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March 14, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	Docket No. 70-3103-ML
Louisiana Energy Services, L.P.	)	
	)	ASLBP No. 04-826-01-ML
(National Enrichment Facility)	)	

LOUISIANA ENERGY SERVICES, L.P.'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW REGARDING ENVIRONMENTAL CONTENTIONS

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In accordance with 10 C.F.R. § 2.712 and the scheduling order of the Atomic Safety and Licensing Board ("Board"),[1] Louisiana Energy Services, L.P. ("LES") submits in the form of a partial initial decision these proposed findings of fact and conclusions of law on Contentions NIRS/PC EC-1, EC-2, EC-4, and EC-7 in this proceeding. These proposed findings of fact and conclusions of law address and resolve all contested issues raised by these four environmental contentions.

Contentions NIRS/PC EC-1, EC-2, EC-4, and EC-7 were derived from certain proposed contentions submitted by NIRS/PC on April 6, 2004. These contentions were re-framed and admitted by the Board by Memorandum and Order of July 19, 2004.[2] Contentions EC-1, EC-2, and EC-4 were subsequently amended by the Board on November 22, 2004 in

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1 Memorandum and Order (Memorializing and Ruling on Matters Raised in Conjunction with August 3, 2004 Conference Call and Setting General Schedule for Proceeding), App. A (General Schedule – Louisiana Energy Services, L.P. Proceeding) (Aug. 16, 2004).

2 *See Louisiana Energy Services, L.P.* (National Enrichment Facility), LBP-04-14, 60 NRC 40, 54-58 (2004).

response to proposed contention amendments/supplements proffered by NIRS/PC after the publication of the NRC Staff's draft environmental impact statement ("DEIS").

An evidentiary hearing was conducted on all four environmental contentions before the Board the week of February 7, 2005. These proposed findings of fact and conclusions of law are based on the evidentiary record in this proceeding and, in total, support a determination by the Board that LES and the NRC Staff have demonstrated, by a preponderance of the evidence, that with respect to the matters raised in Contentions NIRS/PC EC-1, EC-2, EC-4, and EC-7, the environmental impacts of the proposed National Enrichment Facility ("NEF") have been adequately considered in the NEF Environmental Report ("ER") and DEIS, in accordance with the National Environmental Policy Act ("NEPA") and 10 C.F.R. Part 51.

The proposed findings of fact and conclusions of law are presented in sequentially numbered paragraphs. The first section, "Background," briefly describes the licensing approval at issue, the four contentions to be addressed in the Board's partial initial decision, the evidentiary hearing on those contentions, and the applicable legal standards. The second section, "Findings of Fact," presents the specific findings of fact relevant to resolving each contention. The final section, "Conclusions of Law," sets forth the Board's conclusions as necessary to resolve Contentions NIRS/PC EC-1, EC-2, EC-4, and EC-7.

I. BACKGROUND

A. The Application at Issue and the Evidentiary Hearings on Environmental Contentions

1. This proceeding concerns the December 12, 2003 application of LES for authorization to possess and use source, byproduct, and special nuclear material in order to enrich natural uranium to a maximum of five percent uranium-235 by the gas centrifuge process. LES proposes to construct and operate the NEF near Eunice, New Mexico specifically for this

purpose. The application, which seeks a 30-year license issued under 10 C.F.R. Part 70, includes a safety analysis report ("SAR"), an environmental report ("ER"), an emergency plan, a physical security plan, and a fundamental nuclear material control plan.

2. In a January 30, 2004 issuance, the Commission provided notice of the receipt and availability of the LES application and of the opportunity for a hearing on the application.[3] That notice was published in the Federal Register on February 6, 2004. *See* 69 Fed. Reg. 5873 (Feb. 6, 2004).

3. In response to the February 2004 notice, two intervention petitions were filed by governmental entities associated with the State of New Mexico – the New Mexico Environment Department ("NMED") and the Attorney General of New Mexico ("AGNM"). A third joint intervention petition was submitted by two public interest organizations, the Nuclear Resource and Information Service and Public Citizen ("NIRS/PC"). Each of their hearing requests/petitions to intervene included proposed contentions pursuant to 10 C.F.R. § 2.309.

4. In response to those hearing requests, the petitions were referred by the Commission to the Atomic Safety and Licensing Board Panel to conduct any subsequent adjudication. On April 15, 2004, this Board was appointed to preside over this proceeding. *See* 69 Fed. Reg. 22,100 (Apr. 23, 2004).

5. On June 15, 2004, the Board conducted an initial prehearing conference in Hobbs, New Mexico, during which it heard oral presentations regarding the admissibility of numerous proposed contentions proffered by the petitioners. Thereafter, in a July 19, 2004 issuance, the Board found that all the petitioners had established the requisite standing to

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[3] *See* CLI-04-3, 59 NRC 10 (2004).

intervene in this proceeding, and ruled that each had submitted at least one admissible contention concerning the LES application so that each could be admitted as a party to this proceeding.[4]

6. In its July 19, 2004 order, the Board admitted a total of ten contentions. In accordance with a prior Board order, each of the contentions had been identified as falling into one of two groups: (1) Environmental Contentions (*i.e.*, contentions relating primarily to matters discussed or referenced in the ER) and (2) Technical/Safety Contentions (*i.e.*, contentions relating primarily to technical or safety issues discussed or referenced in the SAR). In some instances, contentions were identified as falling into both categories. Of the ten admitted contentions, only four were identified as Environmental Contentions. These are Contentions NIRS/PC EC-1 ("Impacts Upon Ground and Surface Water"), EC-2 ("Impact Upon Water Supplies"), EC-4 ("Impacts of Waste Storage"), and EC-7 ("Need for the Facility").

7. On August 16, 2004, the Board established a general schedule for this proceeding (*see* n.1, supra). That schedule, among other things, allowed for the submittal of motions for the admission of amended and late-filed contentions by October 20, 2004. The schedule also provided for the conduct of evidentiary hearings on the four environmental contentions beginning on February 7, 2005. Hearings on the remaining contentions, which raise technical/safety issues, are to be held from October 24 through November 7, 2005.

8. On November 22, 2004, the Board admitted certain other late-filed amended contentions in response to proposed contention amendments/supplements submitted by NIRS/PC on October 20, 2004.[5] Specifically, the Board admitted amended versions of

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4 *See* LBP-04-14, 60 NRC 40, 54-58 (2004).

5 *See* Memorandum and Order (Ruling on Late-Filed Contentions) (unpublished) (Nov. 22, 2004) ("Ruling on Late-Filed Contentions").

Contentions NIRS/PC EC-1, EC-2, EC-4, and EC-5/TC-2 - AGNM TC-i ("Decommissioning Costs").

9. In accordance with the notice of hearing published in the Federal Register July 30, 2004 (*see* 69 Fed. Reg. 45,854), and the general schedule for this proceeding, evidentiary hearings with respect to the four environmental contentions – NIRS/PC EC-1, EC-2, EC-4, and EC-7 – were held in Hobbs, New Mexico from February 7-10, 2005. Numerous witnesses appeared on behalf of LES, the NRC Staff, and NIRS/PC during the four days of hearings on these contentions, as summarized below.

B. Applicable Legal Standards

10. Contentions NIRS/PC EC-1, EC-2, EC-4, and EC-7 contest the adequacy of LES's and the NRC Staff's consideration of certain potential environmental impacts of the proposed NEF. These challenges arise under NEPA (42 U.S.C. §§ 4321 *et seq.*) and the NRC's NEPA-implementing regulations (10 C.F.R. Part 51). Those statutory and regulatory provisions require, inter alia, that the applicant's ER and the NRC Staff's final EIS describe the potential impacts of the proposed action on the environment. *See* 42 U.S.C. § 4332; 10 C.F.R. §§ 51.45(b)(1), 51.71(d).[6]

11. The duty to consider the potential environmental impacts of a proposed action is governed by several longstanding principles that are particularly relevant to the four NIRS/PC environmental contentions before the Board. First and foremost, an EIS is to be

[6] Although the NRC Staff bears the ultimate burden of demonstrating that environmental issues have been adequately considered, it is well-established that "the filing of an environmental concern based on the ER will not be deferred because the staff may provide a different analysis in its [DEIS]." *See Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 97 (1998); *Duke Power Corp.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041, 1049 (1983); 10 C.F.R. § 2.309(f)(2).

prepared under a "rule of reason" standard.[7] The discussion of environmental impacts only needs to be sufficient "to enable the decisionmaker to take a 'hard look' at environmental factors and make a reasoned decision."[8] As such, NEPA "does not mandate particular results, but simply prescribes the necessary process."[9]

12. Impacts are discussed in proportion to their significance; insignificant impacts, therefore, require little or no treatment in an EIS.[10] The Commission recently reiterated this principle in describing its expectations relative to licensing board review of issues raised in environmental contentions:

> NEPAs twin goals are to inform the agency and the public about the environmental effects of a project. At NRC licensing hearings, petitioners may raise contentions seeking correction of significant inaccuracies and omissions in the ER. Our boards do not sit to "flyspeck" environmental documents or to add details or nuances. If the ER (or EIS) on its face "comes to grips with all important considerations" nothing more need be done.[11]

The role of the Board is thus analogous to that of reviewing court, which " . . . is simply to ensure that the agency has adequately considered and disclosed the environmental impact of its actions. . . ."[12]

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7 *See, e.g., Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 195 (D.C. Cir.), *cert. denied*, 502 U.S. 994; *Claiborne*, CLI-98-3, 47 NRC 77, 89 (1998).

8 *Claiborne*, CLI-98-3, 47 NRC at 88 (citations omitted).

9 *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989).

10 *See* 10 C.F.R. §§ 51.29(a)(2)-(3), 51.45(b)(1).

11 *System Energy Resources, Inc.* (Early Site Permit for Grand Gulf Site), CLI-05-04, 61 NRC __ (slip op. January 18, 2005), at 3-4 (citations omitted) (emphasis added).

12 *Coalition on Sensible Transp., Inc. v. Dole*, 826 F.2d 60, 66 (D.C. Cir. 1987) (citation omitted).

13. The "rule of reason" standard thus applies to an agency's consideration of the "indirect" or "cumulative" environmental impacts of a proposed action.[13] Consistent with the "rule of reason," neither an applicant nor an agency need consider "remote and speculative" environmental impacts, or "events whose probabilities they believe to be inconsequentially small."[14] Rather, NEPA requires an agency to make a "good faith" effort to predict "reasonably foreseeable" environmental impacts.[15] Moreover, an agency need not have complete information on all issues before proceeding.[16] In short, under this standard, the scope of an agency's inquiries for purposes of NEPA must remain reasonable or manageable.[17]

14. To ensure that their NEPA-related inquiries remain within reasonable bounds, agencies are vested with considerable discretion to determine how thoroughly to examine a particular issue or subject.[18] However, "[w]here the Federal government acts, not as a proprietor, but to approve . . . a project being sponsored by a local government or a private applicant, the Federal agency is necessarily more limited."[19] Specifically, when reviewing a license application filed by a private applicant, a federal agency may appropriately "accord

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13 *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2, and Catawba Nuclear Station, Units 1 & 2), CLI-02-14, 55 NRC 278, 295 n.41 (2002).

14 *Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719, 739 (3d Cir. 1989); *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-919, 30 NRC 29, 44 (1989).

15 *See, e.g., Pub. Serv. Co. of Oklahoma* (Black Fox Station, Units 1 and 2), LBP-78-26, 8 NRC 102, 141 (1978).

16 *Id.* at 141 (citation omitted).

17 *See Metropolitan Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 776 (1983 (citation omitted).

18 *See Claiborne*, CLI-98-3, 47 NRC 77, 103 (1998) (citation omitted).

19 *See, e.g., Citizens Against Burlington*, 938 F.2d at 197.

substantial weight to the preferences of the applicant and/or sponsor in the siting and design of the project."[20]

15. Finally, while a federal agency such as the NRC may not "completely abdicate its NEPA responsibilities," it is within an agency's discretion to rely on an EIS prepared by another agency.[21] The extent to which it may do so is again governed by the NEPA "rule of reason."[22] Specifically, "underlying *scientific data and inferences* drawn from [another agency's analysis] may be adopted by the NRC Staff without independent evaluation," but "the NRC must exercise *independent judgment* with respect to conclusions about the environmental impacts based on interpretations of such basic facts."[23] Stated another way, "the underlying scientific data and the direct basic factual conclusions drawn from them will not change due to the context or perspective from which the agency views them."[24]

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20 *Id.* at 197. *See also Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-04, 53 NRC 31, 55 (2001) (quoting *Citizens Against Burlington*, 938 F.2d at 197).

21 *Philadelphia Elec. Co.* (Limerick Generating Station, Units 1 and 2), LBP-82-43A, 15 NRC 1423, 1464-1470 (1982).

22 *Id.* at 1464.

23 *Id.* at 1467-68 (emphasis added).

24 *Id.* at 1468. Indeed, NUREG-1748, an NRC guidance document that provides "general procedures for the determining the level of environmental review and documentation required for NMSS actions," states that "[e]xisting environmental analyses [EAs and EISs] should be considered to evaluate the impacts associated with a proposed action to the extent possible and appropriate." NUREG-1748 states that this approach "builds on work that has already been done, avoids redundancy, and provides a coherent and logical record of the analytical and decisionmaking process." NUREG-1748 specifically recognizes incorporation by reference of, adoption of, and "tiering" off of another agency's EIS (*e.g.*, DOE GEISs) as acceptable approaches, in addition to supplementation of an existing draft or final EIS. *See generally*, NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs – Final Report" (Aug. 2003), § 1.6, at 1-8 to 1-11.

II. FINDINGS OF FACT

1. Contention NIRS/PC EC-1 ("Impacts on Ground and Surface Water")

A. Contention and Evidence Presented

1. As admitted, Contention NIRS/PC EC-1 states as follows:

CONTENTION: Petitioners contend that the Environmental Report contained in the application does not contain a complete or adequate assessment of the potential environmental impacts of the proposed project on ground and surface water, contrary to the requirements of 10 C.F.R. 51.45.

The Draft Environmental Impact Statement, NUREG-1790 (September 2004) ("DEIS") likewise does not contain a complete or adequate assessment of the potential environmental impacts of the proposed project on ground and surface water, contrary to the requirements of 10 C.F.R. Part 51 in that:

(A) The DEIS correctly notes that leakage from the stormwater detention basin and the septic leach fields will probably cause formation of perched bodies of groundwater at the alluvium/Chinle interface. (DEIS, 4-13, 4-14). The DEIS contains estimates of the dimensions of such water bodies, flow rates, and discharge areas. However, NRC provides no explanation of such calculations, and it is not possible to determine whether they are reasonable.

(B) The DEIS does not contain an estimate of the probability and frequency of leakage through the liners of the treated effluent basin or the stormwater detention basin. The basins are to be lined with geosynthetic materials (DEIS at 4-11, 4-12), such liners are known to leak (EPA, Hydrologic Evaluation of Landfill Performance (HELP) Model, User's Guide for Version 3, EPA/600/R-94/168a, Sept. 1994), and such information is necessary to demonstrate the impact of such leakage. The DEIS should contain an estimate of the leakage rate and should show the fate of water and contaminants that leak from the basins.

(C) According to the DEIS, "... no precipitation recharge (*i.e.*, rainfall seeping deeply into the ground) occurs in thick, desert vadose zones with desert vegetation (Walvoord et al., 2002)" (DEIS at 3-35). However, cuttings from one of the borings drilled in September 2003 were "slightly moist" (ER Rev. 2 at 3.4-2). In addition, the clay at the bottom of boring B-2 was "moist" (SAR at Fig. 3.2-11).. The DEIS should explain the presence of this

moisture, which conflicts with its statements about lack of recharge.

(D) The DEIS states: "Although the presence of fracture zones that can significantly increase vertical water transport through the Chinle Formation has not been precluded, the low measured permeabilities indicate the absence of such zones." (DEIS at 3-35). Two permeability measurements have been made on the Chinle Formation at or near the site: laboratory measurement of core samples (ER Rev. 2 Table 3.3-2) and a slug test performed in MW-2 (Cook-Joyce, Hydrogeologic Investigation, Sec. 32, T. 21 R. 38, Nov. 19, 2003). Such extremely limited measurements, where faults are present, cannot describe the permeability of the entire site, and NRC should explain its reliance on such restricted data.

(E) The stormwater basin will discharge runoff containing numerous contaminants, which are not adequately identified in the DEIS, nor is their monitoring explained. LES has stated that the runoff will contain small amounts of oil and grease typically found in runoff from paved roadways and parking areas (RAI Response, May 20, 2004, at 33). However, other contaminants may be present, such as PAHs (USGS, Concentrations of PAHs and Major and Trace Elements in Simulated Rainfall Runoff from parking lots, 2003, Open File Report 2004-1208), other organics such as aliphatic hydrocarbons and alcohols (Barrett, M.E, et al., Review and Evaluation of Literature Pertaining to the Quality and Control of Pollution from Highway Runoff and Construction, Tech. Report CRWR 239, April 1993), and other contaminants from spills and accidents. Their presence should be disclosed. Further, stormwater should be monitored for such contaminants.

2. LES presented a panel of two qualified experts on Contention NIRS/PC EC-1. These witnesses included (1) Mr. George A. Harper, Manager of Regulatory Compliance Programs at Framatome ANP in Marlborough, Massachusetts; and (2) Mr. Roger L. Peery, a Senior Hydrogeologist and Chief Executive Officer at John Shomaker & Associates, Inc. in Albuquerque, New Mexico. The extensive, relevant experience of both LES experts is reflected in their prefiled direct testimony and the statements of professional qualifications attached thereto. *See* "Prefiled Testimony of George A. Harper and Roger L. Peery on Behalf of

Louisiana Energy Services, L.P. Concerning Contention NIRS/PC EC-1 ("Impact Upon Ground and Surface Water") ("Harper/Peery Direct"), Tr. 375-435.

3. The LES panel submitted its prefiled direct testimony on January 7, 2005, and made several minor revisions to it at the evidentiary hearing. Tr. 367-70. LES also submitted rebuttal testimony dated February 3, 2005. *See* "Revised Rebuttal Testimony of George A. Harper and Roger L. Peery on Behalf of Louisiana Energy Services, L.P. on Contention NIRS/PC EC-1 ("Impact Upon Ground and Surface Waters") ("Harper/Peery Rebuttal"), Tr. 439-72.

4. The NRC Staff also presented written direct and rebuttal testimony on Contention NIRS/PC EC-1, from Alan L. Toblin. *See* "NRC Staff Testimony of Alan Toblin Concerning Nuclear Information and Resource Service and Public Citizen Environmental Contention 1 ("NIRS/PC EC-1") (Impacts Upon Ground and Surface Water) ("Toblin Direct"), Tr. 650-84; "NRC Staff Rebuttal Testimony of Alan Toblin Concerning Nuclear Information and Resource Service and Public Citizen Environmental Contention 1 ("NIRS/PC EC-1") (Impacts Upon Ground and Surface Water) ("Toblin Rebuttal"), Tr. 686-95. Mr. Toblin's relevant training and professional experience are set forth in the statement of qualifications attached to his prefiled direct testimony. Tr. 677-684.

