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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

In the Matter of

Louisiana Energy Services, L.P.
National Enrichment Facility

Docket No. 70-3103

ASLBP No. 04-826-01-ML

REPLY
PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW BASED UPON EVIDENTIARY HEARING HELD ON FEBRUARY 7 THROUGH 10, 2005 SUBMITTED ON BEHALF OF INTERVENORS NUCLEAR INFORMATION AND RESOURCE SERVICE AND PUBLIC CITIZEN

Preliminary statement

The following Reply Proposed Findings of Fact and Conclusions of Law are submitted on behalf of Nuclear Information and Resource Service and Public Citizen, Intervenors herein ("NIRS/PC"), pursuant to the orders of the Atomic Safety and Licensing Board (the "Board") dated August 16, 2004 and February 14, 2005.

On issues of compliance with the National Environmental Policy Act, 42 U.S.C. 4332 et seq. ("NEPA"), the Applicant, Louisiana Energy Services, L.P. ("LES") and the Staff of the Nuclear Regulatory Commission ("Commission Staff") have the burden of demonstrating compliance with applicable law and regulations. Thus, the "Staff bears the ultimate burden to demonstrate its compliance with NEPA." *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant), 53 NRC 239, 249, LBP-01-9 (March 1, 2001); *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 89 (1998); 10 CFR 2.325.

Evidence is lacking on several points necessary to carry that burden, as NIRS/PC demonstrate herein. On certain questions there has been a complete failure of supporting data for

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expert opinions advanced by Commission Staff and LES. On some issues Staff has improperly sought to employ environmental impact statements ("EISs") issued by the U. S. Department of Energy ("DOE") to meet the Commission's NEPA burden, where such reliance is not permitted by applicable regulations of the Commission. On other issues the Commission Staff and LES have declined to introduce into evidence the materials on which their expert witnesses rely, contrary to the decisions of this Board.

NIRS/PC submit that, in addition to the findings and conclusions proffered in the proposed findings and conclusions of law submitted by NIRS/PC on March 14, 2005, the following findings of fact and conclusions of law should be made by the Board:

a. Proposed Findings of Fact concerning NIRS/PC Contention EC-1:

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.

A. Basis: In this situation, the ER has several serious shortcomings: The ER fails to demonstrate that there has been any evaluation of the fate of waste waters and runoff that enter the subsurface at the NEF. To determine where this water will go, LES should answer the following questions:

a. How much water would infiltrate into the alluvium from:

- The treated effluent basin?
- The UBC storage pad and cooling tower blowdown basin?
- The stormwater basin?
- The septic leach field?

(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.

1. LES and Commission Staff argue that leakage from the lined basins (TEEB, UBCSPSRB) can be "minimize[d]" by precautions in installation and

maintenance. (LES FF EC-1, 31; NRC Staff FF 4.32[1]). However, the prospect of leakage cannot be ignored. Witnesses for NIRS/PC and LES agreed that lined basins do, from time to time, leak. (Rice, Tr. 786-87; Harper dep., NIRS/PC Ex. 17 at 117-18) (See also EPA, NIRS/PC Ex. 10 at 34; Yadzani, NIRS/PC Ex. 49 at 1; Murphy & Garwell, NIRS/PC Ex. 34 at xii; Reddy & Botul, NIRS/PC Ex. 45 at 19, 25, 108; Laine & Miklas, LES Ex. 72 at 36). The Laine and Miklas report found defects in 58 of the 61 facilities examined and an average density of leaks of 13 per acre. (LES Ex. 72 at 39, 36). In the face of such data, the Board cannot accept the assertion that the potential for leakage "does not present a significant environmental concern." (LES FF EC-1, 26; see also 23).

