity, and the impacts of the no action alternative were also addressed by the Staff in the FEIS. *Id.* at 4-70 to 4-82.

4.146 Based on our review of the FEIS, we conclude that the Staff has conducted the requisite "hard look" at the environmental impacts of the NEF to satisfy its obligations under NEPA and the Commission's implementing regulations in 10 C.F.R. Part 51.

4.147 In addition, the Board has independently considered the factors contained in the record including the environmental, economic and other benefits to national security and energy

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independence against the environmental and economic costs and impacts of the facility. Based on our review, we conclude that granting the requested license is consistent with the nation's security interests in that it will provide a reliable, economical and domestic source of enriched uranium for the production of energy and is consistent with the national interest in protecting the environment and the public health and safety.

### J. <u>SER, Chapter 10, "Decommissioning"</u>

4.148 Chapter 10 of the SER addresses LES's decommissioning plan for the purpose of determining whether there is reasonable assurance that the NEF will be decommissioned safely. Staff Exhibit 49-M at 10-1. The Staff reviewed the plan to determine compliance with the regulatory requirements concerning decommissioning funding and financial assurance (10 C.F.R. §§ 30.35, 40.36, 70.22, 70.25) and the requirements relating to the decommissioning of sites (10 C.F.R. §§ 20.1401-1406, 30.36, 40.42, 70.38). *Id.* The relevant portions of the SRP references NUREG-1727 "NMSS Decommissioning Standard Review Plan." *Id;* Staff Exhibit 50-M at 10-2.

4.149 The Staff reviewed the measures proposed by LES to minimize the spread of radioactive contamination and thereby simplify plant decommissioning and worker exposure. Additionally, specific measures designed to minimize worker exposure to radiation and minimize radioactive waste volumes during decontamination activities were reviewed. *Id.* at 10-2 to 10-3.

4.149 The Staff reviewed LES's decommissioning plan, which proposes utilization of the DECON approach under which the residual radioactivity is to be reduced below regulatory levels so the facilities may be released for unrestricted use. *Id.* at 10-3. The Staff noted that LES had briefly described the decommissioning approach and the activities that will be conducted to accomplish decommissioning. In the SER, the Staff describes the overall decommissioning approach and the specific plans for process systems, dismantling the facility, sale and salvage of items from the facilities, disposal of waste and the final radiation survey. *Id.* 

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at 10-5 to 10-6.

4.150 The Staff also reviewed and found acceptable LES's general plans for management and organization of the decommissioning program with regard to (1) responsibilities for management of the decommissioning program, (2) minimization of waste volumes and worker exposures, and (3) procedural control and training requirements for contractors assisting in decommissioning. *Id.* at 10-6.

4.151 The Staff also reviewed LES's plans for decommissioning health and safety measures, waste management security and nuclear material control, and recordkeeping. *Id.* at 10-7 to 10-8.

4.152 The Staff's review of LES's plan for decontamination, which will be primarily in the form of small amounts of  $UO_2F_2$  and  $UF_4$ , included the plan to install facilities for the purpose accomplishing decontamination activities and the procedures that will be developed to minimize worker exposure and waste volumes and to assure that the work is accomplished safely. *Id.* at 10-8 to 10-10.

4.153 The Staff reviewed LES's funding for decommissioning costs assuming utilization of a private deconversion facility and near surface disposal following the guidance in NUREG-1757, Volume 3 "Consolidated NMSS Decommissioning Guidance - Financial Assurance, Recordkeeping, and Timeliness," LES Exhibit 82. LES included the cost of decommissioning the facility, deconversion of the depleted uranium tails produced by the NEF, and the ultimate disposal of the tails. Staff Exhibit 49-M at 10-10 to 10-11. Based on the Staff's review of LES's documentation supporting the cost estimate, the Staff concluded that LES's cost estimate was sufficiently documented and reasonable and satisfied the criteria set forth in the regulatory guidance. *Id.* at 10-10 to 10-12.

4.154 The Staff also reviewed the means by which LES proposed to provide financial assurance. *Id.* at 10-13 to 10-15. At LES's request, the Staff approved an exemption to

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10 C.F.R. § 40.36 and § 70.25 to allow incremental funding of decommissioning costs to reflect the phased approach to achieving enrichment capacity and the expected generation of depleted uranium tails. *Id.* at 1-9 to 1-10.