5. NIRS/PC presented written direct and rebuttal testimony from George Rice. *See* "Direct Testimony of George Rice on Behalf of Nuclear Information and Resource and Public Citizen NIRS/PC Contention EC-1 (Revised Jan. 28, 2005)" ("Rice Direct"), Tr. 770-802; "Rebuttal Testimony of George Rice on Behalf of Nuclear Information and Resource and Public Citizen NIRS/PC Contention EC-1," dated January 28, 2005 ("Rice Rebuttal"), Tr. 803-

26. Mr. Rice's relevant training and professional experience are set forth in the statement of qualifications attached to his prefiled direct testimony. Tr. 797-99.

B. Adequacy of the NEF Site Characterization

6. As stated above, NIRS/PC contend that neither the ER nor the DEIS contain a complete or adequate assessment of the environmental impacts of the proposed NEF on ground or surface water, contrary to the requirements of 10 C.F.R. 51.45.[25] As a general matter, NIRS/PC assert that LES and the NRC Staff have not performed the investigations necessary to (1) characterize existing groundwater conditions, and (2) determine how the proposed facility will affect groundwater in the future. Rice Direct A.26, Tr. 791.

7. The geology and hydrogeology of the NEF site vicinity are well understood as a result of prior investigations performed at sites in proximity to the proposed NEF site. Harper/Peery Direct A.18, Tr. 383; Tr. 500-07. These sites include (1) the Waste Control Specialists ("WCS") site in Texas, located approximately 0.5 mile east/northeast of the NEF site; (2) the Lea County Municipal Landfill site (located immediately south of State Highway 234 near the southeast corner of the proposed NEF site); and (3) the proposed Atomic Vapor Laser Isotope Separation ("AVLIS") site (abutting the NEF site to the east within Section 33). Id. The WCS facility is permitted, under the Resource Conservation and Recovery Act, to dispose of hazardous waste material by land burial. *Id.* The Lea County Municipal Landfill is permitted to dispose of solid waste. LES Exhibit 3, Tab O, at 5-2.

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[25] Although Contention NIRS/PC EC-1 refers to ground *and* surface water, the NIRS/PC evidentiary presentation focused solely on ground water. In any event, as LES witness George Harper testified, by letter dated March 17, 2004, the U.S. Army Corps of Engineers ("USCOE") notified LES that there are no jurisdictional surface water bodies or drainage features at the proposed NEF site. Harper/Peery Direct A.23, Tr. 388-89; LES Exhibit 3, Tab D.

8. Prior site investigations, which were initiated in 1992, collectively include the drilling of 220 borings, the installation of 109 monitor wells and piezometers, geophysical logging, and surface seismic surveys. LES Exhibit 3, Tab O, at 5-1 to 5-4; Tables 6.5-1 and 6.5-2 (summarizing seven of the hydrogeologic investigations conducted in the site vicinity for the purpose of characterizing subsurface conditions, including the Lea County landfill and NEF site investigations). A review of data and information obtained from these site investigations has provided LES with an in-depth understanding of the geological and hydrogeological conditions associated with the NEF site. Harper/Peery Direct A.18, Tr. 383. Mr. Peery testified that these prior investigations in the NEF site vicinity have provided a "really exhaustive evaluation of the hydrogeologic setting of this area." Tr. 503.

9. LES performed additional field investigations at the NEF site and site vicinity to supplement, where necessary, information about regional or site-specific conditions. Harper/Peery Direct A.18, Tr. 384. LES selected Cook-Joyce, Inc., Engineering and Consulting ("CJI") to assist in the development and conduct of the NEF site groundwater field investigation program due to CJI's extensive experience in performing similar investigations at the nearby WCS site. *Id.*

10. CJI performed a field investigation at the NEF site in September 2003 on behalf of LES to further evaluate hydrogeologic conditions at the NEF site. Harper/Peery Direct A.19, Tr. 384-85. In particular, the investigation sought to ascertain the hydrogeologic conditions associated with the uppermost water-bearing zone beneath the NEF site. Harper/Peery Direct A.19, Tr. 384. The investigation included the installation of nine soil borings (oriented on a three-by-three grid) to determine: (1) the depth to the Chinle Formation

"red beds," and (2) whether any saturated conditions were present in the alluvial sediments overlying the red beds. Harper/Peery Direct A.19, Tr. 384-85; LES Exhibit 3, Tab L.

11. Because groundwater was not encountered in the shallow alluvium, CJI installed three monitoring wells in a siltstone/silty sandstone unit located at a depth of approximately 220 feet below ground surface, *i.e.*, the shallowest occurrence of saturated conditions beneath the NEF site. Harper/Peery Direct A.19, Tr. 385. Of the three wells installed, only one well (MW-2) has produced any water. Harper/Peery Direct A.19, Tr. 385. Ground water from MW-2 has been sampled at quarterly intervals for radiological and non-radiological analysis. Harper/Peery Direct A.19, Tr. 385.

12. In addition, in September 2003, LES, through contractors Lockwood Greene and MACTEC Engineering and Consulting, performed a preliminary geotechnical exploration for the proposed NEF for site construction and engineering purposes. Harper/Peery Direct A.19, Tr. 385, LES Exhibit 3, Tab N. This investigation consisted of drilling five test borings in the proposed building area to depths ranging from 40 to 100 feet below ground surface using hollow-stem auger and split-spoon sampling. *Id.* The geotechnical properties of selected soil samples were determined through laboratory analysis. *Id.* The information obtained from this investigation also has contributed to, and confirmed, LES's understanding of site hydrogeologic conditions. Tr. 500-07.

13. LES's comparison of the information obtained from WCS and other nearby sites to that obtained by LES at the NEF site confirm the applicability of that data to the NEF site. Harper/Peery Direct A.18, Tr. 384; Tr. 500-07. CJI stated that "[th]e data collected from the [NEF] filed investigation activities and from past investigations on the WCS property to the east have been used to develop a general model of the site characteristics." LES Exhibit 3,

Tab L, at 8. Mr. Peery testified that "the hydrogeologic setting is very consistent throughout this area" Tr. 506, and that "the borings at the NEF site confirm that it's very similar to the other sites." Tr. 507. In this regard, Mr. Peery concluded that "the area is quite well characterized." Tr. 501. The geology of the NEF site vicinity and the numerous borings drilled in the area are reflected in Figure 3.3-5 of the ER (LES Exhibit 1).

C. Assessment of Potential for Perched Bodies of Groundwater at the Alluvium/Chinle Interface (Basis A)

14. NIRS/PC contend that the "leakage" from the Site Stormwater Detention Basin and the septic leach fields will probably cause the formation of perched water bodies of groundwater at the alluvium/Chinle interface. NIRS/PC further maintain that, while the DEIS contains estimates of the dimensions, flow rates, and potential discharge areas of such water bodies, it is not possible to assess their reasonableness because the DEIS contains no explanation of the calculations.

15. As the Board recognized in its January 21, 2005 ruling on LES and Staff in limine motions, "the Staff's purported failure to provide an explanation relative to these DEIS calculations" has, in fact, been addressed. *See* Memorandum and Order (Ruling on Motions and Providing Administrative Directives) (Jan. 21, 2005) (unpublished), at 3. In this regard, the Board ruled that, "if at that point NIRS/PC had a concern about the substance of the Staff's response, the appropriate action would have been promptly to amend their contention to specify the nature of their concerns with that response." *Id.* at 4. NIRS/PC did not amend Contention NIRS/PC EC-1, so Basis A is effectively moot.

16. On this point, Staff witness Alan Toblin testified that he evaluated the dimensions, flow rates, and potential discharge locations of perched water bodies assumed to form along the alluvium/Chinle interface due to seepage from the Site Stormwater Detention

Basin and septic leach fields. Toblin Direct A.13, Tr. 655. He conducted this evaluation of potential perched bodies of groundwater specifically to assess the impacts resulting from their potential availability for use by humans or livestock. Toblin Direct A.17, Tr. 658.

17. Mr. Toblin testified that the calculations supporting the evaluation discussed on pages 4-13 and 4-14 of the DEIS are explained in the "NRC Staff's Response to Interrogatories and Document Requests by Petitioners Nuclear Information and Resource Service and Public Citizen to Commission Staff," dated November 10, 2004 (NIRS/PC Exhibit 42, at 7-11). Toblin Direct A.15, Tr. 656. Mr. Toblin also set forth the bases for, and the results of, his calculations in his prefiled direct and rebuttal testimony. Toblin Direct A.14-A.21, Tr. 656-60; Toblin Rebuttal A.18-A.21, Tr. 693-95.

18. Mr. Toblin assumed that *all* annual stormwater runoff (*i.e.*, all precipitation) and discharge to the septic systems would infiltrate into the subsurface and be transported downgradient. Toblin Rebuttal A.18-A.19, Tr. 693-94. With respect to the Stormwater Detention Basin, Mr. Toblin estimated the plume flow rate as the precipitation, at a rate of 46.1 cm/yr, falling on the basin's drainage area of 39 hectares. He ignored runoff infiltration, evaporation of runoff and basin water, and evapotranspiration to obtain a conservative flow rate. Toblin Direct A.15, Tr. 657. With respect to the septic system, he assumed that the plume flow rate is the actual system discharge, 7.3 million liters/yr, again conservatively ignoring evapotranspiration. Toblin Direct A.18, Tr. 659.

19. Mr. Toblin explained that the significance of any impact resulting from the formation of perched body groundwater depends on the potential use and quality of that water. Toblin Direct A.17, Tr. 658. Significantly, Mr. Toblin concluded that there are no present users of groundwater in the direction that any perched groundwater likely would flow, and that any

future use of such water for human consumption would be unlikely given its limited extent and unavailability. Toblin Direct A.17, Tr. 658.

20. The closest possible discharge location for such water, assuming it does not evapotranspire, is Monument Draw, an intermittent stream located approximately 3 miles south-southwest of the NEF site. Toblin Direct A.17, Tr. 658.; Toblin Rebuttal A.20-A.21, Tr. 694-95. The intermittent nature of flow in Monument Draw, however, makes it an unpredictable and unreliable source of water. Toblin Direct A.21, Tr. 660. Further, using the highly conservative estimate of pore velocity of 252 m/yr (0.16 mile/yr) calculated by Mr. Toblin, the time required for discharge at the postulated Monument Draw location would be on the order of 19 years. Harper/Peery Direct A.55, Tr. 419.

21. As to water quality, Mr. Toblin testified that the only potential contaminants in the perched water bodies would be attributable to normal site runoff and sanitary discharges. Toblin Direct A.14, Tr. 656. The water quality of the basin discharge would be typical of runoff from building roofs and paved areas at any industrial facility, and any potential contaminants (*i.e.*, oil and grease) would be expected to absorb into the soil. Toblin Direct A.55, Tr. 673; DEIS at 4-13. Sanitary wastewater discharged to the septic system would meet required levels for all contaminants stipulated in the NEF's New Mexico Groundwater Discharge Permit. DEIS at 4-14; LES Exhibit 4.

22. LES witness Peery viewed the Staff's calculations to be so conservative as to be unrealistic, and a "worst case" scenario, insofar as the calculations assume "total conservation of mass of any water." Tr. 494-95. In reality, significant quantities of precipitation runoff will be lost through the processes conservatively ignored by the NRC Staff, *before* such runoff can reach the Site Stormwater Detention Basin. Harper/Peery Direct A.51, Tr. 416-17.

Similarly, leachates from the septic systems will be subject to evapotranspiration. Harper/Peery Direct A.51, Tr. 416-17. The Staff, in effect, purposely ignored the net soil moisture deficit characteristic of the site vicinity, where evapotranspiration losses exceed precipitation, for purposes of conservatism. Harper/Peery Direct A.51, Tr. 416-17.

23. Mr. Peery testified that, if perched bodies of water were to form, then they likely would be lost to the atmosphere via evapotranspiration before they traveled very far. Tr. 496. He also noted that as the alluvial sediments thin out toward a discharge point, any water moving through those sediments becomes subject to greater rates of evapotranspiration. Tr. 494. LES witness Harper and Peery testified that no adverse environmental impacts would result from seepage of water from the Site Stormwater Detention Basis, even if one assumes that perched bodies of water would form, migrate downgradient, and discharge at the land surface. Harper/Peery Direct A.54-A.55, Tr. 418-19. Neither runoff collected in the Site Stormwater Detention Basin, nor sanitary wastewater discharged to the site septic systems, is expected to contain contaminants at levels that exceed applicable regulatory limits. Harper/Peery Direct A.54-A.55, Tr. 418-19.

24. In sum, Basis A is moot insofar as the NRC Staff has provided an adequate explanation of its calculations regarding the postulated formation of perched bodies of groundwater at the alluvium/Chinle interface. In any event, given the low precipitation and high evapotranspiration rates in the site vicinity, infiltration and migration of water from the Stormwater Detention Basin and septic leach fields is expected to be negligible. Harper/Peery Rebuttal A.26, Tr. 464. Furthermore, neither site stormwater runoff nor sanitary wastewaters is expected to contain contaminants in levels that will pose a significant environmental concern.

Harper/Peery Direct A.54-A.55, Tr. 418-19. Thus, concerns related to the postulated formation of perched bodies are without merit.

D. Assessment of Potential Leakage From the Lined Basins (Basis B)

25. NIRS/PC contend that the DEIS should contain an estimate of the possibility and frequency of leakage through the liners of the Treated Effluent Evaporative Basin ("TEEB") and the Uranium Byproduct Cylinder ("UBC") Storage Pad Stormwater Retention Basin ("USPSRB") and assess the fate of liquids that leak from the these basins. Rice Direct A.21, Tr. 786-87. NIRS/PC maintain that such analyses are necessary because the basins will be lined with geosynthetic materials, and such liners are known to leak. Rice Direct A.21, Tr. 786-87.

26. NRC Staff witness Alan Toblin and LES witness George Harper testified that the potential for leakage from the TEEB and the USPSRB does not present a significant environmental concern, and that the particular analyses sought by NIRS/PC are not necessary or useful. They cited a number of considerations in their respective testimony to support this expert conclusion, including (1) the proposed basin designs, (2) LES's commitment to properly install and maintain the basin liners, (3) the expected composition of the liquids to be discharged to the basins, (4) site hydrological and hydrogeological conditions, and (5) LES's commitment to implement adequate environmental monitoring and measurements programs. Harper/Peery Direct A.17, A.26-A.29, A.57, Tr. 382-83, 393-97, 419-421; Toblin Direct A.23-A.31, Tr. 661-65.

27. Detailed information regarding the proposed design, construction, operation, inspection, and maintenance of the TEEB and USPSRB is set forth in LES's New Mexico Groundwater Discharge Permit Application. LES Exhibit 4, at 11-19.

28. From the bottom up, the TEEB will consist of (1) a minimum of two feet of compacted clay soils; (2) a lower geosynthetic liner; (3) leak collection piping, a monitored sump, and a pumping system; (4) a geomembrane drainage mat and imbedded leak collection system; (5) an upper geosynthetic liner; and (6) a minimum of 1 foot of compacted clay. Toblin Direct A.24, Tr. 662; LES Exhibit 4, at 12. The TEEB will include a liquid-sensor leak detection system that will allow site personnel to determine whether the primary (upper) liner has been breached. Further, this basin will have no outfall (*i.e.*, there will be no outflow of basin water), and will be designed to retain treated effluent under conservatively-estimated precipitation conditions. Harper/Peery Direct A. 28, A.57, Tr. 395, 420.

29. In the event that a failure of the primary or upper liner is detected by the leak detection system, site personnel will take appropriate mitigation measures, *i.e.*, assess any damage to the liner and restore liner integrity. Harper/Peery Direct A.57, Tr. 420. Because the TEEB will be designed with two cells, the cell with the breached liner can be isolated, drained, and repaired, while discharges can continue to the intact cell. Harper/Peery Direct A.57, Tr. 420. The secondary (lower) liner further serves to preclude discharge of TEEB liquids to the subsurface in the event of a breach of the primary liner. Harper/Peery Direct A.57, Tr. 420.

30. From the bottom up, the USPSRB will consist of a minimum of two feet of compacted clay, a synthetic liner, and a minimum of one foot of compacted clay. Toblin Direct A.24, Tr. 662; LES Exhibit 4, at 11-12. The synthetic liner will be used to impose a barrier between the basin and the underlying soils. LES Exhibit 4, at 11. Because it will collect runoff from the UBC Storage Pad, the basin will include no outflow and be conservatively sized to contain runoff for a volume equal to twice that for the 24-hour, 100-year return frequency storm, or approximately 12 inches of rainfall. Harper/Peery Direct A.23, Tr. 397; Tr. 601.

31. Mr. Harper and Mr. Toblin testified that proper liner installation and adherence to industry standards can minimize the possibility of lined basins leaking. Harper/Peery Direct A.57, A.59, Tr. 419, 423; Toblin Direct A.26, Tr. 663. Both witnesses testified that LES has committed to selecting and installing the liners for the TEEB and the USPSRB in accordance with the NMED "Guidelines for Liner Material and Site Preparation for Synthetically-Lined Lagoons" (LES Exhibit 8). Harper/Peery Direct A.57, Tr. 419; Toblin Direct A.27, Tr. 663.

32. The TEEB liners, which will be selected during the final design, will be fabricated from material that is chemically compatible with potential liquid effluents to be discharged to the TEEB, resistant to sunlight deterioration, and of sufficient thickness to have adequate tensile strength and puncture resistance. Harper/Peery Direct A.57, Tr. 419. As required by the NMED guidelines, the liner material will be pre-approved by a professional engineer and the NMED. Harper/Peery Direct A.57, Tr. 419-20. The liner will be installed and tested by certified installers according to project specifications. Harper/Peery Direct A.57, Tr. 420. Further, LES has committed to take the necessary actions to ensure that the liner stays within manufacturer's specifications throughout the required performance period. Harper/Peery Direct A.57, Tr. 420. In this regard, LES will implement a monitoring plan that provides for periodic inspections, and, if necessary, the implementation of corrective actions. Harper/Peery Direct A.57, Tr. 420. Mr. Harper testified that these same considerations apply, as appropriate, to the liner to be installed in the single-lined USPSRB. Harper/Peery Direct A.57, Tr. 421.