2. Commission Staff argue that "there is no way to predict the probability, frequency, or rate of leakage" from the lined basins, because the Laine and Miklas study did not identify a relationship between leaks, leak occurrence, and types of leaks beneath soil covers. (LES Ex. 72 at 39; NRC Staff FF 4.31). But that report does not state, as Commission Staff suggest, that data cannot be found to project the frequency of such leaks. Laine and Miklas show that leaks are common. EPA documents, cited by NIRS/PC, show that estimates of leakage from geomembrane-lined facilities are routinely performed. Mr. Rice testified:

> "Q33. On page 13 of its testimony, NRC states that an attempt to estimate leakage rates from the lined basins ' ... would have little or no meaning, and in fact could be very misleading.' Do you agree?
>
> A33. No. Estimates of leakage rates from lined facilities such as basins and landfills are routinely performed. The EPA has developed computerized models to estimate these rates (e.g., HELP, EPACMTP, NIRS/PC Exhibits 10 and 12). LES/NRC should be required to estimate leakage rates from the lined basins." (Tr. 822).

[1] References to proposed findings of fact submitted by LES on March 14, 2005 are in the form "LES FF EC-1", "LES FF EC-2", etc., followed by the paragraph number. References to proposed findings of fact submitted by the Commission Staff on March 14, 2005 are in the form "NRC Staff FF" followed by the paragraph number.

EPA's model EPACMTP incorporates a methodology for estimating leakage rates from composite-lined (geomembrane/clay) surface impoundments ("SIs") (NIRS/PC Ex. 12 at A-4). The model uses leak distribution densities based on data from existing impoundments:

> "For unlined and single-lined SIs, infiltration through the bottom of the impoundment is calculated internally by EPACMTP, as described in Section 4.3.4 of this document. For composite-lined SIs, we used the Bonaparte (1989) equation to calculate the infiltration rate assuming circular (pin-hole) leaks with a uniform leak size of 6 mm^2, and using the distribution of leak densities (number of leaks per hectare) assembled from the survey of composite-lined units (TetraTech, 2001). (NIRS/PC Ex. 12 at A-1)."

Thus, valid estimates of leakage rates have been developed.

3. Neither LES nor Commission Staff have estimated the amount of wastewater that will leak from the lined basins, even though lined basins frequently leak (NRC Staff FF 4.31; Rice, Tr. 786-87), and estimates of leakage rates from lined facilities are routinely performed (Rice, Tr. 822).
4. It is asserted that the clay liner material will absorb any uranium present in the basin liquids (LES FF EC-1, 38; NRC Staff FF 4.33), but there has been no demonstration of the effectiveness of such absorption. (Toblin, Tr. 720). Mr. Toblin said that the retardation coefficient of the clay would vary depending on the oxidation state of the uranium or its complexation. (Tr. 720). His statement that uranium tends to absorb onto clay was made "off the top of my head." (Tr. 721). The Board cannot rely upon such assumptions.
5. LES claims that water balances in the lined basins could be "mostly dry for a significant portion of the year, depending on annual precipitation rates." (LES FF EC-1, 39). Commission Staff state that the UBCSPSRB will remain dry for 2 to

12 months of the year, depending on precipitation rates. (NRC Staff FF 4.30).

However, the water balance analysis actually states:

> "The results for the TEEB show that basin outflow due to evaporation will exceed all inflows on a monthly basis for the minimum discharge scenario with the exception of the winter months. Under the maximum discharge scenario, the basin would have standing water in it for most of the year.
>
> The results for the UBC Storage Pad Stormwater Retention Basin show that basin outflow due to evaporation will exceed all inflows on a monthly basis under the minimum discharge scenario. Under the maximum discharge scenario, the basin would have standing water for ten months of the year." (LES Ex. 9 at 12).

Thus, whether the basin will be "mostly dry" or have standing water most of the time depends entirely on the rainfall in a given year. It cannot be assumed that the "minimum discharge scenario" will prevail.

h. In addition, LES does not intend to investigate the Santa Rosa Aquifer at the proposed NEF site (ER 3.4-13). LES plans to install only two monitor wells (ER 6.1-7 and figure 6.1-2). Presumably, these wells will be completed in the alluvium. This does not appear to be adequate. There will be at least four potential sources of groundwater contamination at the site (three evaporation basins and the septic leach field). At least one well should be up gradient of the site (background).

i. Further, the detection limit for most metals in groundwater will be 5 ppm (ER table 6.2-1). This is much higher than the health-based standards established for many metals (e.g., arsenic = 0.05 ppm, chromium = 0.1 ppm). [40 CFR sec. 141.11, 141.62] The detection limits for each metal should be no higher than the health-based standard.

j. Also, the full composition of the UF_6 feedstock has not been specified (ER at 1.2-2). LES should identify the other hazardous materials that may be contained in the feedstock (e.g., metals).