4.155 LES proposed providing initial funding for the projected cost of facility decontamination and decommissioning and disposition of the tails expected to be generated during the first three years of operation. *Id.* Thereafter, LES would provide revised funding instruments to account for the depleted uranium tails expected to be generated on an annual basis. *Id.* In the event that LES does not employ all projected modules for production, the updates could reflect a corresponding decrease in decommissioning costs. *Id.* 

4.156 The Staff granted the exemption request based on a determination that the approach proposed by LES would provide funding for LES's decommissioning obligations at any point in time, the proposal would not endanger life or property or the common defense and security. *Id.* Further, the Staff found that it would be in the public interest by reducing unnecessary regulatory costs. *Id.* 

4.157 To ensure that LES will comply with the approach described, the Staff imposed license conditions requiring LES to initially provide financial assurance for the disposition of the first three years of uranium tails to be generated and to thereafter provide revised funding instruments annually to reflect projections of depleted uranium generation. *Id.* at 10-14. The license conditions also require LES to submit updated decommissioning funding estimates and revised funding instruments for facility decommissioning at least every three years. *Id.* 

4.158 The Staff also reviewed draft copies of the surety bond it plan to use to provide the required financial assurance, including the standby trust language. *Id.* at 10-13. Based on that review, the Staff found that the surety bond method proposed by LES would provide a guarantee that decommissioning costs will be paid in the event LES is unable to meets its obligations. *Id.* 

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4.159 Because final executed copies of the surety bond were not available, the Staff imposed license conditions requiring that final copies of the financial assurance instruments be provided to the NRC for review at least six months prior to the planned date for obtaining licensed material and that final executed copies be provided to the NRC before receipt of licensed material. *Id.* at 10-15.

4.160 The funding updates imposed by the license conditions are consistent with, but more vigorous than, those required by regulations. The relevant regulatory requirement, 10 C.F.R. § 70.25(e), requires that each decommissioning funding plan must contain a cost estimate for decommissioning and a description of the method of assuring funds for decommissioning, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility. These adjustments to the cost estimate must be adjusted at intervals not to exceed three years.

4.161 The Board requested additional information from the Staff and LES regarding the means by which these cost adjustments would be made should the cost of decommissioning funding substantially increase due to a future Commission determination that near surface disposal of depleted uranium is no longer appropriate. The Staff submitted pre-filed testimony in response to this question in which it explained that its review of the decommissioning cost estimate is premised upon routine operations, meaning operations under existing regulations. Staff Financial Assurance Testimony at 2-3. Should the Commission alter those regulations in a manner that increases decommissioning costs, LES would be expected to provide additional funding to account for those costs in the periodic updates. *Id.* at 4-5.

4.162 LES also submitted pre-filed testimony addressing this question, explaining that it would assure funding by means of a surety bond in an amount at least equal to the decommissioning cost estimate. LES Financial Assurance Testimony at 4-7. In the event that the cost increases in the future, LES stated that it would either revise the bond to assure the

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higher amount or obtain another financial assurance mechanism to make up the difference. Id.

4.163 With regard to LES's ability to acquire additional funding, LES observed that the LES partners, in particular Urenco, are corporations with significant financial resources and will have significant equity contributions in the NEF. *Id.* at 9-10. Additionally, LES testified that the NEF was expected to generate substantial revenue and profits once operations commence and production ramps up. *Id.* The Staff similarly observed that the size of the financial commitment necessary and the substantial base of contracts for services indicated that its continued solvency and continued operation were somewhat more assured than an ordinary commercial venture. Staff Financial Assurance Testimony at 7.

4.164 Both the Staff and LES noted that LES would be required by regulation to increase funding to account for any increase in the estimated cost of decommissioning funding and, therefore, would be subject to enforcement sanctions by the NRC should LES fail to meet this requirement. Staff Financial Assurance Testimony at 9; LES Financial Assurance Testimony at 7.

4.165 Following issuance of the SER, the Staff conducted a review of information submitted by LES regarding the cost of dispositioning the depleted uranium tails by transferring them to the Department of Energy (DOE) in accordance with the USEC Privatization Act of 1996, 42 U.S.C. 229h. The Staff documented the outcome of its review in the Louisiana Energy Services National Enrichment Facility Safety Evaluation Report Supplement on Decommissioning Financial Assurance, Staff Exhibit 76-M.

4.166 Based on a review of the documentation provided by DOE, the Staff determined that all appropriate costs were included. These included the cost of the pro rata share of capital expenses (for construction, decontamination and decommissioning), and operational costs for deconversion and disposal activities. *Id.* at 3-4. Additionally, the Staff found that the cost estimates were reasonable. *Id.* The Staff found that because the DOE cost estimate was less

than the funding amount for deconversion and disposal already committed to by LES, there was adequate assurance that the decommissioning funding would be sufficient to pay the cost for dispositioning by DOE. *Id.* at 4. To ensure that any increase in DOE costs are accounted for in LES's decommissioning funding, the Staff imposed license conditions that require that updated cost estimates equal or exceed updated DOE cost estimates. *Id.* at 4-5.

4.167 Based on our review of the application and the Staff's review documents relating to decommissioning, we find that the Staff's review was sufficient to support its finding that LES's decommissioning plan and financial assurance for decommissioning provide reasonable assurance of protection for workers, the public and the environment.