33. Assuming that leakage from the TEEB or USPSRB were to occur, such leakage would not pose an environmental concern given the expected composition of the basin waters. Only liquids (*i.e.*, process effluents and shower/hand wash/laundry effluents) meeting

site administrative limits based on prescribed regulatory requirements will be discharged to the TEEB. Harper/Peery Direct A.28, Tr. 394. To ensure that this is the case, post-treatment liquid effluent will be sampled and subjected to isotopic analysis prior to discharge to the TEEB, so as to confirm that release concentrations are below the concentration limits established in Table 3 of Appendix B to 10 C.F.R. Part 20. Harper/Peery Direct A.28, Tr. 394. Any effluents unsuitable for release to the basin could be recycled through the liquid effluent treatment system or processed into a solid and sent to an offsite disposal facility. Harper/Peery Direct A.28, Tr. 394.

34. Mr. Harper testified that only 390 microcuries per year of uranium is expected to be discharged to the TEEB. Harper/Peery Direct A.28, Tr. 395. According to Mr. Harper, if the total amount of uranium to be discharged to the TEEB over 30 years were conservatively assumed to infiltrate into the soil over an area equal to that of the TEEB, the concentration of uranium at a depth of 20 feet would be indistinguishable from the concentration of uranium naturally occurring in the NEF site soil. Harper/Peery Direct A.28, Tr. 395; LES Exhibit 10 (providing calculation of TEEB soil concentration). As stated above, the shallowest saturated zone at the NEF site is located at a depth of 220 feet, which is well beyond the 20-foot depth referenced above.

35. The USPSRB will serve to collect and contain (1) cooling tower blowdown discharges, (2) heating boiler blowdown discharges, and (3) stormwater runoff from the UBC Storage Pad. Harper/Peery Direct A.26, Tr. 393. The expected constituents are described in LES's New Mexico Groundwater Discharge Permit Application. LES Exhibit 4, at 5; Toblin Direct A.24, Tr. 662. The cooling tower and heating boiler blowdown discharges to the basin will not have constituents or characteristics that would adversely impact water resources at the site. Harper/Peery Direct A.29, Tr. 396; Toblin Direct A.31, Tr. 664.

36. With respect to USPSRB runoff, LES will implement numerous measures to preclude uranium contamination of the runoff. Harper/Peery Direct A.29, Tr. 396. For example, LES will use only certified cylinders to ensure cylinder integrity, and will implement a cylinder maintenance and inspection program. Harper/Peery Direct A.29, Tr. 396. UBCs containing depleted uranium hexafluoride will be surveyed for external contamination *before* being placed on the UBC Storage Pad and also will be monitored during their storage on the pad. Harper/Peery Direct A.29, Tr. 396. If any external contamination were to be detected, it would be removed prior to cylinder placement on the pad. Harper/Peery Direct A.29, Tr. 396.

37. According to Mr. Harper, LES performed an assessment of potential runoff contamination levels. Harper/Peery Direct A.29, Tr. 396. LES assumed a conservative level of radioactive contamination on cylinder surfaces and 100% washoff to the USPSRB from a single rainfall event. Harper/Peery Direct A.29, Tr. 396. The assessment demonstrated that the radioactivity level in such a discharge would be well within NRC regulatory limits for release. Harper/Peery Direct A.29, Tr. 396-97.

38. Mr. Toblin added that, to the extent that any leakage of basin liquids did occur, the compacted clay material underlying both the TEEB and USPSRB liners would tend to absorb any uranium or other contaminants *potentially* present in the basin liquids. Toblin Direct A.31, Tr. 665. This would inhibit the migration of such constituents beyond the clay layer. Toblin Direct A.31, Tr. 665.

39. Given site hydrological conditions, however, the ultimate fate of liquids discharged to the TEEB and USPSRB will generally be through evaporation of water and impoundment of the residual dry solids byproduct of evaporation. Harper/Peery Direct A.28, A.29, Tr. 395, 397. Water balances for the TEEB and USPSRB, which take into account

effluent and precipitation inflows and evaporation outflows, indicate that these basins could be mostly dry for a significant portion of the year, depending on annual precipitation rates. Harper/Peery Direct A.28, A.29, Tr. 395, 397; Toblin Direct A.31, Tr. 664-65; LES Exhibit 9 (water balance calculations).

40. As with the Stormwater Detention Basin and the septic leach fields, should any liquids leaked from the TEEB and USPSRB, any potential downgradient movement of those liquids would be limited due to high evapotranspiration rates and the storage capacity of the soils underlying the basins. Harper/Peery Direct A. 57, Tr. 420-21.

41. Finally, as part of its proposed monitoring program, LES will install monitoring wells at five locations. Monitoring wells will be located downgradient of the TEEB and UBC. These wells, which will be sampled quarterly for radiological and non-radiological analysis, will monitor ground water in the shallowest saturated unit at approximately 220 feet below ground surface. Harper/Peery Direct A.28-A.29, Tr. 395-97; Tr. 609-11. Detailed information regarding LES's proposed environmental measurements and monitoring programs is set forth in the ER and DEIS. LES Exhibit 2, at §§ 6.1.2, 6.2; Staff Exhibit 1 at 6-1 to 6-5, 6-8 to 6-17.

42. In sum, potential "leakage" from the TEEB and USPSRB, as asserted by NIRS/PC, is not a significant environmental concern. Several considerations support this conclusion, including: the adequacy of the proposed TEEB and USPSRB designs, LES's commitment to properly install and maintain the basin liners, the expected composition of the liquids to be discharged to the basins, favorable site hydrological/hydrogeological conditions (*e.g.*, high evapotranspiration rates and thick, low-permeable clays), and LES's commitment to

implement adequate environmental monitoring and measurements programs. Additional analyses of the type sought by NIRS/PC are not warranted.

E. Assessment of Moisture in the Alluvium (Basis C)

43. NIRS/PC contend that LES and the NRC Staff have not adequately evaluated the hydraulic properties of the "shallow materials" or "alluvium" beneath the NEF site, and that they should explain the presence of moisture in two of the soil borings drilled by LES. According to NIRS/PC, the limited moisture detected in these soils could be indicative of "recharge." Rice Direct A.11-A.12, Tr. 775-77; Rice Rebuttal A.11, Tr. 810.

44. Mr. Peery testified that there is no need to measure specifically the hydraulic properties of the "alluvium or other shallow materials" underlying the site. Harper/Peery Rebuttal A.7, Tr. 445. No groundwater was encountered in these soils beneath the NEF site when CJI and MACTEC installed a total of 14 borings, which make clear that the alluvium overlying the Chinle Formation red beds consists mainly of fine sand and silt, with some limited gravel in certain areas. Harper/Peery Rebuttal A.7, Tr. 445. The Chinle Formation sediments (*i.e.*, red beds) that lie beneath the alluvium are more important from a hydrogeologic standpoint insofar as they inhibit potential downward migration of groundwater. Harper/Peery Rebuttal A.7, Tr. 445.

45. Both the NRC Staff and LES witnesses disagreed with the assertion that the observation of limited "moisture" in two soil boring intervals is indicative of "recharge." Harper/Peery Rebuttal A.9, Tr. 447; Toblin Rebuttal A.11, Tr. 690-91. Recharge is traditionally defined as the entry into the saturated zone of water made available at the water-table surface, together with the associated flow away from the water table. Harper/Peery Rebuttal A.9, Tr. 447. The saturated zone refers to permeable geologic materials in which the pore spaces are

completely filled with water, such as the saturated sediments below the water table. Harper/Peery Rebuttal A.9, Tr. 447. The root zone, in turn, is the depth to which plant roots extend below the ground surface. Harper/Peery Rebuttal A.9, Tr. 447.

46. The LES and NRC Staff witnesses explained that CJI and MACTEC installed a total of 14 borings (nine groundwater exploration and five geotechnical borings, respectively) at the NEF site. The associated boring logs confirm that the soils encountered by CJI and MACTEC were almost invariably very dry. The "slightly moist" and "moist" soil descriptions cited by NIRS/PC were used only twice (*i.e.*, in CJI boring B-9 at a depth between 6 and 14 feet below ground and in MACTEC boring B-2 at a depth between 35 and 41.4 feet below ground.) Harper/Peery Direct A.38, Tr. 404-05; Toblin Direct A.35-A.37, Tr. 666-67.

47. The limited moisture observed in these two soil samples likely represented some "residual" moisture, possibly infiltrated precipitation that had yet to evapotranspire, attributable to the moisture storage capacity of the soil in the vadose or unsaturated zone (*i.e.*, the space in soil voids or pores are only partially filled with water). Harper/Peery Rebuttal A.8, Tr. 446. The observed moisture does not reflect the existence of saturated conditions, as LES confirmed through recent discussions with the CJI and MACTEC employees who logged the two borings at issue. Harper/Peery Direct A.38, Tr. 404-05; Tr. 509.

48. If a significant quantity of water had been present in the cuttings at issue, then the boring log description of those cuttings likely would have indicated they were "very moist" or "wet" or "saturated." Harper/Peery Direct A.38, Tr. 404-05. Significantly, with respect to the nine borings installed in September 2003, the investigators allowed at least 24 hours for water to enter the borings. Harper/Peery Direct A.38, Tr. 404-05. No water was observed in the boreholes. Harper/Peery Direct A.38, Tr. 404-05. The observed lack of any

significant moisture content in the alluvial sediments beneath the site is consistent with site hydrological conditions, *i.e.*, low precipitation rates and high evapotranspiration rates. Harper/Peery Direct A.38, Tr. 404-05.

49. LES witnesses Harper and Peery testified that moisture present in the vadose zone is typically held in the soil pores under surface-tension forces. Harper/Peery Rebuttal A.8, Tr. 446. The movement of such water within thick (greater than 25 meters) semi-arid to arid vadose zones, such as is present at the NEF site, is dominated largely by an upward hydraulic potential gradient. Harper/Peery Direct A.23, Tr. 389-90; Harper/Peery Rebuttal A.8, Tr. 446; Tr. 519-21, 523-26; LES Exhibit 1, at 3.4-4; LES Exhibit 5 (Walvoord study).

50. While Mr. Peery testified that it is conceivable that some infiltrating water may make its way past the base of the root zone, he testified that it is unlikely that the water would enter underlying saturated zones located at great depths. Harper/Peery Rebuttal A.9, Tr. 447; Tr. 509. That is, even if such water were able to make its way downward to the alluvium/Chinle contact, any further downward movement of that water would be further inhibited by the low-permeability Chinle clay. Harper/Peery Rebuttal A.8, Tr. 447; Tr. 511-12. At the NEF site, the *shallowest* continuous saturated zone occurs at a depth of about 220 feet below ground surface, well into the low-permeable Chinle Formation. Harper/Peery Rebuttal A.9, Tr. 447-48. The saturated zones at approximately 600 and 1,115 feet are substantially deeper, and likewise are overlain, and separated by, substantial thicknesses of low-permeability clay.

51. Staff witness Toblin reached the same conclusion, stating that while precipitation can infiltrate into the shallow portions of the subsurface, it is generally subject to upward hydraulic gradients caused by vaporization and evapotranspiration. Toblin Direct A.39,

Tr. 667. He testified that, given the relatively small size of the proposed site and the general consistency of the alluvial soil, one would expect evidence of precipitation recharge – assuming it occurred – to be consistently present throughout the proposed site. Toblin Direct A.34, Tr. 666. Mr. Toblin indicated that the breadth and spacing of the 14 soil borings advanced at the NEF site were adequate, and that the occurrence of precipitation recharge would have been detected through the presence of moisture in multiple borings. Toblin Direct A.36, Tr. 666.

52. NIRS/PC witness George Rice testified that moist clay at the alluvial/Chinle contact also occurs at the neighboring WCS site. Rice Direct A.12, Tr. 776. Specifically, he claimed that in the early 1990s, moist clay was found in most of the borings that penetrated the contact. Rice Direct A.12, Tr. 776. According to Mr. Rice, this moisture "probably indicates that some recharge currently occurs at the site" Rice Direct A.12, Tr. 776, and that "there is no reason to believe that this recharge will not occur in the future." Rice Direct A.12, Tr. 776.

53. The LES and Staff witnesses disagreed with Mr. Rice's interpretation of the WCS data. Mr. Peery acknowledged that a number of the WCS boring logs indicated the presence of moisture in certain soil samples, including clay samples taken near the Chinle contact. Harper/Peery Rebuttal A.11, Tr. 449. However, the moisture content descriptions generally indicated only "slightly moist," "moist," or "damp." Harper/Peery Rebuttal A.11, Tr. 449. Mr. Peery also testified that several of the "moist" samples occurred at depths approaching or exceeding 200 feet below ground surface, where one might expect to find groundwater associated with the so-called "220-foot" groundwater zone. Harper/Peery Rebuttal A.11, Tr. 449. In fact, the monitoring wells installed in these borings were screened from 185 to 215 feet and 211 to 221 feet, respectively. Harper/Peery Rebuttal A.11, Tr. 449, LES Exhibit 3, Tab G.

54. As Mr. Peery further testified, the vast majority of the WCS boring log descriptions reflect very dry conditions. Harper/Peery Rebuttal A.11, Tr. 450; Tr. 539-45. Many of the samples were described as being hard, brittle, and crumbly, in addition to dry, both above and below those discrete intervals near the Chinle contact where "moisture" was observed. Harper/Peery Rebuttal A.11, Tr. 450. Mr. Peery stated that the Chinle Formation is "an effective barrier to vertical migration of water." Tr. 540.

55. On this issue, Mr. Toblin testified that the detection of moisture in multiple borings at the WCS site is not unexpected, insofar as there are known lenses (*i.e.*, limited and discontinuous occurrences of perched water) at the WCS site. Toblin Rebuttal A.13, Tr. 691. By contrast, such lenses do not appear to exist at the proposed NEF site. Toblin Rebuttal A.13, Tr. 691.

56. With regard to other sites, Mr. Rice testified that groundwater is known to exist in the alluvium at three places to the north and east of the site (*i.e.*, Wallach Quarry, Baker Spring, and WCS). Mr. Peery explained, however, that these occurrences of water are limited and intermittent, and are attributable to conditions not present at the NEF site. Harper/Peery Direct A.39, Tr. 405-08; Tr. 489, 492, 514, 547. These conditions include, for example, the presence of "buffalo wallow" depressions at WCS, and the presence of more sand and gravel at the Wallach site. Harper/Peery Direct A.39, Tr. 406-07. None of these occurrences of shallow water appears to be laterally continuous or hydrologically connected to any deeper water-bearing units. Harper/Peery Direct A.39, Tr. 407-08.

57. In sum, the properties of the alluvium beneath the NEF site, and the origin of the limited moisture observed therein, have been adequately evaluated by LES and the NRC

Staff. There is no need to perform additional testing, including radioisotopic analysis of vadose zone water. Harper/Peery Rebuttal A.12, Tr. 450-57.

F. Assessment of Potential for Fracture Zones or "Fast Flow Paths" (Basis D)

58. NIRS/PC contend that LES and the NRC Staff rely on "limited permeability measurements," and have not adequately evaluated the potential for fractures beneath the NEF site to act as "preferential flow paths." Rice Direct A.12, Tr. 779.

59. Permeability relates to the ability of a soil or rock mass to transmit water. This term is often used interchangeably with hydraulic conductivity. Toblin Direct A.45, Tr. 669. Permeability is related to Darcy's Law and is measured in units of length per time (*e.g.*, cm/sec). Toblin Direct A.48, Tr. 670.

60. Permeability can be measured in the laboratory, in which case it is typically determined by measuring the flow transmitted by field samples of the geologic medium under conditions of known hydraulic head (*i.e.*, the pressure of a column of water). Toblin Direct A.45, Tr. 669. Permeability also can be measured in the field. Toblin Direct A.45, Tr. 669. Slug tests are a common method of measuring in situ or field permeability. Toblin Direct A.45, Tr. 670. Slug tests typically consist of suddenly changing the static water level in a well by adding or removing water, and then monitoring the water level in the well over time as it returns to its static level. Toblin Direct A.45, Tr. 670.

61. Over 50 permeability measurements have been made on soil samples taken from the Dockum Group (Chinle Formation) beneath the adjacent WCS site. Harper/Peery Direct A.24, Tr. 390-92; LES Exhibit 3, Tab O, Table 5.6-2; Tr. 500. Laboratory results for 5 horizontal permeability tests of the Dockum Group (Chinle Formation) sediments at depths ranging from 68 to 90 ft ranged from 7.18×10^{-7} to 1.63×10^{-9} cm/sec. Harper/Peery Direct

A.24, Tr. 390-92; LES Exhibit 3, Tab O, Table 5.6-2; Tr. 500. Results of 54 laboratory vertical permeability tests of the Dockum Group sediments at depths ranging from 34 to 208 ft ranged from 1.53×10^{-5} to $<1.00 \times 10^{-9}$ cm/sec at the WCS site, with an average of 6.2×10^{-7} cm/sec, and a median value of 5.7×10^{-9} cm/sec. Harper/Peery Direct A.24, Tr. 390-92; LES Exhibit 3, Tab O, Table 5.6-2; Tr. 500.

62. LES witnesses testified that a significant amount of subsurface data also are available from the nearby Lea County Municipal Landfill site, which is within the same geologic setting as the NEF site. Harper/Peery Direct A.24, Tr. 391-92. A total of 11 borings were drilled on the site to depths ranging from about 50 to 600 feet. Harper/Peery Direct A.24, Tr. 391-92. Ten samples were collected in the Dockum Group sediments at depths ranging from 60 to 485 feet, and the vertical laboratory permeability ranged from 2.73×10^{-9} cm/sec to 7.25×10^{-8} cm/sec. Harper/Peery Direct A.24, Tr. 391-92.

63. With respect to the water-bearing unit at approximately 220 feet below ground surface, WCS site data indicate that the permeability/hydraulic conductivity of this siltstone/silty sandstone unit is very low. Harper/Peery Direct A.24, Tr. 391. Specifically, five laboratory permeability tests of samples from this unit yielded a geometric mean of 2.15×10^{-8} cm/sec, and two field slug tests yielded hydraulic conductivities of 6.0×10^{-8} cm/sec and 6.17×10^{-8} cm/sec, respectively. Harper/Peery Direct A.24, Tr. 391; LES Exhibit 3, Tab O, at 6-6. By comparison, a slug test performed by LES in MW-2 at the NEF site yielded a hydraulic conductivity value of 3.7×10^{-6} cm/sec for the siltstone/silty sandstone water-bearing unit located approximately 220 feet below ground surface. Harper/Peery Direct A.24, Tr. 391. This low value, 3.7×10^{-6} cm/sec, is consistent with the WCS laboratory and field-measured siltstone/sandstone permeabilities set forth above. Tr. 553-54.