(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.

6. LES says that the discharge from the SSDB and the septic system could not contain contaminants of concern to users of ground water. (LES FF EC-1, 21-23). Such assertion is not supported by any data or analysis. (Rice, Tr. 811-12). Mr. Rice has pointed out that the water discharged to the stormwater runoff basin may contain a variety of contaminants. (Tr. 789-90). Commission Staff state that not all of the contaminants that one might expect at the NEF are specifically listed in the DEIS, but only the general categories. (Toblin, Tr. 673; NRC Staff Ex. 1B, Table 6-9).
7. Commission Staff also concede that monitoring of the contents of the SSDB would not include PAHs, aliphatic hydrocarbons, or alcohols. (Tr. 675-76) (NRC Staff FF 4.63). It is not correct, as LES and Commission Staff assert (LES FF EC-1, 85; NRC Staff FF 4.63), that organic contaminants would be detected by the analyses listed in the DEIS. The listed analyses are not capable of detecting many of the likely organic contaminants. In addition, the health-based standards (MCLs) for some of the organic contaminants are much lower than the detection limits in the DEIS. (Rice, Tr. 825-26).
8. There is no reason to expect that contaminants from the SSDB would not contaminate moisture reaching the alluvial/Chinle contact. (Rice, Tr. 812; Barrett, NIRS/PC Ex. 2 at 44). Whether, and to what extent, overlying alluvium could remove some contaminants is not known; such supposed capacity has not been investigated. (Rice, Tr. 812).
9. Likewise, LES asserts that releases to the TEEB and the contents of the UBCSPSRB will be sampled and, if release limits are complied with, should not present a risk. (LES FF EC-1, 33, 34). However, sampling simply detects

potential exceedences; it does not ensure against them. It is not possible to determine whether limits are exceeded until samples are taken and analyzed. (Rice, Tr. 811). Thus, to contend, as LES does, that within applicable release limits, the TEEB discharges should be limited to 390 microcuries per year (LES FF EC-1, 34) is to assume perfect compliance with such discharge limits—an unsupported assumption.

10. LES similarly claims that it has calculated that runoff from the UBC Storage Pad will not exceed regulatory limits (LES FF EC-1, 37). However, LES has not put in evidence the claimed calculations, so that the bases and assumptions may be tested. The Board should not entertain claims about expert conclusions where the experts do not introduce the documentation that they rely upon. The Board has required such evidence. (Memorandum and Order (Regarding NIRS/PC Prefiled Testimony and Exhibits) at 1-2, Jan. 18, 2005).

11. The claim is also made that any releases from the TEEB or the UBCSPSRB will be identified by LES's monitoring wells. (LES FF EC-1, 41). However, the monitoring wells will not identify contaminants at the point of contact between the alluvium and the Chinle Formation—a likely location for perched water. (Tr. 616-17, 814). Additional alluvial monitoring wells may be needed. (NIRS/PC Ex. 35 at 4, 5).

A. Basis: In this situation, the ER has several serious shortcomings: The ER fails to demonstrate that there has been any evaluation of the fate of waste waters and runoff that enter the subsurface at the NEF. To determine where this water will go, LES should answer the following questions:

b. Where would water flowing along the alluvial/Chinle contact be discharged?

c. How long would it take for water from the NEF to reach the discharge area?

d. Are there subsurface fractures or other fast pathways that would allow water to flow rapidly from the alluvium to the Chinle, or from the Chinle to the Santa Rosa?