## K. <u>SER, Chapter 11, "Management Measures"</u>

4.168 The applicant must provide information to ensure that the management measures applied to items relied on for safety (IROFS), as documented in the Integrated Safety Analysis (ISA) Summary, provide assurance that the IROFS will be available and reliable, consistent with the performance requirements of 10 C.F.R. § 70.61. Staff Exhibit 50-M at 11-1; *see also* Staff Exhibit 49-M at 11-1. 10 C.F.R. § 70.4 states that "management measures" include configuration management, maintenance, training and qualifications, procedures, audits and assessments, incident investigations, records management, and other quality assurance elements. Each applicant or licensee must keep records of IROFS failures in accordance with 10 C.F.R. § 70.62(a)(3), and also must establish management measures to ensure compliance with the performance requirements of § 70.61. 10 C.F.R. § 70.62(a)(3) and (d). Other applicable regulatory requirements are: 10 C.F.R. § 19.2, "Instructions to Workers"; 10 C.F.R. § 70.22(a)(8), the requirement for procedures that protect health and minimize danger to life; 10 C.F.R. § 70.72, the requirements for facility change processes; and 10 C.F.R. § 70.74(a) and (b), the requirement for incident investigation and reporting.

4.169 When reviewing the application to determine compliance with the above

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regulatory requirements, the Staff is guided by the acceptance criteria listed in Chapter 11 of NUREG-1520. Staff Exhibit 51-M at 11-9 to 11-24. Chapter 11 of NUREG-1520 was applicable to the LES application in its entirety. Staff NUREG-1520 Testimony at 18. Thus, the Staff reviewed LES's management measures against the acceptance criteria listed in NUREG-1520. Staff Exhibit 49-M at 11-2.

4.170 According to 10 C.F.R. § 70.4, configuration management (CM) is included in management measures. The Staff reviewed the CM program to determine whether it will ensure that accurate and current documentation matches the facility's physical/functional configuration, and to ensure that IROFS are available and reliable and comply with regulatory requirements. Staff Exhibit 49-M at 11-2. The review found that the CM program will be implemented throughout facility design, construction, testing, and operation and will be applied to all structures, systems, and components (SSCs) that the ISA identifies as IROFS, and any items that affect the function of the IROFS. The applicant provided a descriptive review process which will be implemented to ensure changes to the facility's physical/functional configuration, procedures, and controlled documents are implemented in accordance with the provisions of 10 C.F.R. § 70.72. The Staff's evaluation found that the applicant has suitably and acceptably described its implementation strategy for a CM program that meets the requirements of 10 C.F.R. § 70.72, and the CM program appropriately covered CM policy, design requirements, document control, change control, and assessments. Based on its review, the Staff concluded that the applicant's CM program is acceptable. Id.; see also Staff Exhibit 50-M at 11-1 to 11-2.

4.171 The Staff reviewed the information in the application related to proposed maintenance and functional testing programs. Staff Exhibit 49-M at 11-6 to 11-11. The maintenance program includes corrective maintenance, preventative maintenance, surveillance and monitoring, and functional testing. The application outlined the planned and scheduled

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maintenance and functional testing programs, for IROFS, that will ensure that equipment and controls will be maintained in a condition of readiness and will perform their safety functions when required. *Id.*; *see also* Staff Exhibit 50-M at 11-2. The application also establishes a maintenance organization to plan, schedule, and track maintenance activities, and maintain records for these activities. *Id.* Based on its review, the Staff determined that the applicant's maintenance functions meet the requirements of 10 C.F.R. Part 70 and provide assurance of protecting the health and safety of workers, the public, and the environment. *Id.* 

4.172 Training and gualifications programs are also included in management measures under 10 C.F.R. § 70.4. The Staff reviewed LES's training and qualifications program for the operational phase of the facility, including training, testing, and gualification of personnel who perform activities relied on for safety and training for pre-operational functional testing and initial-start-up testing. Staff Exhibit 49-M at 11-11 to 11-20; see also Staff Exhibit 50-M at 11-2. LES stated that that gualification will be indicated by successful completion of prescribed training, demonstration of the ability to perform assigned tasks, and, where required by regulation, maintaining an active and valid license issued by a regulatory agency. The application described the methods that will be employed to perform an analysis of job training needs and to ensure that personnel who work on tasks related to IROFS are provided the appropriate training. Id. The Staff's evaluation found that the applicant's description of its training program appropriately covered the acceptance criteria listed in NUREG-1520, including: (a) training organization and management; (b) analysis and identification of functional and position training requirements; (c) training basis and objectives; (d) organization of instruction; (e) evaluation of trainee learning; (f) conduct of on-the-job training; (g) evaluation of training program effectiveness; (h) personnel qualification; and (i) personnel evaluations. Based on this evaluation, the Staff found LES's training program acceptable. Id.