64. LES witness Peery and Staff witness Toblin agreed that the large number of permeability/hydraulic conductivity measurements made in the NEF site vicinity provide a reliable indicator of the permeability of the underlying Chinle Formation. Harper/Peery Direct A.24, Tr. 392; Toblin Direct A.49-A.50, Tr. 671-72. In sum, these data show that the Chinle Formation clays, with permeability values that are comparable to those of engineered landfill liner materials, are highly impervious. Harper/Peery Direct A.24, Tr. 390-91. In addition, while the siltstones/sandstones within the Chinle Formation may be slightly more permeable than the clays, they also have very low permeabilities and also do not readily transmit water. Tr. 553-54.

65. With respect to the issue of fractures and "fast" flow paths, Mr. Peery and Mr. Toblin again were in agreement. Both witnesses testified that, in view of the NEF site's hydrogeological setting, the existence of fracture zones beneath the NEF site that could facilitate increased vertical flow of water is unlikely. Harper/Peery Direct A.36, Tr. 402-03; Toblin Direct A.52, Tr. 672. These conclusions are supported by the extensive data collected at and near the NEF site. On the issue of "fast" flow paths, Mr. Peery also testified that there is no evidence that the NEF is underlain by continuous "channels" of gravel that may extend for miles, as Mr. rice asserts. Harper/Peery A.53, Tr. 418; Tr. 497-99, 560-61.

66. Mr. Peery testified that the low hydraulic conductivity and confined nature of the 220-foot zone suggest the absence of fracture-induced flow. Harper/Peery Direct A.36, Tr. 402-03; Tr. 574-75; Tr. 585-86. In addition, he noted that CJI has concluded that the large differences in hydraulic head among the principal saturated zones underlying the WCS and NEF sites (*i.e.*, at roughly 220, 600, and 1,100 feet below ground surface) indicate a lack of hydraulic communication among these zones. Harper/Peery Direct A.23, Tr. 389. This too suggests the unlikelihood of any fracture-related flow beneath the NEF site.

67. It also is unlikely that any fractures that might exist beneath the NEF site would form interconnected or continuous zones that extend hundreds of feet vertically downward through the alluvium and Chinle Formation. Harper/Peery Direct A.36, Tr. 403. As Mr. Toblin explained, the lack of interconnectivity, the lack of proper fracture orientation, and/or the filling in of fracture apertures by clay or mineralization (also known as "self-healing") tend to limit the ability of fractures to act as "fast" or "preferential" flow paths. Toblin Direct A. 43, Tr. 669.

68. Notwithstanding, NIRS/PC witness Rice testified that fractures were found at various depths, from the alluvial/Chinle contact to more than 200 feet below ground surface, in core samples taken by Terra Dynamics at the WCS site from 1992 to 1993. Rice Direct A.13, Tr. 778. According to Mr. Rice, such fractures might be indicative of groundwater flow paths and episodic recharge events. Rice Direct A.13, Tr. 778. LES witness Peery, however, fully refuted these claims.

69. Mr. Peery testified that the fractures described in the WCS boring logs cited by NIRS/PC are not indicative of the presence of large-scale, continuous interconnected fracture systems that extend to great depths within the Chinle Formation. Harper/Peery Rebuttal A.17, Tr. 454; Tr. 514; Tr. 558-61. Mr. Peery explained that the presence of small fractures in desicated or very dry clays is certainly not unusual. Harper/Peery Rebuttal A.17, Tr. 454. Most of the Chinle samples in which fractures were observed were described as dry, hard, crumbly, and/or brittle, and as exhibiting "conchoidal" or "blocky" fracture. Harper/Peery Rebuttal A.17, Tr. 454. The fractures likely reflect the natural mineralogical composition/structure of the sediments, their very low moisture content, and the effects of sampling itself. Harper/Peery Rebuttal A.17, Tr. 454; Tr. 579-80, 588-89. The very limited extent of this moisture observed in these borings further confirms that groundwater is not moving through "fast flow paths" and

reaching the deep saturated zones beneath the NEF and WCS sites. Harper/Peery Rebuttal A.11, Tr. 450; Tr. 577-50, 590-92.

70. Mr. Peery further testified that selected core samples from some of the WCS borings cited by NIRS/PC had been visually inspected by an expert (Dr. Ken Rainwater) shortly after they were collected. Harper/Peery Rebuttal A.17, Tr. 455. Dr. Rainwater observed that the red claystone (*i.e.*, Chinle red beds) was typically continuous, solid, and tight with few fractures, and that the sampling process contributed, to some degree, to any fracturing observed in the core samples. Harper/Peery Rebuttal A.17, Tr. 455, LES Exhibit 3, Tab H, at 8-9. He also observed that the claystone was naturally compacted over time, making it more solid, which, in turn, would decrease its permeability. Harper/Peery Rebuttal A.17, Tr. 455, LES Exhibit 3, Tab H, at 8-9. Dr. Rainwater concluded that the presence of the Chinle Formation made the study area an excellent location for a properly designed and constructed landfill. Harper/Peery Rebuttal A.17, Tr. 455; LES Exhibit 3, Tab H, at 8-9.

71. Mr. Rice testified that that the presence of "mineral deposits" in some of the 1993 WCS core samples indicate that the fractures have acted as groundwater flow paths. Rice Direct A.13, Tr. 778. Mr. Peery, in response, explained that it not uncommon for minerals (*e.g.*, quartz, calcite, and metal oxides) to precipitate from ions in solution within a fracture. Harper/Peery Rebuttal A.19, Tr. 457. However, he testified that the mere presence of such mineralized veins, particularly on a small or localized scale, is not in itself an indication that the fractures have acted as groundwater flow paths. Harper/Peery Rebuttal A.19, Tr. 457; Tr. 573-74, 584-85.

72. According to Mr. Peery, mineral deposits observed in the WCS borings were deposited when climatic and geologic conditions were very different from those that exist

at the site today (*i.e.*, on the order of thousands to perhaps millions of years ago). Harper/Peery Rebuttal A.19, Tr. 457-458. The red bed sediments were deposited millions of years ago in an aqueous environment. Harper/Peery Rebuttal A.19, Tr. 457-458; Tr. 573-74. The mineral deposits may have precipitated from a very modest quantity of water that was trapped in the fracture, or as the sediments dried out after their initial deposition. Harper/Peery Rebuttal A.19, Tr. 457-458. Mr. Peery's testimony establishes that the existence of "fast flow paths" or episodic recharge events cannot be inferred simply from the presence of mineral veins in the low-permeability Chinle red beds.

73. Mr. Peery and Mr. Toblin also refuted Mr. Rice's claim that the largely laboratory-measured permeability data relied upon by LES and the NRC Staff are inadequate because they purportedly underestimate the bulk permeability of a unit by not accounting for fractures and other "preferential flow paths." Rice Direct A.13, Tr. 779. Mr. Peery and Mr. Toblin both testified, however, that sediment samples collected for laboratory permeability in consolidated (*i.e.*, rock-like) sediments, such as the Chinle Formation, would tend to be biased towards higher permeability values, rather than lower, due to the fact that the sampling device would generally have to be pounded into the sediments, potentially increasing the permeability of the sediments as a result of breaking or fracturing. Harper/Peery Direct A.24, Tr. 392; Harper/Peery Rebuttal A.21, Tr. 459; Tr. 557-58; Toblin Rebuttal A.15, Tr. 692-93.

74. Conversely, samples collected for laboratory permeability values in unconsolidated sediments, which are not present at the NEF site at the depths of interest, would tend to bias the samples towards lower permeability values as a result of the sediments being compacted as the sampling device is driven through them. Harper/Peery Direct A.24, Tr. 392; Harper/Peery Rebuttal A.21, Tr. 459; Toblin Rebuttal A.15, Tr. 692-93. Mr. Peery and Mr.

Toblin specifically refuted Mr. Rice's reliance on a 1981 paper (NIRS/PC Exhibit 43) purportedly addressing the relationship between laboratory and field measurements of fine-grained soils. Harper/Peery Direct A.24, Tr. 392; Harper/Peery Rebuttal A.21-A.22, Tr. 459-60; Tr. 565-67. Toblin Rebuttal A.15, Tr. 692-93.

75. Mr. Peery also refuted Mr. Rice's claim that cross-formational groundwater flow may be occurring in the NEF site vicinity, thereby suggesting the presence of preferential flow paths. Rice Direct A.14, Tr. 780. Mr. Peery testified that conditions conducive to cross-formational flow are not present at the NEF site, and that the low-permeability red beds tended to inhibit such flow. Harper/Peery Rebuttal A.24, Tr. 461-63. He clarified that two of the references cited by Mr. Rice (NIRS/PC Exhibits 23 and 33) involve different hydrogeologic settings and are inapplicable insofar as they relate to possible hydraulic communication between the Ogallala Formation and the Dockum Group (which includes the Chinle and Santa Rosa Formations). Harper/Peery Rebuttal A.24, Tr. 461-62; Tr. 535-38. The Ogallala Formation, however, has not been found at the NEF site. The conclusions reached in the NIRS/PC references relative to cross-formational flow thus do not apply to the NEF site vicinity.

76. Mr. Peery testified that recent erosion of the Pecos and Canadian River valleys during the Pleistocene created groundwater basin divides along the western and northern limits of the Southern High Plains, thereby preventing modern recharge in the Dockum Group outcrops from reaching confined parts of the Dockum Group aquifers. Harper/Peery Direct A.40, Tr. 408 at 34 (citing LES Exhibit 6, at 32.). This is evidenced by the fact that water in the Santa Rosa Aquifer is quite old, with recent published data indicating that recharge to the aquifer

occurred during the Pleistocene, more than 15,000 years ago. Harper/Peery Direct A.40, Tr. 408 at 34 (citing LES Exhibit 6, at 32.).

77. In contrast to Mr. Rice, CJI, the principal hydrogeologic investigator at the WCS and NEF sites, also has concluded that the relative difference in hydraulic head between the lower Dockum aquifer and the overlying Ogallala aquifer throughout much of the region (though the Ogallala aquifer is not present at the NEF site) suggests that the lower Dockum aquifer is receiving essentially no recharge from cross-formational flow. Harper/Peery Rebuttal A.24, Tr. 463; LES Exhibit 3, Tab O, at 3-4. According to CJI, "the primary limiting factors on recharge to the Dockum Group aquifer include the low-permeability aquitard characteristics of the upper Dockum Group and the cut-off by the Pecos River Valley of historical recharge areas in eastern New Mexico." Harper/Peery Rebuttal A.24, Tr. 463; LES Exhibit 3, Tab O, at 3-4.

78. Mr. Peery and Mr. Toblin also testified that, in 2004, CJI and Intera, Inc. evaluated ancient (approximately 135-million-year-old) faulting observed in the Chinle Formation red beds at the WCS site, particularly its relationship to, or possible effect on, the overlying Antlers Formation (*i.e.*, alluvial deposits). Harper/Peery Rebuttal A.15, Tr. 453; Toblin Direct A.51, Tr. 671-72. Through a large excavation that extended 30 to 40 feet into the red beds, WCS exposed the geology of the site over about 60 vertical feet and 400 horizontal feet. CJI and Intera then performed detailed geologic mapping of the excavation that "focused on geologic contacts and distinguishable geologic features, including faults, joints, slickensides, bedding planes, partings, channels, alteration and weathering zones." LES Exhibit 73, at 4-6.

79. According to Mr. Peery and Mr. Toblin, CJI and Intera found that the faulting in the Triassic-aged Dockum Group sediments at the WCS site did not create joints or fractures that acted as fast flow paths. Harper/Peery Rebuttal A.16, Tr. 454; Toblin Rebuttal

A.7, Tr. 689; LES Exhibit 73, at 4-11. The fault investigators specifically concluded that "there are no issues with respect to potential migration pathways resulting from the faulting at the WCS site." LES Exhibit 73, at 4-11. They determined that the faulting occurred completely within the Triassic red beds, "which have great capacity for healing and closing fault planes and joints to fluid migration as indicated by the limited penetration of the alteration front in the red beds." LES Exhibit 73, at 4-11.

80. In summary, the weight of the evidence clearly establishes that LES and the NRC Staff have adequately evaluated the permeability of the soils underlying the NEF site and the potential for fractures to act as "fast flow paths." The extensive permeability/hydraulic conductivity data obtained from the site vicinity confirm that the Chinle Formation sediments underlying the site have low permeabilities. The confined nature of the various water-bearing zones beneath the NEF site, and the lack of hydraulic communication among those zones, do not suggest the presence of continuous and interconnected fractures that extend hundreds of feet vertically downward through the Chinle Formation.

G. Adequacy of NEF Site Stormwater Monitoring (Basis E)

81. NIRS/PC contend that the Site Stormwater Detention Basin will discharge runoff containing numerous contaminants, and that the DEIS neither adequately identifies these contaminants nor explains how they will be monitored. According to NIRS/PC, the presence of certain additional contaminants (*e.g.*, PAHs, aliphatic hydrocarbons, and alcohols) should be disclosed, and the stormwater should be monitored for such contaminants.

82. The testimony of witnesses Harper and Toblin establishes that LES and the NRC Staff have adequately considered the potential environmental impacts of contaminants that might be present in site stormwater runoff. In short, their testimony demonstrates that LES

will conduct monitoring of site stormwater runoff in accordance with applicable federal/state requirements. Harper/Peery Direct A.62, Tr. 426. Monitoring is governed by the National Pollutant Discharge Elimination System ("NPDES") process and related State of New Mexico regulations. Toblin Direct A.60, Tr. 675. Implementation of the program would occur at the time of facility construction, and data collected through the program would indicate whether contamination of stormwater is being effectively prevented. Toblin Direct A.60, Tr. 675. Monitoring would continue during operation of the NEF. Toblin Direct A.60, Tr. 675.

83. Section 6.2 of the ER sets forth LES's proposed physiochemical monitoring program, which encompasses the Site Stormwater Detention Basin. Harper/Peery Direct A.62, Tr. 426. ER Table 6.2-2, sets forth the various parameters to be monitored by LES (as well as the monitoring frequency, sample type, and lower limit of detection) with respect to stormwater detention basin discharges. Harper/Peery Direct A.62, Tr. 426. Monitoring will occur on a quarterly basis. These parameters include oil and grease, total suspended solids, 5-day biological oxygen demand, chemical oxygen demand, total phosphorus, total Kjeldahl nitrogen, pH, nitrate plus nitrite nitrogen, and metals. Harper/Peery Direct A.62, Tr. 426. LES's Stormwater Monitoring Program will be monitored by the NMED through LES's New Mexico Groundwater Discharge Permit. Harper/Peery Direct A.62, Tr. 426.

84. The applicable permitting processes are still in progress. Harper/Peery Direct A.62, Tr. 426. According to Mr. Harper, however, the proposed monitoring program meets or exceeds NPDES Multi-Sector General Permit stormwater monitoring requirements. Harper/Peery Direct A.62, Tr. 426. Further, the ER specifically provides that the monitoring program will be refined to reflect applicable regulatory requirements, and that "the Site

Stormwater Detention Basin will adhere to the requirements of the Groundwater Discharge Permit/Plan from the New Mexico Water Quality Board. Harper/Peery Direct A.62, Tr. 426.

85. Staff witness Toblin testified that the potential site stormwater contaminants are typical of those associated with other industrial facilities, and could result from activities such as vehicle maintenance and fueling, the filling of storage tanks, and painting operations during construction and operation of the facility. Toblin Direct A.55, Tr. 673. Mr. Toblin does not expect the organics identified by NIRS/PC (PAHs, aliphatic hydrocarbons, and alcohols) to be present at the NEF in levels greater than those associated with any other facility located near a highway or featuring parking lots. Toblin Direct A.59, Tr. 675. Although all of these contaminants are not listed in the DEIS, Mr. Toblin testified that the general chemical categories that would encompass them are listed as the parameters that will be evaluated as part of the NEF's stormwater monitoring program. Toblin Direct A.55, Tr. 673.

86. As set forth in the ER, LES will implement numerous mitigation measures to protect water resources. LES Exhibit 1, at 4.4-8. These include implementation of a Spill Prevention Control and Countermeasures Plan during construction and operation of the proposed NEF. The mitigation measures included in this plan are intended to minimize releases from spills and accidents to site soils. For example, LES would establish staging areas to manage waste materials, the generation of which would be minimized. Toblin Direct A.56, Tr. 673-74. Accordingly, any impact of potential spills and releases into stormwater runoff also would be reduced.

87. In support of its claim that the proposed Stormwater Monitoring Program is inadequate, NIRS/PC rely on two reports in particular. The first report (LES Exhibit 71) provides a review and evaluation of the literature associated with the quantity and control of

pollution from highway runoff and construction. The second report (NIRS/PC Exhibit 47) considers PAHs that might wash off of seal-coated parking lots that be transported to surface bodies of water.

88. LES witness Harper addressed the applicability of these reports to the NEF site. Neither document calls into question the adequacy of LES's proposed stormwater monitoring program. The first report specifically refers to the existence of studies "which have shown minimal effects on groundwater quality have been located in areas with fairly thick soils, which immobilize many of the pollutants in runoff." LES Exhibit 71, at xxiv. The same report states that even thin soils can result in significant attenuation and that no obvious impact of highway runoff on groundwater was found. The report shows that potential groundwater contamination would be more likely to occur where the runoff is immediately available to shallow groundwater systems, which is *not* the case at the NEF site. The soils at the NEF site will provide similar attenuation of any runoff constituents from the paved vehicle roadways or parking lots at the NEF site and no impacts on groundwater are expected. With respect to the second report, Mr. Harper concluded that, given the depth of soil to groundwater and the conclusions of the first study described above, no impacts to groundwater from PAHs – assuming they are present – are expected at the NEF site. Mr. Harper testified that these conclusions would apply to the conveyance systems, basin and outfall areas. Harper/Peery Direct A.63-A.64, Tr. 426-27.

89. In sum, given the design of the NEF basins, the characteristics of the liquid discharges, the hydrogeologic characteristics of the site, and LES's proposed monitoring measures, the possibility that seepage or leakage from the NEF basins and septic leach fields will pose a contamination threat to ephemeral drainages or groundwater is negligible. The additional

monitoring measures proposed by NIRS/PC (*e.g.*, the installation of additional monitoring devices and wells and monitoring for additional contaminants) are unnecessary. In any event, the relevant stormwater and groundwater monitoring requirements will be set forth in the applicable Federal/State permits, with which LES will be required to comply.

2. Contention NIRS/PC EC-2 ("Impact Upon Water Supplies")

A. Contention and Evidence Presented

1. As admitted, Contention NIRS/PC EC-2 states as follows:

> CONTENTION: Petitioners contend that the Environmental Report (ER) contained in the application does not contain a complete or adequate assessment of the potential environmental impacts of the proposed project upon water supplies in the area of the project, contrary to 10 C.F.R. 51.45.
>
> To introduce a new industrial facility with significant water needs in an area with a projected water shortage runs counter to the federal responsibility to act "as a trustee of the environment for succeeding generations," according to the National Environmental Policy Act § 101(b)(1) and 55 U.S.C. § 4331(b)(1). To present a full statement of the costs and benefits of the proposed facility the ER should set forth the impacts of the National Enrichment Facility on groundwater supplies.
>
> The DEIS does compare the water use of the proposed facility to the amount of water stored in the Ogallala Aquifer in the entire State of New Mexico (DEIS at 4-15). However, NRC has not shown in the DEIS how this pumpage would affect water levels and the long-term productivity of the Hobbs well field or the Lea County Underground Water Basin.