4.173 Pursuant to 10 C.F.R. §§ 70.4 and 70.22(a)(8), procedures are to be included in

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management measures. The Staff reviewed the applicant's programs for the development and implementation of procedures. Staff Exhibit 49-M at 11-20 to 11-21. LES identified four types of plant procedures that will be used to control activities at the facility: (1) operational procedures, used to directly control process operations at the facility; (2) administrative procedures, used to perform activities that support operations; (3) maintenance procedures, used to address preventative and corrective maintenance of IROFS, surveillance, functional testing of IROFS, and pre-maintenance activity requirements; and (4) emergency procedures, used to address the preplanned actions of operators and other plant personnel, in case of an emergency. *Id.* at 11-20. The application also described a process for creating, reviewing, and approving procedures. *Id.* Based on its review of the application's plans for procedure development and implementation, the Staff determined that the applicant described a suitably detailed process for the development, approval, and implementation of procedures. The Staff concludes that the applicant's strategic plan for procedure development will meet the requirements of 10 C.F.R. Part 70. *Id.* at 11-30; *see also* Staff Exhibit 50-M at 11-3.

4.174 LES committed to implement a system of audits and assessments to help ensure that facility activities are conducted in a safe manner. The Staff reviewed LES's policies, directives and commitments to conduct such audits and assessments. Staff Exhibit 49-M at 11-21 to 11-23; *see also* Staff Exhibit 50-M at 11-3. The review showed that the system of audits and assessments for the proposed facility consists of two distinct levels of activities: audit activity structured to monitor compliance with regulatory requirements, licensing commitments, and facility procedures; and assessment activity oriented toward determining the effectiveness of the activities in ensuring that IROFS are reliable and available to perform their intended safety functions. Audits will be performed in the following areas: (a) nuclear criticality safety, radiation safety, and chemical safety; (b) industrial safety and fire protection; (c) environmental protection; (d) emergency management; (e) QA; (f) CM; (g) maintenance; (h) training and

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qualification; (I) procedures; (j) corrective action program (CAP) and incident investigation; and (k) records management. The frequency of audits and assessments will be based on the status, safety significance, and history of the activities being performed, but all major activities will be audited or assessed annually. LES states that audits and assessments will be performed routinely by appropriately-trained and qualified staff who are not directly responsible for production activities. The Staff's review also confirmed that audits and assessments will use approved procedures. *Id.* Based on its review, the Staff concluded that the LES had adequately described its audit and assessment functions and that its plan for audits and assessments meets the requirements of 10 C.F.R. Part 70 and provides assurance of protection of the health and safety of workers, the public, and the environment. Staff Exhibit 49-M at 11-30 to 11-31.

4.175 The Staff reviewed information in the application related to incident investigation Staff Exhibit 49-M at 11-23 to 11-25. The application described the policy, procedures, and management structure used to investigate abnormal events and complete appropriate corrective actions. *Id.*; *see also* Staff Exhibit 50-M at 11-3. The review showed that the described process will satisfy 10 C.F.R. §§ 70.50 and 70.74, which requires licensees to report abnormal events to the NRC. The applicant's overall incident investigation process will provide for incident identification, investigation, root-cause analysis, environmental protection analysis, recording, reporting, follow-up, and reporting events to NRC. These activities will be conducted pursuant to a written corrective action process and implementing procedures to be developed by LES. This guidance will also be used to evaluate the significance of each event or condition with respect to the levels of uranium released or the potential for exposure to workers, the public or the environment to determine the level of investigation required. *Id.* Based on the Staff's review of LES's planned incident investigation process, the Staff determined that the process adequately follows the acceptance criteria in NUREG-1520. Staff Exhibit 49-M

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at 11-31.

4.176 The Staff reviewed LES's records management system, included in management measures under 10 C.F.R. § 70.4. The records management system has procedures for handling and storing records related to the QA program, including all completed records that furnish documentary evidence of the quality of items and/or activities affecting quality, including records related to health and safety. Staff Exhibit 49-M at 11-25. The application describes the types of records that will be retained under records management procedures. *Id.* The Staff's review showed that the applicant will use a records storage system that will provide for efficient and accurate retrieval of information; is capable of protecting and preserving health and safety records; and is capable of protecting stored records from loss, theft, tampering and damages. *Id.* at 11-25 to 11-26. Based on its review of the description of LES's proposed records management system, the Staff concluded that the system as described is acceptable. *Id.* at 11-31.

4.177 The Staff reviewed LES's other QA elements required by 10 C.F.R. § 70.62(d) and 10 C.F.R. Part 50, Appendix B to obtain reasonable assurance of the implementation of accepted QA principles applied to management measures during the design, construction, operation, maintenance, and modification phases of the facility's life. Staff Exhibit 50-M at 11-4. These QA elements will be applied to IROFS and other management measures. Staff Exhibit 49-M at 11-26. LES included a complete description of its application of QA elements to IROFS. The applicant will assign QA levels (1, 2, or 3) to facility structures, systems, and components (SSCs) and associated processes, based on their safety significance. *Id.* at 11-27. The applicant's QA Program and its supporting manuals, procedures, and instructions are applicable to items and activities designated as QA Levels 1 and 2. *Id.* QA Level-1 will meet the criteria established in 10 C.F.R. Part 50, Appendix B by

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conforming to American Society of Mechanical Engineers (ASME) guidelines. The QA Level-1 Program will be applied to those SSCs and administrative controls that have been determined to be IROFS; items that affect the functions of IROFS; and items required to satisfy those regulatory requirements applicable to QA Level-1. *Id.* at 11-27 to 11-28. The applicant's QA Level-2 Program, which will be applied to owner-designated SSCs and activities, is an ownerdefined QA Program that also uses the ASME guidance. *Id.* at 11-28. The Level-3 Program, which will govern all activities not designated as is QA Levels 1 or 2, is defined as standard commercial practice. *Id.* Based on its review, the Staff concluded that the description of other QA elements was adequate to meet the requirements of Appendix B of 10 C.F.R. Part 50 and 10 C.F.R. § 70.62(d).

4.178 Based on the reviews described above, the Staff found that the management measures described in the application meet all applicable regulatory requirements and provide reasonable assurance of protection of public health and safety and protection of the environment. Staff Exhibit 49-M at 11-28 to 11-32.

4.179 Based on the above, we find that the Staff's had a reasonable basis for its conclusions, and that the record is sufficient with respect to management measures to support license issuance.

L. <u>SER, Chapter 12, "Material Control and Accounting"</u>

4.180 10 C.F.R. Part 74 requires an applicant to provide a Fundamental Nuclear Material Control Plan (FNMCP) to show that it has an acceptable Material Control and Accounting (MC&A) program. Specifically, the MC&A program must meet the general performance objectives presented at 10 C.F.R. § 74.33(a) and the system capabilities described at 10 C.F.R. § 74.33(c).

4.181 Acceptance criteria applicable to MC&A programs are found in NUREG-1065, "Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities." Staff NUREG-1520 Testimony at 19. In order to determine whether the proposed MC&A program complies with 10 C.F.R. Part 74, the Staff reviewed the FNMCP against the acceptance criteria in NUREG-1065. *Id.*; *see also* Staff Exhibit 50-M at 12-1. The Staff's review of the MC&A program contains information that has been marked as "Proprietary Information" by the applicant, pursuant to 10 C.F.R. § 2.390, and was not provided in the SER in its entirety. The SER Summary, Staff Exhibit 50-M, however, does provide a non-proprietary summary of the Staff's review.

4.182 The FNMCP describes the proposed methods for achieving the performance objectives and the system capabilities in 10 C.F.R. § 74.33(a) and (c). Staff Exhibit 49-M at 12-1. The Staff's review of the MC&A program encompassed the following programs: (1) MC&A organization; (2) measurement program; (3) statistical program, (4) physical inventory program; (5) item control program; (6) material receipt and shipment program; (7) assessment program; (8) unauthorized-enrichment assessment program; (9) program for resolving indications of missing uranium; (10) investigation assistance; and (11) record-keeping.

4.183 The applicant described the management structure and organization positions related to the MC&A program. Based on its review of the description, the Staff found that LES has an organization, position qualification requirements, core procedures, and a training program sufficient to effectively manage the MC&A system. Staff Exhibit 50-M at 12-1.

4.184 10. C.F.R. § 74.33(c)(2-3) requires a measurement program. The Staff reviewed the measurements that will be used for accounting purposes or for a monitoring program to detect an unauthorized activity and the measurement control program to ensure that measurements are properly made. Staff Exhibit 50-M at 12-2. Based on the Staff's review, the Staff determined the applicant's system of measurements appropriate and acceptable to ensure that all quantities of nuclear material in the accounting records are based on reliable measurements, as required in 10 C.F.R. § 74.33(c)(2). The staff also concluded that the

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FNMCP adequately described a measurement control program that ensures the capabilities required in 10 C.F.R. § 74.33(c)(3) are met. *Id.* 

4.185 The Staff reviewed the applicant's statistical program to evaluate MC&A data. The review showed that the FNMCP detailed the procedures and methods for statistically evaluating MC&A data. Based on its review, the Staff found that the statistical program described is adequate. Staff Exhibit 50-M at 12-2.

4.186 10 C.F.R. § 74.33(c)(4) requires a physical inventory program that provides for performing a physical inventories of SNM and reconciling and resolving the results of such inventories. The Staff reviewed the applicant's basic elements for scheduling, performing, and reporting bimonthly and annual physical inventories. The staff found that the FNMCP demonstrates its ability to confirm the presence and quantities of nuclear materials, and complies with § 74.33(c)(4). Staff Exhibit 50-M at 12-2.

4.187 Licensees must have an item control program for uranium and U<sup>235</sup> under 10 C.F.R. § 74.33(c)(6). The Staff reviewed LES's ability to maintain a record of all source material (SM) and SNM. The Staff found that the FNMCP adequately described an item control program that will identity all SNM and SM contained in all items, as required in § 74.33(c)(6). Staff Exhibit 50-M at 12-2.