2. LES presented a panel of five qualified experts on Contention NIRS/PC EC-2. LES's experts were (1) Mr. Rod M. Krich, Vice President of Licensing, Safety, and Nuclear Engineering for LES; (2) Mr. George R. Campbell, a Senior Mechanical Engineering Consultant employed by Lockwood Greene; (3) Mr. Roger L. Peery, a Senior Hydrogeologist and Chief Executive Officer of John Shomaker & Associates, Inc.; (4) Len R. Stokes, an independent water resources consultant and President of Progressive Environmental Systems, Inc.; and (5) Timothy M. Woomer, Director of Utilities for the City of Hobbs, New Mexico. The

extensive, relevant experience of all five LES experts is demonstrated in their prefiled direct testimony and the statements of professional qualifications attached thereto. *See* "Prefiled Testimony of Rod M. Krich, George R. Campbell, Roger L. Peery, Len R. Stokes, and Timothy Woomer on Behalf of Louisiana Energy Services, L.P. Regarding Contention NIRS/PC EC-2 ("Impact Upon Water Supplies") ("Krich et al. Direct"), A.1-A.26, Tr. 1184-93; Tr. 1214-1230.

3. The LES panel submitted its direct testimony on January 7, 2005. This testimony was slightly revised at the evidentiary hearing. Tr. 1180-82. LES also submitted written rebuttal testimony dated February 3, 2005. *See* "Revised Rebuttal Testimony of Roger L. Peery, Len R. Stokes, and Timothy Woomer Regarding Contention NIRS/PC EC-2 ("Impact Upon Water Supplies") ("Peery et al. Rebuttal"), Tr. 1233-39.

4. The NRC Staff also presented direct testimony on Contention NIRS/PC EC-2, from Alan L. Toblin. *See* "NRC Staff Testimony of Alan Toblin Concerning Nuclear Information and Resource Service and Public Citizen Environmental Contention 2 ("NIRS/PC EC-2") (Impacts Upon Water Supplies) ("Toblin Direct"), Tr. 1311-17. Mr. Toblin's relevant training and experience is reflected in the statement of professional qualifications attached to his prefiled direct testimony. Tr. 1318-25.

5. NIRS/PC presented written direct and rebuttal testimony from George Rice. *See* "Direct Testimony of George Rice on Behalf of Nuclear Information and Resource and Public Citizen NIRS/PC Contention EC-2 (Revised Jan. 28, 2005)" ("Rice Direct"), Tr. 1353-56; "Rebuttal Testimony of George Rice on Behalf of Nuclear Information and Resource and Public Citizen NIRS/PC Contention EC-2," dated January 28, 2005 ("Rice Rebuttal"), Tr. 1365. Mr. Rice also provided oral rebuttal testimony in response to the written direct testimony of NRC Staff witness Alan Toblin. Tr. 1371-1376. Mr. Rice's relevant training and experience

is reflected in the statement of professional qualifications attached to his prefiled direct testimony. Tr. 1357-59.

B. NEF Water Usage Requirements

6. The NEF will require a supply of water for typical potable/sanitary uses (*i.e.*, for use in sinks, hand wash stations and showers, lavatories, etc.) and for various process and mechanical applications. Krich et al. Direct A.32, Tr. 1196. These applications include, among others, decontamination, rinse water, laundry, degreasing, sludge removal, and operation of the cooling water tower (process cooler and HVAC). Krich et al. Direct A.32, Tr. 1196. This water also will be used to initially fill, and to "top off" as necessary, the facility's two 125,000-gallon fire water storage tanks. Krich et al. Direct A.32, Tr. 1196; Tr. 1244, 1250-51.

7. The NEF's anticipated normal (average) water consumption is expected to be approximately 63,423 gallons per day. Krich et al. Direct A.31, Tr. 1196. This equates to 71.1 acre-feet/yr. Krich et al. Direct A.32, Tr. 1196. The specific water uses and associated consumption rates accounting for this figure are summarized in the ER. LES Exhibit 1, Table 3.4-4.

8. The NEF's peak water usage rate is estimated to be 378 gallons per minute. LES Exhibit 1, at 4.4-6. When extrapolated over a 24-hour period, this rate is approximately 540,000 gallons per day. Krich et al. Direct A.31, Tr. 1196. The specific water uses and associated peak flow rates accounting for this figure are summarized in the ER. LES Exhibit 1, Table 3.4-5. As LES witnesses Rod Krich and George Campbell explained, the anticipated peak water consumption figure is intended to represent a "worst-case" scenario. Tr. 1246-47. In reality, however, once the facility's two 125,000-gallon fire water tanks are initially

filled, facility water usage will generally be at the anticipated normal consumption rate of 63,423 gallons per day. Tr. 1244-51.

C. The Source and Adequacy of the NEF Water Supply

9. As set forth in the ER, the NEF will obtain 100 percent of its water supply from the municipal water systems of the Cities of Hobbs and/or Eunice, New Mexico. Krich et al. Direct A.30, Tr. 1195; LES Exhibit 1, at 3.4-9, 4.4-5. LES has entered into memoranda of understanding ("MOUs") with the Cities of Hobbs and Eunice specifically for this purpose, pursuant to which LES can obtain water from those cities' municipal water systems. Krich et al. Direct A.30, Tr. 1195; LES Exhibits 22 and 23. Accordingly, the NEF will not withdraw any groundwater from beneath the NEF site. Krich et al. Direct A.30, Tr. 1195.

10. The Hobbs municipal water supply system has a capacity of 20 million gallons per day (75,700 cubic meters per day), and a current usage rate of approximately 6.2 million gallons per day (23,450 cubic meters per day). LES Exhibit 1, at 4.4-6. The Eunice municipal water supply system, in turn, has a capacity of 4.32 million gallons per day (16,350 cubic meters per day), and a current usage rate of approximately 1.48 million gallons per day (5,600 cubic meters per day). LES Exhibit 1, at 4.4-6.

11. The projected water usage requirements of the NEF are very small when viewed relative to the current capacities and usages of the Hobbs and Eunice municipal water supply systems. Krich et al. Direct A.34, Tr. 1197. The projected normal daily water usage by the NEF constitutes only 0.32 percent of the Hobbs system capacity, and 1.02 percent of the current Hobbs system usage rate. Krich et al. Direct A.34, Tr. 1197. As such, the Hobbs City Manager has stated that "the proposed NEF project does not involve a major investment of the City's water resources in light of the tremendous potential benefit of strengthening and

diversifying our local economy." LES Exhibit 25. Similarly, the projected average (normal) daily water usage by the NEF constitutes only 1.47 percent of the Eunice system capacity, and 4.29 percent of the current Eunice system usage rate. Krich et al. Direct A.34, Tr. 1197.

12. The expected daily water usage requirements of the NEF constitute an even smaller percentage of the combined Hobbs and Eunice water supply system capacities and usage rates (0.26 percent and 0.83 percent, respectively). Krich et al. Direct A.34, Tr. 1197. Moreover, the peak NEF water use rate of 378 gallons per minute, when extrapolated over a 24-hour period (about 540,000 gallons per day), represents only about 2.2 percent of the combined potable water capacity for Eunice and Hobbs (24.32 million gallons per day). Krich et al. Direct A.34, Tr. 1197. In any event, as LES witness Len Stokes testified, given the water storage capabilities of the municipalities, the ability to meet "peak demand" is "really an infrastructure question, and not a supply question." Tr. 1249-50.

13. LES witnesses put the proposed NEF's water usage into perspective by comparing the NEF's anticipated usage requirements to those of other water users in Lea County, New Mexico. Mr. Peery testified that the NEF's average daily water usage of 63,423 gallons roughly equates to pumping a well at a rate of 71 gallons per minute for 60 percent of the day, which he characterized as "a very small amount of water." Tr. 1266. In contrast, large-scale agricultural users deploying center pivot irrigation systems pump water at a rate of 600 gallons per minute to irrigate their farms. Tr. 1263. Mr. Peery testified that the NEF's projected annual water usage of 71 acre-feet is roughly equivalent to the amount used to irrigate 25 acres of farmland. Tr. 1266.

14. Timothy Woomer, Director of Utilities for Hobbs, emphasized that "the modest use" projected for the NEF plant (71 acre-feet per year) is less than one percent of the

City of Hobbs' current annual usage of 8,500 to 9,000 acre-feet per year. Tr. 1278. The total amount of water that would be used by the NEF over its entire lifetime is less than 50% of the City of Hobbs' current annual production rate. Krich et al. Direct A.40, Tr. 1202. The NEF would rank only seventh among Hobbs' largest water users. Tr. 1279. For purposes of comparison, Mr. Woomer indicated that the City of Hobbs municipal golf course uses on the order of 310 acre-feet of water per year, almost four-and-one-half times as much as the NEF's projected annual water usage. Tr. 1284. Other examples are provided in a press release issued by the Lea County Water Users Association, an entity responsible for assessing water availability and usage in Lea County and for implementing appropriate strategies to ensure the long-term protection of the County's water resources. Krich et al. Direct A.34, Tr. 1198; LES Exhibit 24. Significantly, that organization has concluded that "NEF water usage is actually very small," and that Lea County can "easily" meet NEF requirements. Krich et al. Direct A.34, Tr. 1198; LES Exhibit 25.

D. The De Minimis Impact of the NEF on the Lea County and Hobbs Water Supplies

15. It is clear from the testimony of LES's expert witnesses that the impacts of NEF water usage on water supplies, *i.e.*, the Lea County Underground Water Basin and the Hobbs well field, are expected to be commensurately small, whether viewed relative to (1) the Hobbs well field or (2) the Lea County Underground Water Basin (the portion of the Ogallala aquifer within Lea County). Krich et al. Direct A.49, Tr. 1212-13. According to the Lea County Regional Water Plan, approximately 14,000,000 acre-feet (about 4.56 trillion gallons) of water presently in the Lea County portion of the Ogallala is recoverable. Krich et al. Direct A.48, Tr. 1210; LES Exhibit 26, at 6-12. By comparison, the NEF's projected facility lifetime water usage

of roughly 695 million gallons is less than 0.02 percent of this volume of water, *i.e.*, clearly a de minimis amount. Krich et al. Direct A.48, Tr. 1210.

16. The Hobbs and Eunice well fields are positioned in "very productive" portions of the Ogallala Aquifer. Krich et al. Direct A.48, Tr. 1210. LES witness Roger Peery testified that these well fields are in a "very favorable hydrogeologic setting," where the aquifer has ample saturated thickness, high hydraulic conductivities, and very high specific yield. Tr. 1265-66, 1293. For example, the saturated thickness of the Hobbs well field (*i.e.*, the vertical thickness of the hydrogeologically defined aquifer in which the pore spaces of the rock forming the aquifer are filled, or saturated, with water) approaches 160 feet. LES Exhibit 27, at H-2. The specific yield, or the volume of water that an unconfined aquifer releases from storage per unit of surface area per unit decline in the water table, may be as high as 0.28. LES Exhibit 27, at H-2. The usual range of specific yield is 0.01 to 0.30. Krich et al. Direct A.48, Tr. 1210. These aquifer properties allows for greater well production with smaller head changes over less extensive areas. Krich et al. Direct A. 48, Tr. 1210.

17. NIRS/PC witness George Rice suggested that "the long-term effects of water use by the NEF could be estimated by simulating pumpage from the Hobbs well field both with, and without, the additional pumpage required for the proposed NEF." Rice Direct A.6, Tr. 1355. LES witnesses Peery, Stokes, and Woomer testified that no such analysis is necessary, given that the NEF's projected water usage constitutes an extremely small fraction of the water currently used by, and available to, the City of Hobbs. Peery et al. Rebuttal A.6, Tr. 1236. They further testified that the favorable hydraulic properties of the portion of the Ogallala aquifer supplying the Hobbs well field ensure that the proposed NEF would not have any significant

impact on water levels or well productivity within the Hobbs well field. Peery et al. Rebuttal A.6, Tr. 1236.

18. Mr. Peery testified that the pumpage of an additional 71 acre-feet of water per year would have "a negligible impact" and would not affect the saturated thickness in the vicinity of the Hobbs well field "to any large degree." Tr. 1296. He specifically opined that if this pumpage were distributed among all of the wells in the Hobbs well field, then any associated drawdown would be on the order of "inches throughout the well field." Tr. 1297.

19. Mr. Woomer testified that his primary management duties as Director of Utilities for the City of Hobbs include administering the City's water rights, as well as evaluating requests to obtain water from the Hobbs system on a case-by-case basis. Tr. 1302. In the case of the NEF, Mr. Woomer stated that the "modest amount of water" sought by LES does not necessitate a 30-year projection (the operational life of the proposed NEF) of future water availability. Tr. 1302. Mr. Stokes agreed, testifying that he represents four cities in the State of New Mexico – all of them in Lea County – and that none of them "would run a model" to predict the effects of withdrawing an additional 71 acre-feet of water per year, as this is "a de minimis usage." Tr. 1295.

20. On this point, Mr. Woomer also testified that the NEF's projected annual water usage of 71 acre-feet per year would be "well below" the normal variation in yearly water usage by the City of Hobbs. Tr. 1282. According to Mr. Woomer, the year-to-year variation in the City's annual water usage rate is on the order of "a few hundred acre-feet per year." Tr. 1282. The fact that the normal or statistical year-to-year variation in the City's water usage eclipses the NEF's projected annual water usage confirms that no further analysis is necessary.

21. Mr. Woomer concluded that the City of Hobbs' water rights holdings will protect the water supply for the City for the next 40 years, and that the current production and distribution systems are more than adequate to supply the projected NEF plant site now, and through its expected operational life of thirty years, while still adequately meeting the needs of the community. Krich et al. Direct A.48, Tr. 1211; Peery et al. Rebuttal A.6, Tr. 1236-37.

22. Citing only the prior deposition testimony of Mr. Woomer, and certain statements in the Lea County Regional Water Plan (LES Exhibit 26), NIRS/PC claim that this conclusion is unsubstantiated. Rice Rebuttal A.5, Tr. 1366-67. The testimony and evidence summarized above, however, supports the conclusion that Hobbs can meet the NEF's water usage needs for the life of facility, and without adversely impacting the community's water supply.

23. Relative to the issue of future water availability, LES witnesses testified that the City of Hobbs holds 20,066 acre-feet per year of permitted water rights, yet currently uses only about 8,000 to 9,000 acre-feet of water per year. Krich et al. A.40, Tr. 1202; Tr. 1278; LES Exhibit 27 at H-1. The City of Eunice, for its part, has permitted rights to divert 3,292 acre-feet/yr of water, yet currently uses only about 1,650 acre-feet of that permitted water right per year 27. Krich et al. Direct A.40, Tr. 1202; LES Exhibit 27 at E-1. Therefore, in addition to having excess system capacities relative to NEF water usage needs, Hobbs and Eunice collectively hold the rights to divert an additional 13,000 acre-feet per year of water, a volume which far exceeds the roughly 71 acre-feet of water that the NEF would require per year, or the conservatively estimated 3,000 acre-feet that the proposed facility would require over its lifetime. Krich et al. Direct A.40, Tr. 1202-03. As Mr. Peery put it: "We're just putting water to beneficial use that is already permitted by the state engineer's office." Tr. 1284.

24. Mr. Peery and Mr. Stokes, both of whom were substantially involved in the preparation and review of the *Lea County Regional Water Plan* upon which NIRS/PC rely (*see* Krich et al. Direct A.39, Tr. 1200), testified that the plan is based on highly conservative, if not worst-case, assumptions. Krich et al. Direct A.42, Tr. 1204; Tr. 1268. Specifically, the plan reflects "predicted withdrawals [that] are based on currently held water rights and water diversions." Krich et al. Direct A.42, Tr. 1204; LES Exhibit 26, at 8-8. The Plan thus assumes the full exercise or use of all declared and permitted water rights within Lea County, including the exercise of all of the water rights currently held by the Cities of Hobbs and Eunice. Krich et al. Direct A.42, Tr. 1204; LES Exhibit 26, at 8-8. Mr. Stokes further explained that the Lea County Regional Water Plan is intended largely to protect ground water within the Lea County Underground Water Basin – by identifying "every possible usage we have" – from attempts by water users (particularly users in Texas) to appropriate large quantities of ground water from that basin for use outside of the basin. Tr. 1267-70.

25. According to Mr. Peery and Mr. Stokes, in reality, water use in Lea County in 2040 is not likely to approach the 360,000 acre-feet per year figure cited to result from the "unrestrained" water use scenario considered in the Lea County Regional Water Plan. LES Exhibit 26 (Executive Summary). In particular, Mr. Peery and Mr. Stokes testified that virtually unrestricted groundwater pumping in Texas along the New Mexico border for agricultural irrigation is unlikely to continue for economic reasons. Tr. 1263-64, 1271. Additionally, Mr. Stokes testified that the potash mines located along the western side of the basin – formerly large consumers of Lea County water – have gone out of business. Tr. 1271. Mr. Stokes noted that in 1975, "when the potash mines were in full force and the agriculture was booming," almost 240,000 acre-feet of water were used in Lea County. Tr. 1271. In contrast, in 1998, only about

180,000 acre-feet were used. Tr. 1280; LES Exhibit 26, Table 4-4, at 4-10. Neither of these industries is thus expected to contribute to a great increase in water use within Lea County. Tr. 1271-72.

26. On a related note, Mr. Peery testified that in modeling the potential effects of future water use in Lea County (NRC Staff Exhibit 21), the New Mexico Office of the State Engineer ("NMOSE") did not assume increased water use over the next 40 years, but rather, assumed pumping rates consistent with the "long-term average" and representative of "current conditions." Tr. 1270; NRC Staff Exhibit 21, at 53. Significantly, Mr. Peery testified that in view of historical data now available, it appears that the NMOSE model "over-predicts drawdowns in much of the County," despite assuming "more pumping from Texas than is probably actually occurring." Tr. 1289, 1291.

27. Looking forward, Mr. Woomer and Mr. Stokes expressed confidence that the City Hobbs easily could meet, without detriment to its water supply, the NEF's "de minimis" water usage needs, even if one uses the "optimistic" population growth rate assumed in connection with recent Hobbs infrastructure analyses. Tr. 1272-79. Mr. Woomer testified that Hobbs plans to reduce water withdrawals to irrigate the two golf courses in Hobbs by using wastewater effluent to irrigate both of them. Tr. 1284. Mr. Stokes stated the expert view that the City of Hobbs does not need to seek new appropriations, stating that the City has flexibility because its water rights extend over three township blocks. Tr. 1287.