4.188 The Staff reviewed the applicant's proposed practices and methods for receipt, transfer, and shipment of nuclear materials and evaluation and resolution of shipper-receiver differences and found them appropriate and acceptable with regard to the resolution program contained in 10 C.F.R. § 74.33(c)(7). Staff Exhibit 50-M at 12-2.

4.189 In the SER, the Staff reviewed the applicant's independent assessment program for review of the facility MC&A program capabilities, performance, and overall effectiveness on a periodic basis. The Staff found that the program will provide for documented independent

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assessments within the required 24 months and conforms to the requirements contained in 10 C.F.R. § 74.33(c)(8). Staff Exhibit 50-M at 12-2 to 12-3.

4.190 The Staff reviewed the applicant's program for precluding and detecting unauthorized production of enriched uranium. The Staff determined that the approaches and methods for the detection, resolution, and reporting programs comply with 10 C.F.R. § 74.33(c)(5). Staff Exhibit 50-M at 12-3.

4.191 The Staff reviewed the applicant's proposed methods and procedures for resolving indicators of missing nuclear materials or unauthorized production of enriched uranium. The Staff determined that the approaches and methods of the detection, resolution, and reporting programs comply with the requirements of 10 C.F.R. § 74.33(a). Staff Exhibit 50-M at 12-3.

4.192 The Staff reviewed the applicant's program to provide informational items to the NRC or other Government agencies to assist in any investigation relating to actual or highly suspicious events pertaining to missing uranium or unauthorized enrichment. The Staff found that the commitments in the FNMCP meet the requirements in 10 C.F.R. § 74.33(a) to provide information to aid in the investigation of missing uranium and unauthorized production activities. Staff Exhibit 50-M at 12-3.

4.193 The Staff reviewed the applicant's nuclear material accounting and recordkeeping system. The Staff found that the accounting system is secure and adequate and identified the necessary documentation needed. The Staff determined that the applicant's record-keeping system is acceptable and conforms to the requirements in 10 C.F.R. § 74.33(d). Staff Exhibit 50-M at 12-3.

4.194 Based on the above reviews, the Staff found that LES's FNMCP for the proposed NEF is acceptable and will meet the applicable Part 74 requirements. Thus, the Staff

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determined that LES meets the requirements in the area of MC&A to operate the proposed facility under Part 74. Staff Exhibit 49-M at 12-1.

4.195 Based on the above, we find that the Staff's had a reasonable basis for its conclusions, and that the record is sufficient with respect to the MC&A program to support license issuance.

#### M. <u>SER, Chapter 13, "Physical Protection"</u>

4.196 Each applicant or licensee who possesses, uses, or transports special nuclear material of moderate or low strategic significance must have a physical protection plan. 10 C.F.R. § 73.67. The plan must meet the performance objectives, systems capabilities, and reporting requirements specified in 10 C.F.R. §§ 73.67 and 73.71. *See* Staff Exhibit 49-M at 13-1.

4.197 In its review of physical protection plans, the Staff uses 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." LES also used Regulatory Guide 5.59 in preparing its physical protection plan. Staff NUREG-1520 testimony at 32.

4.198 The Staff reviewed LES's Physical Security Plan to ensure that the plan complies with the requirements of 10 C.F.R. §§ 73.67 and 73.71 as well as Regulatory Guide 5.59. Staff Exhibit 49-M at 13-1. The review included information marked as "Proprietary Information" pursuant to 10 C.F.R. § 2.390. *Id.* Thus, only redacted and summary information regarding the review of the Physical Security Plan is publicly available. *See* Staff Exhibit 49-M at 13-1; *see also* Staff Exhibit 50-M at 13-1 to 13-2.

4.199 The Staff reviewed the following areas of the Physical Security Plan: (1) the applicant's proposed barrier for physical protection of the facility; (2) the applicant's proposed

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personnel and vehicle access control measures; (3) the applicant's proposed intrusion detection measures; (4) the applicant's proposed response to unauthorized penetrations into the facility; and (5) the applicant's plan for reporting security events. Staff Exhibit 50-M at 13-1 to 13-2. Based on its review, the Staff found that the Physical Security Plan for the proposed NEF is acceptable and satisfies the applicable regulatory requirements for physical protection of SNM of low strategic significance. Staff Exhibit 49-M at 13-1.

4.200 Based on the above, we find that the Staff had a reasonable basis for its conclusions, and that the record is sufficient with respect to the Physical Security Plan for the proposed facility to support license issuance.