28. LES witnesses also testified as to the existence of water-resources regulatory and planning frameworks in New Mexico and Lea County. Krich et al. Direct A.40, A.43, Tr. 1201, 1206-07. According to LES witnesses, these regulatory and planning

frameworks provide even further assurance that the NEF's modest water usage will not adversely affect water supplies. Krich et al. Direct A.49, Tr. 1212-13.

29. These frameworks include, for example, regulations and criteria administered by the NMOSE, the relevant state regulatory authority. The NMOSE permits "mining" of the Lea County Underground Water Basin, but only in accordance with specific administrative criteria so as to preclude non-beneficial uses of water. As Mr. Stokes testified, "Western water law is based upon putting water to beneficial uses. It's not based on locking water up in a jar and everybody going home." Tr. 1280-81. Krich et al. Direct A.40, Tr. 1201. Notably, the current administrative criteria permit the annual basin-wide withdrawal of approximately 440,000 acre-feet, which is far in excess of the 71 acre-feet per year of water to be used by the NEF, or even the roughly 23,000 acre-feet per year of permitted water rights collectively held by Hobbs and Eunice. Krich et al. Direct A.40, Tr. 1201-02.

30. On the planning side, State and regional water plans have been developed and approved, both of which promote the identification and implementation of measures to conserve water, develop additional water supplies, and improve water management. LES, for its part, plans to implement a number of water conservation measures at the proposed NEF. Krich et al. Direct A.44, Tr. 1208; LES Exhibit 1, at 4.4-9; LES Exhibit 28.

31. In sum, no persuasive quantitative or qualitative evidence supports the NIRS/PC assertion that the potential environmental impacts of the proposed NEF upon water supplies and water levels in the site vicinity have not been completely and adequately assessed. The weight of the expert testimony supports the conclusion that water use will be regulated as a state and local matter, and any additional pumpage by Hobbs or Eunice to meet NEF water usage

needs will not adversely affect aquifer water levels in, or the long-term productivity of, the Hobbs well field and the Lea County Underground Water Basin.

3. Contention NIRS/PC EC-4 ("Impacts of Waste Storage")

A. Contention and Evidence Presented

1. As originally admitted, NIRS/PC EC-4 stated as follows:

> CONTENTION: Petitioners contend that the Louisiana Energy Services, L.P. Environmental Report (ER) lacks adequate information to make an informed licensing judgment, contrary to the requirements of 10 C.F.R Part 51. The ER fails to discuss the environmental impacts of construction and lifetime operation of a conversion plant for the Depleted Uranium Hexafluoride ("UF6") waste that is required in conjunction with the proposed enrichment plant.

In a Memorandum and Order dated November 22, 2004, the Board admitted the following late-filed amendment to NIRS/PC EC-4:

> The DEIS fails to discuss the environmental impacts of the construction and operation of a conversion plant for the depleted uranium hexafluoride waste. The DEIS entirely relies upon final EISs issued in connection with the construction of two conversion plants at Paducah, Kentucky, and Portsmouth, Ohio, that will convert the Department of Energy's inventory of depleted uranium (DEIS at 2-28, 2-30, 4-53, 4-54). Such reliance is erroneous because the DOE plants are unlike the private conversion plant contemplated by LES.

In the November 22, 2004 Memorandum and Order, the Board also ruled that "to clarify the scope of this contention, we will delete the words 'and Disposal' from its title." (Order, p. 15).

2. LES presented a panel of two qualified experts on Contention NIRS/PC EC-4. These witnesses were (1) Rod M. Krich, Vice President of Licensing, Safety, and Nuclear Engineering for LES; and (2) Mr. Paul G. Schneider, a technical and management consultant for SMG Inc. The extensive, relevant experience of both LES experts is reflected in the prefiled direct testimony (A.1-A.5) and rebuttal testimony (A.1) identified below, and the statements of

professional qualifications attached thereto. Tr. 885-86, 900-02, 907-08. Mr. Schneider's Statement of Professional Qualifications was filed separately on March 7, 2005. (*See* Statement of Professional Qualifications of Paul G. Schneider on Behalf of Louisiana Energy Services, L.P.)

3. Mr. Krich submitted prefiled direct testimony on January 7, 2005. *See* "Prefiled Testimony of Rod M. Krich on Behalf of Louisiana Energy Services, L.P. Regarding Contention NIRS/PC EC-4 ("Impacts of Waste Storage") ("Krich Direct"), Tr. 885-902 Mr. Krich and Mr. Schneider submitted prefiled rebuttal testimony on February 3, 2005, to which certain minor corrections were made at the evidentiary hearing. *See* "Revised Prefiled Rebuttal Testimony of Rod M. Krich and Paul G. Schneider on Behalf of Louisiana Energy Services, L.P. on Contention NIRS/PC EC-4 ("Impacts of Waste Storage") ("Krich/Schneider Rebuttal"). Tr. 907-18.

4. The NRC Staff also presented written direct and rebuttal testimony on Contention NIRS/PC EC-4, from Dr. Donald E. Palmrose. *See* "NRC Staff Testimony of Donald E. Palmrose Concerning Nuclear Information and Resource Service and Public Citizen Environmental Contention 4 ("NIRS/PC EC-4") (Impacts of Waste Storage)" ("Palmrose Direct") Tr. 996-1014; "NRC Staff Rebuttal Testimony of Donald E. Palmrose Concerning Nuclear Information and Resource Service and Public Citizen Environmental Contention 4 ("NIRS/PC EC-4") (Impacts of Waste Storage)." ("Palmrose Rebuttal") Tr. 1017-1022. The extensive, relevant experience of the Staff witness is demonstrated by his statement of professional qualifications. Tr. 1008-1014.

5. NIRS/PC presented written direct and rebuttal testimony from Dr. Arjun Makhijani. *See* "Direct Testimony of Dr. Arjun Makhijani Regarding Nuclear Information and

Resource Service and Public Citizens Contention EC-4, Revised January 28, 2005" ("Makhijani Direct") Tr. 1064-88; "Rebuttal Testimony of Dr. Arjun Makhijani Regarding Nuclear Information and Resource Service and Public Citizens's Contention EC-4, Revised February 7, 2005" ("Makhijani Rebuttal") Tr. 1099-1106.

B. Reliance on Department of Energy Environmental Impact Statements

6. Revision 2 of LES's License Application, submitted in July of 2004, contains a discussion of the environmental impacts of the construction and lifetime operation of a deconversion plant for the depleted uranium hexafluoride from the NEF that will be required in conjunction with the proposed enrichment plant. LES Exhibit 14, at 4.13-3. Specifically, Revision 2 references previous environmental evaluations undertaken by the NRC of a UF_6 deconversion facility for the Claiborne Enrichment Center, as well as the Final Environmental Impact Statements recently issued by the Department of Energy ("DOE") for the deconversion facilities to be constructed and operated at Paducah, KY and Portsmouth, OH. *See* LES Exhibit 14, at 4.13-3.

7. The Commission's "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," published in the *Federal Register* on February 6, 2004, provides that, relative to the environmental issues associated with the treatment of depleted uranium hexafluoride tails, the NRC staff may consider the DOE EIS in preparing the Staff's EIS. Tr. 955.

8. Dr. Palmrose, the witness for the NRC Staff, cited the Commission's February 6, 2004 Hearing Notice indicating that the NRC can use and apply DOE environmental impact statements. Tr. 1049-50. He further testified that, based upon his experience, it is

common practice to rely on and make reference to previous analyses such as the environmental impact statements published by DOE. Tr. 1056. He also testified that a directive from the Commission was not necessary in order for the Staff to rely upon such analyses. Tr. 1056-57.

9. Dr. Palmrose testified that the Staff advised him to apply the most current available DOE EISs for the deconversion facilities. Tr. 1055. On this basis, Dr. Palmrose testified that he evaluated the draft EISs for the Paducah and Portsmouth deconversion facilities, and upon the final EISs for those facilities becoming available, he considered these, as well. Tr. 1055.

C. *Adequacy of Discussion in Department of Energy Environmental Impact Statements Regarding Environmental Impacts of a Deconversion Facility*

10. DOE has published two site-specific environmental impact statements which address the environmental impacts of deconversion facilities to be constructed at Portsmouth, OH and Paducah, KY. LES Exhibits 16 and 17. Each of these site-specific EISs, in turn, explicitly incorporates by reference the "Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride" ("PEIS") published by DOE in April of 1999. LES Exhibit 18; Tr. 985-86. Mr. Krich testified that he relied on the two site-specific EISs, as well as the PEIS, in arriving at the conclusion that the potential environmental impacts of a non-site-specific deconversion facility for the DUF_6 to be generated by LES had been appropriately evaluated in the DOE EISs. Krich Direct A.17, Tr. 892. In reaching this conclusion, Mr. Krich testified that he reviewed the information in the DOE EISs and found the information to be both pertinent and reasonable for the type of facility that might be required for the deconversion of the NEF DUF_6. Tr. 968, 970-71.

11. Mr. Krich testified that if LES should elect to send its DUF_6 to one of the two DOE facilities (*i.e.*, Portsmouth, OH or Paducah, KY), then the environmental evaluations published by DOE, including the PEIS and the site-specific EISs for the Portsmouth and Paducah sites, contain a comprehensive evaluation of the environmental impacts associated with the construction, operation, and decommissioning of these two facilities. Krich Direct A.18, Tr. 893. Specifically, Mr. Krich testified that these EISs comprehensively evaluated a wide range of environmental impacts, including human health and safety during construction and facility operation, as well as during transportation and in accident conditions. The EISs evaluated air quality and noise, water and soil, socioeconomics, ecology, waste management, resource requirements, land use, cultural resources and environmental justice. Krich Direct A.18, Tr. 893.

12. Mr. Krich further testified that the site-specific EISs for Portsmouth and Paducah analyzed the environmental impacts associated with expanding deconversion facility operations at each of these sites beyond that needed to process DOE's DUF_6, to process additional DUF_6 that might be transferred to DOE at some time in the future by a commercial enrichment facility. Krich Direct A.18, Tr. 893. In this regard, Mr. Krich testified that the two site-specific EISs specifically analyzed the environmental impacts of two options: (i) extending the operational period for the deconversion facilities; or (ii) increasing plant throughput. Krich Direct A.18, Tr. 893.

13. In the event that LES elects to pursue its "preferred" strategy of transporting DUF_6 from the NEF to a private sector deconversion facility, Mr. Krich testified that the DOE EISs appropriately address and bound the generic environmental impacts that might be associated with the construction, operation, and decommissioning of a private sector facility. Krich Direct A.19, Tr. 894. Specifically, Mr. Krich testified that the NEF plant would

conservatively be projected to generate 15,727 cylinders of DUF_6 during its 30-year licensed life, or approximately 196,588 metric tons of DUF_6. Krich Direct A.19, Tr. 894. Mr. Krich further testified that the environmental evaluation undertaken by DOE in its PEIS was for a facility of nearly four times the capacity of the plant that would be required to deconvert LES's DUF_6 and, on this basis, the PEIS would clearly bound the generic environmental impacts of a facility that might be built for LES. Krich Direct A.19, Tr. 894-95; Tr. 975. In each case, the two site-specific EISs contain a thorough evaluation of the potential environmental impacts associated with each of these options. Krich Direct A.18, Tr. 893.

14. Mr. Krich testified that DOE's PEIS assessed the environmental impacts of a deconversion facility by using representative or generic environmental settings, which in turn were based upon the three sites at which DOE's DUF_6 is currently stored. Krich Direct A.21, Tr. 895. Mr. Krich further testified that the range of populations at the three existing DUF_6 storage sites – Paducah, KY, Portsmouth, OH, and Oak Ridge, TN – was determined by DOE to be representative of potential sites for a deconversion facility. Krich Direct Answer 21, Tr. 895. DOE's analysis assumed as representative a population within a radius of 50 miles ranging from 500,000 to 800,000. LES Exhibit 18, Vol. 1, at 5-2; Vol. 2, Appendix F, at F-4, F-17. Mr. Krich testified that the assumptions employed by DOE represent a reasonable range of environmental conditions, and could reasonably be expected to encompass any site that might be selected for a private sector deconversion facility for NEF's DUF_6. Krich Direct Answer 21, Tr. 895. For example, Mr. Krich testified that if a deconversion facility is located in the vicinity of the NEF, then the range of population assumed in DOE's analysis is clearly bounding, as the population in the vicinity surrounding the NEF is less than 100,000. Krich Direct A.21, Tr. 895.

15. Mr. Krich further testified that DOE evaluated a comprehensive range of environmental impacts that, in his opinion, would encompass the type of impacts that might be associated with a private sector deconversion facility. These include the human health and safety impacts of a deconversion facility during both normal and accident conditions for both radiological and chemical exposures. DOE also evaluated the human health and safety impacts during transportation, both by truck and rail, including normal operation and assumed accident conditions. DOE also evaluated environmental impacts associated with air quality, water and soil, socioeconomics, ecology, waste management, resource requirements, land use, cultural resources, and environmental justice. Based upon the programmatic evaluation undertaken by DOE, Mr. Krich concluded that DOE's PEIS comprehensively evaluated all of the relevant environmental impacts that might be associated with the construction, operation, and decommissioning of a deconversion facility. Krich Direct A.22, Tr. 895-96.

16. Mr. Krich testified that if LES should elect to pursue a private sector deconversion facility, then further evaluation would be undertaken of the site-specific impacts of such a facility as part of the licensing process for that facility. Krich Direct A.19, Tr. 894.

17. In support of the NIRS/PC contention that it is "erroneous to rely on the site-specific EISs because the DOE plants are unlike the private deconversion plant contemplated by LES," NIRS/PC expert witness, Dr. Makhijani, focused much of his criticism on what he considers to be inadequate treatment of one of the deconversion options, the option that would result in the production of anhydrous hydrofluoric acid ("HF"). Makhijani Direct A.6-A.9, Tr. 1071-76; Makhijani Rebuttal A.4-A.5, Tr. 1101-04; Krich/Schneider Rebuttal A.4, Tr. 910-11. Mr. Krich testified that the DOE's PEIS did, in fact, thoroughly evaluate not only the aqueous HF option, but also the anhydrous HF option. Krich Direct A.23, Tr. 896. Dr. Makhijani

acknowledged that the DOE PEIS evaluated the anhydrous hydrofluoric option. Tr. 1122. Dr. Makhijani further acknowledged that it was appropriate to discuss and evaluate technology on a programmatic basis. Tr. 1123.

18. In addition to testifying that DOE's PEIS thoroughly considered both deconversion options, Mr. Krich further testified that, pursuant to a Memorandum of Understanding that LES has executed with AREVA (LES Proprietary Exhibit 79), the two parties announced their intent to enter into a definitive contract for a deconversion plant for NEF's DUF_6. Krich Rebuttal A.7, Tr. 922. This plant would be based upon one of AREVA's deconversion technologies and would employ processes that result in aqueous HF, the same byproduct that will be produced by the Portsmouth and Paducah deconversion facilities for which site-specific EISs were issued. Given the decision reached by LES not to pursue a process that results in anhydrous HF, Mr. Krich testified that there was no need to consider any issues relating to anhydrous HF, or the process that produces it, since LES would not be pursuing this option. Krich Rebuttal A.7, Tr. 922.

19. Mr. Krich also stated that, based upon the Memorandum of Understanding between LES and AREVA, LES would not employ the anhydrous hydrofluoric acid option, and that LES is prepared to amend, the license application to so reflect, and, in so doing, LES will be bound by a condition of the license not to pursue the anhydrous HF option or alternative. Tr. 931-32.[26]

20. As to the transportation impacts associated with a potential deconversion facility, Mr. Krich testified that DOE's PEIS contains a comprehensive evaluation of the

[26] The amendment to the license application was submitted on March 11, 2005 (*see* NEF-05-010).

environmental impacts associated with the transportation of DUF_6 cylinders, as well as the transportation of the deconversion product, U_3O_8. The analysis also addressed the environmental impacts associated with the transportation of chemicals required for or produced during processing, such as hydrogen fluoride and ammonia, as well as any low-level radioactive waste, low-level mixed waste, and hazardous chemical waste generated during operations. Krich Direct A.24, Tr. 897.

21. Mr. Krich further testified that the transportation impacts analyzed in the PEIS were evaluated for distances ranging from 155 to 3,100 miles. Mr. Krich testified that these distances would certainly bound transportation distances that might be involved in a private sector facility. Krich Direct A.24, Tr. 897. In his testimony, Dr. Makhijani acknowledged that he had no disagreement with the transportation distances assumed by DOE in its PEIS analysis. Tr. 1138.

D. Reliance on Environmental Impact Statement for Claiborne Enrichment Center

22. Mr. Krich testified that he also relied on the Final Environmental Impact Statement for the Claiborne Enrichment Center ("CEC") in support of his conclusion that the environmental impacts of a deconversion facility have been thoroughly evaluated. Krich Direct A.14-A.15, Tr. 889-90. In particular, Mr. Krich testified that the CEC FEIS addressed the environmental impacts of a deconversion facility in section 4.2.2.8, entitled "Radiological Impacts of DUF_6 Conversion and U_3O_8 Disposal," as well as in Appendix A, entitled "Assessment of the Environmental Impacts of Depleted UF6 Disposition." Krich Direct A.15, Tr. 890.

23. Mr. Krich testified that he "scaled" the CEC FEIS to account for the larger NEF plant. Specifically, Mr. Krich noted that the evaluation of the environmental impact of a

deconversion facility performed for the CEC was based upon a deconversion facility that would need to process approximately 5,700 MT DUF_6 per year. On this basis, Mr. Krich testified that if you assumed conservatively that the calculated doses in the CEC FEIS were doubled to account for the larger NEF plant – a conservative assumption, in his view, in light of the fact that DUF_6 generated by the NEF will be approximately 7,800 MT DUF_6 per year (or only 37 percent more than the plant assumed in the CEC analysis) – the environmental impacts of such a deconversion facility would still be small and well within the regulatory limits (*e.g.*, 5.2 mrem total effective dose equivalent, 5.9 mrem effective dose equivalent to the thyroid). Krich Direct A.16, Tr. 891-92.

E. NIRS/PC Argument Concerning Filter Efficiency

24. Dr. Makhijani testified that, based upon a study that was undertaken regarding scrubbers installed at the Fernald, Ohio plant, "a consideration of the impacts for lower filter efficiency should be included in the assessment of the routine impacts of deconversion facility." Makhijani Direct A.10, Tr. 1077. Dr. Makhijani testified that he had not studied the history of the Fernald scrubbers, nor did he know whether they were replaced or updated. Tr. 1153. He further acknowledged that the Fernald scrubbers were installed to remove acids and uranium, not hydrofluoric acid. Tr. 1156. Dr. Makhijani testified that he didn't "want to make any implication that there is an exact analogy between that situation [Fernald] and this one [NEF deconversion plant]." Tr. 1156. Moreover, he testified that he had no familiarity with NRC's enforcement regime for emissions from plants that have scrubbers and filters, and hence was not able to express a view as to the adequacy of this regime. Tr. 1157. When asked whether he was familiar with scrubber and filter technology of recent years, Dr. Makhijani testified that he was

not. Tr. 1157. He stated that he "wouldn't consider myself or present myself as a chemical engineering expert – I'm not." Tr. 1157.

25. LES's expert witness, Mr. Paul G. Schneider, testified that the Fernald Report has absolutely no applicability to the HF filter system that would be employed by a deconversion facility. Krich/Schneider Rebuttal A.9, Tr. 915. First, Mr. Schneider testified that the Fernald system was designed to remove uranium compounds (*i.e.*, particulates) from the effluent, not HF in a gaseous state. Krich/Schneider Rebuttal A.9, Tr. 915-16. Second, by contrast to the system at the Fernald plant, which was built more than 50 years ago, Mr. Schneider testified that current operating experience with activated carbon and scrubber systems has demonstrated the ability of these filters to operate reliably at high efficiencies. Mr. Schneider also testified that Dr. Makhijani offered no support for his statement that "even if a 99.9 percent efficiency scrubber is installed, maintaining the efficiency at such a high level would be difficult and expensive due to the corrosive nature of HF." Mr. Schneider testified that it is, in fact, feasible to design a system that will achieve a very high level of filtering efficiency, and that there is abundant operating experience that today's standards can be met with cost-efficient designs. Krich/Schneider Rebuttal A.9, Tr. 917.

F. Regulatory Standards Governing Free Release of Contaminated HF and CAF_2

26. Dr. Makhijani testified that "there are no DOE or general NRC guidelines that govern the free release of contaminated hydrofluoric acid or calcium fluoride." Makhijani Direct A.5, Tr. 1070. He further testified that "given the potential for even tighter standards in the U.S. for the future . . . it should be assumed that the hydrofluoric acid resulting from the deconversion of the DUF_6 from the proposed LES facility will not be able to be resold on the open market." Makhijani Direct A.11, Tr. 1078. Mr. Krich noted in his testimony that "LES

does not intend to seek to sell the HF." Krich/Schneider Rebuttal A.8, Tr. 914. Thus, to the extent that Dr. Makhijani's concern about the absence of regulatory standards is prompted by the possibility of HF resale, Mr. Krich indicated that LES has no current intention to do so.

27. In any event, as Mr. Krich testified, both the DOE PEIS, as well as the site-specific EISs, evaluate the environmental impacts associated with the possible sale of the HF from a deconversion facility, as well as the impacts associated with the disposal of this HF. Krich/Schneider Rebuttal A.8, Tr. 913. Thus, while LES does not currently intend to sell the HF, the environmental impacts of this option have been thoroughly evaluated.

28. As to the alleged "lack of regulatory standards," Mr. Krich testified that the two site-specific EISs explicitly discuss the process for ensuring that appropriate limits are established and enforced. Krich/Schneider Rebuttal A.8, Tr. 913. Mr. Krich further testified that the EISs explicitly state that "authorized limits for DOE property that will be released from DOE control are established and implemented on a case-specific basis according to a process defined by DOE Order 5400.5, 'Radiation Protection of the Public and the Environment.'" Krich/Schneider Rebuttal A.8, Tr. 913. This process explicitly contemplates consultation with the NRC.

29. When asked about the discussion in the site-specific EISs of the process that would be followed and the standard that would be applied by DOE (*i.e.*, one-quarter of the 25 mrem public dose limit), Dr. Makhijani asserted that "this process hasn't been completed for calcium fluoride and hydrofluoric acid." Tr. 1149. Dr. Makhijani's statement is in direct conflict with the explicit discussion in the site-specific EISs that the process and standard would apply to both HF and CAF_2. Tr. 1150. When asked about the clear statement in the site-specific

EISs that they establish a process and a standard for both HF and CAF_2, Dr. Makhijani testified "I'm simply making an existential statement about two specific materials." Tr. 1150.

30. Mr. Krich also testified that there are many instances where regulators have made decisions to authorize, or would be prepared to authorize, the disposal of CaF_2 in municipal landfills. Krich/Schneider Rebuttal A.8, Tr. 914. In so doing, Mr. Krich testified that it is implicit in such decisions that the regulators are applying a standard in reaching the conclusion that CaF_2 need not be disposed of in a licensed low-level radioactive waste disposal facility. Tr. 980-81. Indeed, Mr. Krich pointed out that regulators did, in fact, apply a standard in reaching such decisions. Tr. 981; LES Exhibit 77 (referring to an acceptance criterion of 30 pCi/gm for CaF_2); LES Exhibit 78 (referring to a standard of 250 pCi/gm for CaF_2).

31. In sum, the weight of the expert testimony supports the conclusion that LES appropriately relied on the Department of Energy programmatic and site-specific environmental impact statements, as well as the CEC EIS, as a basis for concluding that the potential environmental impacts of the possible construction and operation of a commercial facility for deconverting DUF_6 from the proposed NEF to DU_3O_8 have been adequately considered.

4. Contention NIRS/PC EC-7 ("Need for the Facility")

A. Contention and Evidence Presented

1. As admitted, Contention NIRS/PC EC-7 states:

> Petitioners contend that the Environmental Report (ER) does not adequately describe or weigh the environmental, social, and economic impacts and costs of operating the National Enrichment Facility (*See* ER 1.1.1 et seq.) in that:
>
> (A) Louisiana Energy Services, L.P.'s (LES) presentation erroneously assumes that there is a shortage of enrichment capacity.

(B) LES's statements of "need" for the LES plant (ER 1.1) depend primarily upon global projections of need rather than projections of need for enrichment services in the U.S.

(C) LES has referred to supply and demand in the uranium enrichment market (ER 1.1), but it has not shown how LES would effectively enter this market in the face of existing and anticipated competitors and contribute some public benefit.

2. On this contention, LES presented three witnesses. These witnesses included Michael H. Schwartz, a technical and economic consultant from Energy Resources International, Inc. ("ERI") who specializes in nuclear fuels planning and procurement, and resource and market analyses; (2) Rod M. Krich, Vice President of Licensing, Safety, and Nuclear Engineering for LES; and (3) Kirk S. Schnoebelen, Marketing Manager for Urenco, Inc., who provides marketing and sales of enrichment services for both Urenco and LES. The extensive, relevant experience of these LES experts is reflected in the prefiled direct testimony identified below, and in the statements of professional qualifications attached thereto. Tr. 1389-90, 1402-03, 1431-35, 1468-74.

3. Mr. Schwartz and Mr. Krich submitted prefiled direct testimony dated January 7, 2005. *See* "Prefiled Testimony of Michael H. Schwartz and Rod M. Krich on Behalf of Louisiana Energy Services, L.P. Concerning Contention NIRS/PC EC-7 ("Need for the Facility") ("Schwartz/Krich Direct"), Tr. 1431-74. Mr. Schnoebelen submitted prefiled direct testimony dated February 3, 2005. *See* "Revised Prefiled Direct Testimony of Kirk S. Schnoebelen on Behalf of Louisiana Energy Services, L.P. Concerning Contention NIRS/PC EC-7 ("Need for the Facility") ("Schnoebelen Direct"), Tr. 1389-1403. Mr. Schwartz also submitted prefiled rebuttal testimony dated February 3, 2005. *See* "Revised Prefiled Rebuttal Testimony of Michael H. Schwartz on Behalf of Louisiana Energy Services, L.P. Regarding Contention NIRS/PC EC-7 ("Need for the Facility") ("Schwartz Rebuttal"), Tr. 1477-80.

4. The NRC Staff also submitted direct testimony and rebuttal testimony on this contention, both dated February 3, 2005, from Rick Nevin. *See* "NRC Staff Testimony of Rick Nevin Concerning Nuclear Information and Resource Service and Public Citizen Environmental Contention 7 ("NIRS/PC EC-7") (Need for the Facility) ("Nevin Direct"), Tr. 1541-54; "NRC Staff Rebuttal Testimony of Rick Nevin Concerning Nuclear Information and Resource Service and Public Citizen Environmental Contention 7 ("NIRS/PC EC-7") (Need for the Facility) ("Nevin Rebuttal"), Tr. 1557-60. Mr. Nevin is a consultant to the Staff and employed by ICF Consulting. His extensive, relevant experience is reflected in his prefiled testimony and the statement of professional qualifications attached thereto. Tr. 1541-42, 1551-54.

5. NIRS/PC submitted direct and rebuttal testimony from Michael Sheehan. *See* "Direct Testimony of Michael F. Sheehan on Behalf of Nuclear Information and Resource Service and Public Citizen NIRS/PC Contention EC-7 – Revised Jan. 28, 2005" ("Sheehan Direct"), Tr. 1578-1628; "Rebuttal Testimony of Michael F. Sheehan on Behalf of Nuclear Information and Resource Service and Public Citizen NIRS/PC Contention EC-7 – Revised Feb. 7, 2005" (Sheehan Rebuttal"), Tr. 1638-55. Dr. Sheehan is a consultant to NIRS/PC and a partner in the firm Osterberg & Sheehan, Public Utility Economists. His training and experience are reflected in the statement of professional qualifications attached to his prefiled testimony. Tr. 1589-1626.

B. The LES "Need" Statement and Showing

6. In Section 1.1.1 of the NEF ER (LES Exhibit 30), LES provided a detailed description of the "need" for the proposed action. The proposed action is issuance of an NRC license that would permit construction and operation of the NEF. As set forth in the ER, the

primary basis for the "need" for the NEF involves national policy considerations: the recognized interest of the U.S. government to promote energy and national security through the development of diverse, reliable domestic enrichment capacity. Schwartz/Krich Direct A.14, Tr. 1436-37.

7. As part of its "need" showing, LES also included a comprehensive market analysis, prepared by Mr. Schwartz and ERI, of global enrichment services supply and requirements. The ERI analysis, presented in Section 1.1.2 of the NEF ER (LES Exhibit 30), was intended as an additional, or secondary, basis for the "need" for the NEF. Schwartz/Krich Direct Testimony A.14, Tr. 1437. It shows the close balance of enrichment services supply and demand through 2020, even with the NEF included in the supply. Schwartz/Krich Direct A.17, Tr. 1438.

8. As part of his testimony, Mr. Schnoebelen presented information on contracts that LES has already executed with domestic utilities, as well as "imminent commitments," to deliver enrichment services from the NEF. Schnoebelen Direct Testimony A.10-A.17. Specifically, LES has firm contracts with five utilities and a commitment from a sixth (that is anticipated to be executed in the first half of 2005). Schnoebelen Direct A.10-A.11, Tr. 1393-98. The six customers operate 42 licensed nuclear plants in the U.S. Schnoebelen Direct A.13, Tr. 1395. As shown in Figure 1 of Mr. Schnoebelen's testimony, the contracts and commitments represent a substantial portion of the NEF production capacity for the first 10 years of operation of the plant. Schnoebelen Direct A.10, Tr. 1394. The five executed contracts account for 67% of the NEF's initial 10 years of production. Schnoebelen Direct A.16, Tr. 1397. The additional imminent contract would bring that total to 72%. Schnoebelen Direct A.16, Tr. 1397. Through these contracts, the NEF would contribute a public benefit by providing

enrichment services to a substantial portion of the nation's nuclear power reactor fleet, which supplies about 20 percent of U.S. electricity. LES Exhibit 30, at 1.1-1.

C. LES Analysis of "Need" for Enrichment Capacity (Basis A)

9. The ERI supply and requirements analysis of enrichment services encompassed the period 2002 to 2020. Based on the results of this analysis, ERI concluded that there will be a continuing demand for uranium enrichment services both in the United States and abroad during the period evaluated, particularly after 2010, and that the NEF is a component of the necessary supply. Schwartz/Krich Direct A.17, Tr. 1438. This supports the secondary statement of "need" for the NEF.

10. As set forth in Section 1.1.2 of the ER, ERI first conservatively projected installed nuclear generating capacities in the United States and the world for the specified period. LES Exhibit 30. Based on these installed nuclear generating capacity forecasts, ERI then developed forecasts of uranium enrichment requirements in the United States and the world for four specific intervals, *i.e.*, 2003-2005, 2006-2010, 2011-2015, and 2016-2020. ERI conservatively estimated current and future sources and quantities of enrichment services in the U.S. and the world for the timeframes evaluated. LES Exhibit 30. Schwartz/Krich Direct A.18, Tr. 1438-39.

11. ERI obtained the data and information underlying its forecasts from an array of publicly available sources, as well as from direct communications with market participants. Examples include the NRC's website, various DOE and/or Energy Information Administration ("EIA") reports and databases, World Nuclear Association ("WNA") publications, nuclear trade press articles and reports (*e.g.*, *Nuclear Fuel, Nukem Market Report, The Ux Weekly, Japan Nuclear Fuel Limited*), newspaper articles, meeting presentation materials

prepared by industry participants and analysts, industry press releases, and financial filings (*e.g.*, annual and 10-K reports). Schwartz/Krich Direct A.19, Tr. 1439.

12. In its forecasts of installed nuclear generating capacity, ERI specifically took into account the following considerations: (1) the number of nuclear generating units currently in operation, along with the number of retirements that may occur among these units during the forecast period; (2) capacity that has been created, and that may be created, by extending the initial operating lifetimes of units currently in operation through license renewals; (3) capacity created and likely to be created by increasing the maximum power levels at which the units may operate through power uprates; (4) the number of units under construction, already ordered, or firmly planned with likely near-term site approval; and (5) additional new capacity that will require site approval and will be ordered in the future. Schwartz/Krich Direct A.21, Tr. 1440.

13. Based on its analysis, ERI expects that world generating capacity will increase from 356.8 GWe in 2002 to 387.7 GWe by 2010 (an average annual rate of change of +1.0% to 2010), and to continue to increase to 390.1 GWe by 2020 (an average annual rate of change of +0.1% after 2010). U.S. generating capacity is conservatively forecasted to increase from 97.3 million GWe in 2002 to 102.7 GWe in 2010 (with an annual rate of change of +0.7% to 2010), and then to decrease to 101.7 GWe by 2020 (an average annual rate of change of –0.1% after 2010). Schwartz/Krich Direct A.23, Tr. 1442.

14. According to Mr. Schwartz, the ERI forecasts of U.S. and world installed nuclear generating capacity compare well with those prepared by the EIA and WNA during 2003, as illustrated in Figures 1.1-2 and 1.1-3 of the ER. LES Exhibit 30. As averaged over the 2010 to 2020 period, the ERI forecast for the U.S. is 2.0% higher than the EIA forecast and 4.5%

lower than the WNA forecast. It is 1.4% below the average of the EIA and WNA U.S. forecasts. Over this same period, the ERI forecast for the world is 0.8% higher than the EIA forecast and 6.8% lower than the WNA forecast. It is 3.2% below the average of the EIA and WNA world forecasts of installed nuclear generating capacity. When compared to the average of these other forecasts, the ERI forecast is slightly more conservative in that it does not project as much installed nuclear generating capacity to be in operation during this period. Schwartz/Krich Direct A.29, Tr. 1446.

15. The latest EIA forecast averaged over the 2010-2020 period for the U.S. is even 3.2% higher than its 2003 forecast and its world forecast is 3.7% higher than its earlier forecast over this same period. Schwartz/Krich Direct A.30, Tr. 1446; Staff Exhibit 24.

16. In an assessment of uranium enrichment requirements in the U.S. and abroad, certain design and management parameters must be considered. In this second component of its analysis, ERI took into account: (1) country-by-country average capacity factors; (2) individual plant enriched product assays, in terms of weight percent of uranium-235, based on plant design, energy production, design burnup, and fuel type; (3) enrichment tails assays, in terms of weight percent uranium-235; (4) current plant-specific fuel discharge burnup rates for U.S. plants, and country and reactor-type-specific fuel burnup rates for foreign facilities; (5) country or plant-specific fuel cycle lengths; (6) equivalent uranium enrichment requirements savings resulting from plutonium recycle in some Western European countries (*i.e.*, France, Germany, Belgium, Switzerland, and possibly Sweden) and Japan; and (7) equivalent enrichment requirements savings resulting from the recycle and use of excess weapons plutonium (for use in mixed-oxide, or "MOX," fuel) in the United States and Russia. Schwartz/Krich Direct A.33, Tr. 1447-48.

17. As set forth in the ER, ERI compared its forecasts of world and U.S. average annual uranium enrichment requirements to comparable forecasts prepared by EIA and WNA in 2003. Because neither the EIA nor WNA forecast reflects adjustment for the use of recycled plutonium in MOX fuel, ERI removed this adjustment from its own forecast for purposes of comparison. Notably, ERI forecasted U.S. uranium enrichment requirements that are 14.6% lower than the average of the EIA and WNA forecasts for the period 2011 through 2020, and world uranium enrichment requirements that are 8.5% lower than the average of the EIA and WNA forecasts for the same period. This indicates that ERI's forecasts of U.S. and world enrichment requirements are not only reasonable, but are also conservative when viewed relative to comparable forecasts prepared by the EIA and WNA. Figures 1.1-4 and 1.1-5 of the NEF ER present these comparisons graphically. LES Exhibit 30; Schwartz/Krich Direct A.36, Tr. 1449.

18. The third component of the ERI supply and requirements analysis is an evaluation of the current and potential future world and U.S. supplies of enrichment services that are suitable for use in commercial nuclear reactors. ERI identified, based on its review of available information, all current and potential future sources of uranium enrichment services/enriched uranium. These sources include: (1) existing inventories of low enriched uranium ("LEU"); (2) production from existing uranium enrichment plants; (3) new enrichment plants and expansions of existing facilities, including the NEF, the proposed USEC American Centrifuge Plant ("ACP"), and expansion of Urenco production; (4) LEU obtained by blending down Russian weapons-grade high enriched uranium ("HEU"); and (5) LEU that might be obtained by blending down U.S.-owned weapons-grade HEU. ERI then determined the specific quantities of enrichment services currently provided by, and/or likely to be provided by, those

particular sources for the period evaluated. Table 1.1-5 of the ER summarizes all current and potential future sources of enrichment services and the specific quantities of enrichment services associated with, or potentially associated with, those sources. LES Exhibit 30; Schwartz/Krich Direct A.40, Tr. 1450-51.