# N. SER, Chapter 14, "Physical Security of the Transportation of Special Nuclear Material of Low Strategic Significance"

4.201 Licensees must provide adequate physical protection of SNM of low strategic significance (LSS) in transit. 10 C.F.R. § 73.67(c) requires licensees who transport SNM-LSS to submit a security plan that explains how the licensee will comply with the in-transit requirements for SNM-LSS listed in § 73.67(g). The licensee must also meet regulatory requirements regarding reporting of safeguards events to the NRC, 10 C.F.R. § 73.71; regulatory requirements regarding notice and protection of export shipments of SNM-LSS, 10 C.F.R. § 73.73; and regulatory requirements for advance notice and protection of import shipments of SNM-LSS from countries that are not party to the Convention on the Physical Protection of Nuclear Material, 10 C.F.R. § 73.74. Licensees who transfer or receive SNM must comply with requirements for nuclear material transfer reports. 10 C.F.R. §74.15.

4.202 Upon review of an applicant's physical security plan for transportation of SNM-LSS, the Staff will consider a plan acceptable if it meets the regulatory requirements listed above. Staff Exhibit 49-M at 14-1. The Staff reviewed transportation provisions in LES's

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Physical Security Plan. The review contains information that has been marked as "Proprietary Information" by the applicant, pursuant to 10 C.F.R. § 2.390, and was not provided in the SER in its entirety. *Id.* The SER Summary, however, does provide a non-proprietary summary of the Staff's review. Staff Exhibit 50-M at 14-1 to 14-3.

4.203 The Staff reviewed Chapters 7-10 of LES's Physical Security Plan, which comprises the Transportation Security Plan for SNM-LSS shipments originating from, or arriving at, the facility. Staff Exhibit 49-M at 14-1. The review encompassed to following areas of the plan: (1) material transportation requirements; (2) receiver requirements; (3) in-transit physical protection requirements; (4) export requirements; (5) import requirements; and (6) document retention requirements. The Staff's review was informed by 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," and Regulatory Guide 5.15, "Tamper-Indicating Seals for the Protection and Control of Special Nuclear Material."

4.204 The Staff evaluated the Transportation Security Plan to confirm that material transportation requirements are met and to confirm the applicant's commitments as a shipper. Prior to shipment of SNM-LSS, LES will notify the receiver of the mode of transportation, estimated time of arrival, location of SNM-LSS transfer point, name of carrier, and transport identification. LES will not release a shipment from the site without the receiver's acknowledgment of its readiness to receive the shipment. Every container will be properly sealed with a security seal (tamper-indicating device) and inspected just prior to the commencement of the shipment. Finally, LES will assure that the responsibility for the in-transit physical protection of SNM-LSS will be designated in advance, in writing, to either LES or the licensee receiver. Staff Exhibit 50-M at 14-2.

4.205 The Staff evaluated the Transportation Security Plan to confirm the applicant's commitments as a receiver. Upon receipt of a shipment at the facility, LES will verify the

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integrity of all security seals. LES will provide a notification of received shipment within ten days to the shipper. LES will either acknowledge responsibility for the in-transit physical protection of SNM-LSS or will ensure that a prior written agreement from the shipper has been received in which the shipper accepts either full or shared responsibility for the in-transit physical protection of SNM-LSS in accordance with 10 C.F.R. §§ 73.67(g)(2)(iii) and 73.67(g)(3). Staff Exhibit 50-M at 14-2.

4.206 The Transportation Security Plan describes procedures for meeting in-transit physical protection requirements. The Staff evaluated the Transportation Security Plan to confirm that arrangements will be made for notifying the licensee, who arranges for the in-transit protection of SNM-LSS, of the arrival of the shipment to its destination. The Staff confirmed that if any shipment of SNM-LSS is determined to be lost or unaccounted for, the shipper will launch a trace investigation, and the Nuclear Regulatory Commission (NRC) will be notified in accordance with 10 C.F.R. § 73.71. Staff Exhibit 50-M at 14-2.

4.207 LES has committed to protect export shipments of SNM-LSS. The Staff reviewed these commitments. SNM-LSS in transit outside the United States will be protected in accordance with Annex I of the Convention of Physical Protection of Nuclear Material as required under 10 C.F.R. § 73.73(a)(4). For the domestic U.S. portion of the shipment, the licensee will comply with the transportation security requirements identified in 10 C.F.R. § 73.67(g)(1) and (3). The applicant's plan also contains procedures for making advanced notifications to the NRC of export shipments of SNM-LSS that originates from the facility, as required under 10 C.F.R. § 73.73(a)(1-3). Staff Exhibit 50-M at 14-2 to 14-3.

4.208 LES also committed to protect import shipments of SNM-LSS, and the Staff reviewed these commitments. According to the Transportation Security Plan, LES will comply with the requirements of 10 C.F.R. § 73.67(g)(2) and (3) for shipments from a country that is a

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party to the Convention on the Physical Protection of Nuclear Material. For a country that is not a party to the Convention on the Physical Protection of Nuclear Material, LES will protect any such shipment in accordance with Annex I to the Convention on the Physical Protection of Nuclear Material during its transport outside the United States, as required under 10 C.F.R. § 73.74(c), and in accordance with 10 C.F.R. § 73.67(g)(2) and (3) during its transit within the United States (i.e., from the port of entry). LES will notify the person or customer who delivered the material to a carrier for transport of the arrival of such material at the facility as required under 10 C.F.R. § 73.67(g)(5)(ii). The Staff's review also confirmed that the applicant's plan contains procedures for making advance notifications to NRC of import shipments of SNM-LSS from countries that are not party to the Convention on Physical Protection of Nuclear Material, as required under 10 C.F.R. § 73.74(a)(1-3). Staff Exhibit 50-M at 13-3.

4.209 The Transportation Security Plan contains commitments to meet regulatory requirements related to document retention. In its review of the Transportation Security Plan, the Staff confirmed the licensee's commitment to meeting the security document retention requirements specified in 10 C.F.R. §§ 73.67(c)(2), 73.67(g)(3)(i), 73.67(g)(4), and 73.67(g)(5)(i).

4.210 Based on the reviews described above, the Staff determined that the approaches and procedures outlined in the Transportation Security Plan for the proposed NEF satisfy the performance objectives, systems capabilities, and event and advance notification requirements specified in 10 C.F.R. §§ 73.67(c) and (g), 73.71, 73.73, 73.74, and 74.15. Therefore, the Staff concluded that the Transportation Security Plan is acceptable and meets the NRC requirements for physical protection of SNM-LSS in transit. Staff Exhibit 49-M at 14-1.

4.211 Based on the above, we find that the Staff had a reasonable basis for its conclusions, and that the record is sufficient with respect to physical protection of SNM-LSS to support license issuance.

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### V. CONCLUSIONS OF LAW

5.1 Based on the foregoing, the Board finds that the license application and the record in the above-captioned proceeding contain sufficient information, and the Staff's review of the application is adequate, to support findings in accordance with 10 C.F.R. §§ 2.104(b)(1) (i)-(iv) and (b)(2)(i) that: (1) the applicant has sufficiently described the proposed facility, processes, technical and design information, and safety features and components; (2) the applicant is technically qualified to design and construct the proposed NEF; (3) the applicant is financially qualified to design and construct the proposed NEF; and (4) the issuance of a permit for the construction of the proposed NEF will not be inimical to the common defense and security or to the health and safety of the public.

5.2 Based on the information with regard to the Staff's environmental review of the proposed NEF presented above, the Board finds that the Staff's review of the application pursuant to NEPA has been adequate, in accordance with 10 C.F.R. § 2.104(b)(2)(ii). In addition, the Board finds that the requirements of section 102(2)(A), (C) and (E) of NEPA and the regulations in 10 C.F.R. Part 51, Subpart A have been met.

5.3 Based on an independent review of the final balance of environmental considerations and the reasonable alternatives to the proposed NEF, the Board finds that protection of the environment does not require denial or conditioning of the license.

Respectfully submitted,

#### /RA by Margaret J. Bupp/

Lisa B. Clark Margaret J. Bupp Counsel for NRC Staff

Dated at Rockville, Maryland this 10<sup>th</sup> day of April, 2006

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## 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'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW IN THE MANDATORY HEARING" 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 10<sup>th</sup> day of April, 2006.

Administrative Judge \* \*\* G. Paul Bollwerk, III Atomic Safety and Licensing Board Panel U.S. Nuclear Regulatory Commission Mail Stop: T-3F23 Washington, D.C. 20555 E-Mail: <u>gpb@nrc.gov</u>

Administrative Judge \* \*\* Paul Abramson Atomic Safety and Licensing Board Panel U.S. Nuclear Regulatory Commission Mail Stop: T-3F23 Washington, D.C. 20555 E-Mail: pba@nrc.gov

Office of the Secretary \* \*\* ATTN: Rulemakings and Adjudication Staff U.S. Nuclear Regulatory Commission Mail Stop: O-16C1 Washington, D.C. 20555 E-mail: <u>HEARINGDOCKET@nrc.gov</u> Administrative Judge \* \*\* Charles Kelber Atomic Safety and Licensing Board Panel U.S. Nuclear Regulatory Commission Mail Stop: T-3F23 Washington, D.C. 20555 E-Mail: <u>cnkelber@aol.com</u>

Office of Commission Appellate Adjudication\* U.S. Nuclear Regulatory Commission Mail Stop: O-16C1 Washington, D.C. 20555

Mr. Rod Krich, Vice President Licensing, Safety and Nuclear Engineering Louisiana Energy Services 2600 Virginia Avenue NW. Suite 610 Washington, D.C. 20037 James R. Curtiss, Esq. \*\* Dave Repka, Esq. \*\* Martin O'Neill, Esq. \*\* Amy C. Roma, Esq. \*\* Tyson R. Smith, Esq. \*\* Winston & Strawn 1700 K Street, N.W. Washington, D.C. 20006 E-mail: jcurtiss@winston.com drepka@winston.com moneill@winston.com trsmith@winston.com

/**RA**/

Margaret J. Bupp Counsel for NRC Staff