19. Current total world annual enrichment services supply capability from all available sources, independent of physical suitability of material or economics, is presently estimated by ERI to be approximately 49.6 million Separative Work Units ("SWU"), as shown in Table 1.1-5 of the ER. However, the total world annual supply capability of enrichment services that are used to meet Confederation of Independent States ("CIS") (*i.e.*, former Soviet Union) and Eastern European requirements, plus those which are economically competitive, and are not constrained by international trade restrictions, amounts to only 40.7 million SWU, as also shown in Table 1.1-5. This is only 1.8 million SWU greater than the estimated 2002 requirements of 38.9 million SWU (a margin of only 4%), and is nearly identical to the 2003 to 2005 average requirements of 40.2 million SWU. During the 2011 to 2020 time period, as described in Section 1.1.2.4 of the ER, ERI forecasted that the small excess supply that previously existed would become even smaller, with available annual supply averaging 41.9 million SWU, and annual requirements averaging 41.5 million SWU. Schwartz/Krich Direct A.50, Tr. 1457-58.

20. ERI assumed that all presently planned and announced uranium enrichment facilities, including the NEF and ACP, commence operations on schedule. If this does not occur, or if requirements increase, then there will be a supply deficit. Schwartz/Krich Direct A.50, Tr. 1458. The expansion of existing enrichment plants, and the addition of new enrichment facilities such as the NEF, will compensate for the shut down of the Paducah gaseous

diffusion plant in the U.S. and the George Besse gaseous diffusion plant in France. Schwartz/Krich Direct A.52, Tr. 1459.

21. Several examples of other comparable evaluations are cited in Section 1.1.2.3 of the ER. They include Grigoriev, 2002 - Techsnabexport, "Techsnabexport-Russian Enrichment Overview", presented at Nuclear Energy Institute International Uranium Fuel Seminar 2002, October 1, 2002; NEIN 2003 - "The Race is On," *Nuclear Engineering International*, September 2003; NMR, 2002b - "The Future of SWU", *Nukem Market Report*, July 2002; and Van Namen 2000 - USEC Inc., "The Nuclear Fuel Industry," presented at The Uranium Institute 25th Annual Seminar, September 2000. In addition, the results of a more recent evaluation of the enrichment industry entitled "Facing New Challenges", by J. Combs, Ux Consulting, was published in the September 2004 issue of *Nuclear Engineering International*, LES Exhibit 60, and a paper entitled "Legacies Shaping the Future: Uranium Production, Inventories & Prices - 1947-2004", by T. Neff, MIT, LES Exhibit 61, was presented at the Nuclear Energy Institute International Uranium Fuel Seminar 2004, in October 2004. Both of these evaluations arrive at the same conclusion regarding the adequacy of current and potential future world and U.S. supplies of enrichment services; *i.e.*, there is a need for additional enrichment supply. Schwartz/Krich Direct A.51, Tr. 145859.

22. Overall, ERI's forecast indicates that enrichment services requirements and supply will remain in very close balance after 2010, even with projected new capacity. This is illustrated by Figure 1.1-7 in the ER — which presents a graphic comparison of ERI's forecast of world enrichment services requirements and ERI's forecast of the world supply of enrichment services. LES Exhibit 30. It is very clear from this figure, which is based on ERI's comprehensive, quantitative assessment of future enrichment services requirements and supplies,

that, absent construction of the NEF (and USEC's and Eurodif's proposed centrifuge facilities), there is likely to be a shortage of enrichment capacity after 2010. Indeed, new facilities will be needed in large part simply to replace existing enrichment capacity that will be lost due to the planned shutdowns of USEC's Paducah and Eurodif's Georges Besse gaseous diffusion plants in the near future. Schwartz/Krich Direct A.52, Tr. 1459.

23. ERI also considered a number of scenarios that represent potential alternatives to construction and operation of the NEF. The "baseline" scenario ("Scenario A") (in which ERI assumes the construction of both the NEF and USEC's ACP), is the "best estimate" case. Tr. 1512. In the other cases it was postulated that LES does not proceed with construction and operation of the NEF. ERI also concluded that Scenario A is the optimal scenario in that it serves the interest in an additional domestic source of enrichment services. In contrast, the other scenarios considered by ERI are deficient, or at least much less desirable from a fuel procurement perspective, in that they: (1) rely either in part or entirely upon the long-term use of the Paducah gaseous diffusion plant; (2) require continued reliance on USEC as the single domestic provider of enrichment services; (3) require increased reliance on foreign sources of enrichment services (*e.g.*, additional Russian HEU-derived SWU, additional Russian commercial enrichment services, European suppliers); and/or (4) require reliance on largely speculative sources of enrichment services (*e.g.*, additional Russian HEU-derived SWU, additional Russian commercial enrichment services, additional U.S. HEU-derived SWU). Schwartz/Krich Direct A.54, Tr. 1461-62.

24. NIRS/PC questioned Mr. Schwartz regarding his assumptions, such as the capacity assumed for the ACP. Mr. Schwartz indicated, reasonably, that ERI utilized USEC's

stated capacity for the plant. Tr. 1507. In addition, one of the scenarios specifically considered by ERI (Scenario C) involved expanding the USEC centrifuge capacity. Tr. 1511.

25. Mr. Schwartz also testified to the soundness of the assumption that the Paducah gaseous diffusion plant would be replaced, and no meaningful challenge was made to this conclusion. Tr. 1517. It is not a decision that Mr. Schwartz expects will be reconsidered based on the market price of SWU. Tr. 1520-23. Rather, it reflects a worldwide evolution in which old gaseous diffusion plants have been, or are being, shut down and replaced with centrifuge enrichment plants. Tr. 1517.

26. If ERI were to update the market analysis contained in the ER, it would increase the forecast of world enrichment requirements by an average of at least 4 million SWU per year (or approximately 10%). This is a significant increase in world requirements for enrichment services, and further supports the LES conclusion on the "need" for the NEF as a source of supply. Schwartz/Krich Direct A.57, Tr. 1465. Three factors lead to this conclusion.

27. First, since late 2003, uranium prices have increased by about 70%, which has caused purchasers to order enrichment services based upon lower tails assays to reduce their overall cost for enriched uranium product. LES Exhibit 62. That is, purchasers are able to obtain the same amount of enriched uranium product to fuel their nuclear power plants, yet use less uranium in the process. To accomplish this, however, they must purchase more enrichment services from suppliers. Taking into account current trends, ERI would expect the selection of lower tails assays to increase average world requirements for uranium enrichment services by at least 2 million SWU per year during the 2011 to 2020 period relative to the forecast that appears in the ER. Schwartz/Krich Direct A.57, Tr. 1464-65.

28. Second, ERI now expects that installed nuclear generating capacity during the 2011 to 2020 time period will be higher than that forecasted in the ER, in view of recent developments related to license renewal, power uprates, and new construction. The increase in installed nuclear generating capacity is expected to increase world enrichment services requirements by roughly 1.5 million SWU during this time period. Schwartz/Krich Direct A.57, Tr. 1465.

29. Third, based on updated reports of nuclear power plant operating performance, ERI now expects that changes in other factors such as nuclear power plant operating capacity factors during the 2011 to 2020 period would add at least 0.5 million SWU per year to average world enrichment services requirements. Schwartz/Krich Direct A.57, Tr. 1465.

30. NIRS/PC raised the possibility of increases in the supply of Russian enrichment services, such as by increased or extended use of downblended HEU. Tr. 1505-07. However, at this point this scenario is speculative at best. Even the NIRS/PC witness could not state that continuation of the current Russian HEU agreement beyond 2013 is a certainty. Tr. 1663. Further, Mr. Schwartz testified that evidence supports a conclusion that the Russians need to utilize any enrichment capacity they have for their own use and therefore such capacity would not be likely to enter the market. Tr. 1535-37

31. The NRC Staff witness testified that the ER (referencing the ERI study) is a reasonable projection of future supply and demand for enrichment services based on current indicators. Further, the Staff witness explained that, due to the combination of the conservative demand forecast in that study and the risk of a Russian HEU supply reduction after 2013, there

could actually be a global supply shortfall after 2010 *even with the NEF.* Nevin Direct A.12, Tr. 1545-46 (emphasis added).

32. The NRC Staff also included an independent assessment in the DEIS. The DEIS especially highlights the shortfall of domestic supply of enrichment services relative to domestic demand, and the need for additional domestic supply to ensure national energy security. Nevin Direct A.18, Tr. 1548. The Staff indicates in the DEIS that the U.S. domestic market would be especially vulnerable to any unforeseen global supply shortfall. Staff Exhibit 1, at 1-4.

33. NIRS/PC did not present any meaningful challenge to either the ERI or Staff evaluations of the supply and demand for enrichment services. NIRS/PC did not present any detailed independent analysis or data.

34. First, Dr. Sheehan made a cryptic argument that "LEU is the relevant product," not SWU. Sheehan Direct A.12, Tr. 1585-86. Mr. Schwartz explained, however, that "enrichment services" is indeed the relevant product that is marketed and supplied as a discrete component of the nuclear fuel cycle. Schwartz Rebuttal A.3, Tr. 1479. Accordingly, a market analysis of the enrichment services component is appropriate.

35. Second, Dr. Sheehan attempted to show that the growth rate for annual enrichment requirements is flat, or slightly negative by 2016 – 2020. Sheehan Direct A.16, Tr. 1588. He also projects a small decrease in supply capability by 2016, considering projections for USEC supply. Sheehan Direct A.14, Tr. 1587. Without accepting his data (which are far less detailed than those presented in the ER), Dr. Sheehan offers no explanation of how a flat domestic demand combined with a forecasted decline in supply supports a conclusion that the

NEF is not needed, or that the NEF will not provide a diverse, competitive supply of enrichment services. Nevin Rebuttal A.6, Tr. 1559.

36. The forecasts in Dr. Sheehan's testimony actually support the conclusion in the ER that the combined capability of the NEF (3 million SWU per year) and USEC ACP (3.5 million SWU per year) are needed to replace the enrichment services from the Paducah gaseous diffusion plant (6.5 SWU per year) presently slated for closure. Nevin Rebuttal A.6, Tr. 1559-1560.

37. In total, contrary to the assertion in Basis A, LES did not "erroneously assume" that there is a shortage of enrichment capacity. Rather, by detailed analysis, which was not effectively contradicted by NIRS/PC, LES demonstrated that enrichment capacity and demand is such that there is a need for the NEF and a place in the market for production from that facility.

D. LES Analysis of Global and U.S. "Need" for Enrichment Capacity (Basis B)

38. As discussed above, the ERI market analysis to which NIRS/PC allude in Basis B is a secondary component of LES's "statement of need" for the NEF. As such, the "need" for the enriched uranium or "special nuclear material" to be provided by the NEF does not rest solely on the "projections" contained in the ERI market analysis. Furthermore, the market analysis is consistent with the guidance set forth in NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility" (March 2000), which specifically seeks information about:

> (i) the quantities of SNM [special nuclear material] used for domestic benefit, (ii) a projection of *domestic and foreign* requirements for the services, and (iii) *alternative sources of supply* for the facility's proposed services. (Emphasis added.)

Schwartz/Krich Direct A.59, Tr. 1466.

39. The ERI market analysis presented in the ER contains, among other things, the following information: (1) the quantities of enrichment services used for domestic benefit (*see, e.g.*, Sections 1.1.2.2, Table 1.1-3, Figure 1.1-5); (2) domestic and foreign requirements for enrichment services (*see, e.g.*, Sections 1.1.2.2, Table 1.1-3, Figure 1.1-4); and (3) potential alternative sources of supply for a proposed facility's services (*see, e.g.*, Sections 1.1.2.3 to 1.1.2.5, Table 1.1-5). Schwartz/Krich Direct A.59, Tr. 1466.

40. In particular, ERI prepared forecasts of installed nuclear power generating capacity *by country*, and grouped those countries into five world regions. One of those world regions is the *United States*. ERI prepared its forecast of uranium enrichment services requirements, in turn, in a manner consistent with the nuclear generation capacity forecasts, *i.e.*, by "world region." In other words, ERI prepared a forecast of uranium enrichment services requirements specifically for the United States (*i.e.*, per NUREG-1520, ERI considered the quantity of enriched uranium presently used for "domestic benefit" and the quantities likely to be required in the future), and forecasts for other countries. Therefore, in its market analysis, ERI took into account both U.S. and foreign requirements and sources of supply. Schwartz/Krich Direct A.59, Tr. 1466-67.

41. The evidence also supports the conclusion that the enrichment services market is, in fact, a *global* one. That is, U.S. purchasers presently purchase enrichment services or enriched uranium from domestic (*i.e.*, USEC) and foreign suppliers (*e.g.*, Urenco, Eurodif, etc.), and the majority of U.S.-purchased enrichment services are of foreign origin. Conversely, USEC, the sole domestic provider of enrichment services, exports much of its ongoing Paducah plant production to Far East countries. Schwartz/Krich Direct A.59, Tr. 1467.

42. The NRC Staff witness observed that an exclusive focus on domestic supply and demand projections would support the need for the NEF. However, the global supply and demand projections in the ER – showing the close balance in supply and demand after 2010 – provide important context in the global marketplace. Nevin Direct A.18, Tr. 1548.

E. LES Ability to Enter Market (Basis C)

43. LES has shown its ability to "enter the market" and provide a "public benefit" based on the substantial contracts and imminent commitments for uranium enrichment services discussed above. LES has, in effect, already entered the market in the face of existing and anticipated competition. According to Mr. Schnoebelen, LES has commitments to deliver "a far greater quantity of enrichment in the next decade and beyond than any other western enrichment company." Schnoebelen Direct A.9, Tr. 1392.

44. Only two of LES's contracts/commitments are with LES partners. Schnoebelen Direct A.10, Tr. 1393.

45. With one exception, the executed contracts are "take-or-pay" contracts. That is, the contracts require the customers to pay for the enrichment services that are under contract, whether or not those customers take possession of enriched uranium produced by the NEF. Schnoebelen Direct A.14, Tr. 1396. If, for example, customers are unable to accept services, LES would be allowed to invoice the customers. Tr. 1414-1416.

46. The one exception is a "requirements" contract that LES has executed with a utility for the licensed lives of that utility's reactors. Under this executed agreement. the NEF will supply 100% of the enrichment requirements for the licensed operation lives of the units. Schnoebelen Direct A.15, Tr. 1397.

47. The contracts have very limited termination rights. The contracts are null and void if (1) LES does not receive a license from the NRC to construct and operate the plant,

or (2) LES decides, as a business matter, not to build the NEF. Schnoebelen Direct A.14, Tr. 1396. Obviously, if there is no facility, then there can be no performance. Tr. 1411. NIRS/PC questioned whether LES could simply substitute enrichment services from other facilities. The LES witness testified that LES could not meet the commitments from other sources because supply of the magnitude required would not be available. Tr. 1409-10.

48. The NRC Staff witness concurred that the contracts and commitments LES has obtained demonstrate LES's ability to enter the market. Nevin Direct A.21, Tr. 1550. The Staff witness also pointed out that the industry experience of LES's partners enhances LES's ability to enter the market. Nevin Direct A.19, Tr. 1549. Specifically, Urenco operates enrichment facilities in Europe and LES's partners operate domestic nuclear reactors. LES, therefore, has the technical and industry expertise to finance, build, and operate an enrichment facility, and the market knowledge to sell its product. Nevin Direct A.21, Tr. 1550.

49. In sum, the weight of the expert testimony supports the conclusion that LES has adequately demonstrated the "need" for the proposed NEF. In this regard, LES has met its burden with respect to each basis of the contention. Specifically, LES has provided a comprehensive global market analysis of enrichment services supply and demand that takes into account both domestic and foreign enrichment services requirements and considers alternative sources of supply. LES has demonstrated its ability to enter the market by executing numerous contracts with utility customers that account for a substantial portion of the NEF's first ten years of production capacity. Insofar as roughly 20 percent of the nation's electricity is derived from nuclear power plants, the ability of the NEF to provide such plants with enrichment services constitutes an obvious public benefit.

III. CONCLUSIONS OF LAW

1. Based upon the complete evidentiary record and the findings of fact set forth above, Environmental Contentions NIRS/PC EC-1, EC-2, EC-4, and EC-7 should be resolved on the merits in favor of the applicant, Louisiana Energy Services, L.P. (supported by the NRC Staff), and against the intervenors, Nuclear Information and Resource Service and Public Citizen. LES and the NRC Staff have met their respective burdens under NEPA and 10 C.F.R. Part 51.

2. With respect to the issues raised in Contention NIRS/PC EC-1, LES and the NRC Staff have specifically shown by a preponderance of the credible evidence that they have adequately considered the potential environmental impacts of the proposed facility on groundwater during construction and operation of the proposed NEF.

3. With respect to the issues raised in Contention NIRS/PC EC-2, LES and the NRC Staff have specifically shown by a preponderance of the credible evidence that they have adequately considered the potential impacts of the proposed facility on water supplies in the site vicinity, *i.e.*, the Hobbs well field and the Lea County Underground Water Basin.

4. With respect to the issues raised in Contention NIRS/PC EC-4, LES and the NRC Staff have specifically shown by a preponderance of the credible evidence that they have adequately considered the potential environmental impacts of the possible construction and operation of a commercial facility for deconverting DUF_6 from the proposed NEF to DU_3O_8.

5. With respect to the issues raised in Contention NIRS/PC EC-7, LES and the NRC Staff have specifically shown by a preponderance of the credible evidence that they have adequately considered the need for the proposed facility as it relates to NEPA.

6. All issues, arguments, testimony, or exhibits presented by NIRS/PC but not addressed herein should be found to be without merit or unnecessary for issuance of a Partial Initial Decision on Contentions NIRS/PC EC-1, EC-2, EC-4, and EC-7.

7. In accordance with 10 C.F.R. §§ 2.340 and 2.713, the Licensing Board's Partial Initial Decision should be effective immediately and should constitute final action of the NRC within forty (40) days of the date of issuance unless a petition for review is filed in accordance with 10 C.F.R. § 2.341(b) or the Commission directs otherwise. Any petition for review must be filed within fifteen (15) days after service of the Partial Initial Decision and shall conform with the requirements of 10 C.F.R. §§ 2.341(b)(2) and must be based on the grounds specified in 10 C.F.R. § 2.341(b)(4). In accordance with 10 C.F.R. § 2.341(b)(1), a petition for review is mandatory in order for a party to have exhausted its administrative remedies before seeking judicial review.

Respectfully submitted,

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Dated at Washington, District of Columbia
this 14th day of March 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket No. 70-3103-ML
	)	
Louisiana Energy Services, L.P.	)	ASLBP No. 04-826-01-ML
	)	
(National Enrichment Facility)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the "LOUISIANA ENERGY SERVICES, L.P.'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW ON ENVIRONMENTAL CONTENTIONS" in the captioned proceeding have been served on the following by e-mail service, designated by **, on March 14, 2005 as shown below. Additional service has been made by deposit in the United States mail, first class, this 14th day of March 2005.

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