f. LES has also failed to adequately address whether groundwater exists in the alluvium at the proposed NEF site. LES has installed three Chinle monitor wells (ER 3.2-17) and drilled 14 borings at the site (ER 3.2-20). LES has provided logs for five borings (ER figures 3.2-10 – 3.2-14), but not for the other nine borings or the monitor wells. LES should provide all logs and descriptions of subsurface materials so that its claim that there is no groundwater in the alluvium (ER 3.4-5) can be thoroughly evaluated. The five logs that were provided indicate that the borings were backfilled on the same day they were drilled (ER figures 3.2-10 – 3.2-14). Thus, LES may not have allowed sufficient time for water to enter the borings. Water levels in the alluvial groundwater system at the WCS site are known to recover slowly (ER 3.2-15). Further, the clay at the bottom of boring B-2 was described as "moist" (ER figure 3.2-11). This could be due to the presence of water in the alluvium. In addition, groundwater is known to exist in the alluvium at three places near the NEF site: 1) about ½ mile north at the Wallach sand and gravel quarry (ER 3.4-2), 2) about ½ mile northeast at Baker Spring (ER 3.4-2 and 3.4-3), and 3) about 2/3 mile east at the WCS site (ER 3.4-3 and 3.4-4). In this situation, the ER should also have addressed questions such as: What are the sources (recharge points) of groundwater in the Chinle and Santa Rosa? How will LES distinguish between groundwater contamination caused by the NEF and contamination caused by other potential sources (e.g., Wallach quarry, WCS site, Lea County Landfill)?

12. LES and Commission Staff seek to minimize the lack of information about the NEF site. (LES FF EC-1, 7-8, 13; NRC Staff FF 4.37, 4.52). It is clear, however, that the extent of the 230' zone beneath the NEF site is not known; it was only encountered in one of the three monitoring wells installed by LES (Rice, Tr. 804). Moreover, the 230' wells are the deepest borings on the NEF site, and there is no site-specific information on deeper subsurface geology and water-bearing units. (id.). LES and Commission Staff emphasize the exploration conducted at the WCS site and the Lea County Landfill, claiming that the sites are similar to the NEF site. However, site-specific information is necessary to calculate the performance of the NEF site. (Rice, Tr. 804).

13. When convenient, LES and Commission Staff claim that the NEF site differs from nearby areas. For instance, surface depressions form ponds on the WCS site, which give rise to localized perched water systems (Peery, Tr. 407, 514; LES

Ex. 3, Tab O, at 4-18, 4-19; Toblin, Tr. 735-36), and LES originally claimed that such would not occur at the NEF site. (ER, LES Ex. 1 at 3.4-15). However, at the hearing LES's expert, Mr. Peery, admitted that similar perched water bodies would form beneath basins on the NEF site, if water leaks downward. (Peery, Tr. 518-20; 530-32).

14. Moreover, the exploration by Holt at the WCS site disclosed that in 16 of 25 borings moisture was found at the point where the alluvium contacts the Chinle Formation. (Rice, Tr. 823; LES Ex. 3, Tab G, boreholes B-23, B-37, B-18, B-33, B-13, B-27, B-46, B-36, B-44, B-19, B-25, B-35, B-20, B-45, B-51, B-52). Similar behavior could be expected at the NEF site.

15. LES asserts that there are no present users of ground water in the direction toward which perched ground water would flow (LES FF EC-1, 19), but Mr. Peery, LES's expert, said that wells that pumped ground water from the alluvium at Monument Draw are downgradient "approximately where a theoretical plume would arrive." (Tr. 634). Groundwater in the alluvium along Monument Draw has been used as a source of domestic supply (Rice, Tr. 774). This source is within two miles of the proposed site (NIRS/PC Exhibit 37, plate 2).

16. LES and Commission Staff assert broadly that there is no need to assess the hydrologic characteristics of the alluvium, which has not been investigated as to, e.g., its permeability or hydraulic conductivity. (LES FF EC-1, 43-44; NRC Staff FF 4.44; Tr. 555-56; NIRC/PC Ex. 17 at 54). LES and Commission Staff state that recharge does not occur to the alluvium. (LES FF EC-1, 45; NRC Staff FF 4.43). However, it is known that water penetrates the alluvium and has been found in perched zones at several locations on the WCS site. (ER, LES Ex. 1 at

3.4-15; DEIS, NRC Staff Ex. 1A, at 3-35). Boreholes B-2 and B-9 on the NEF site identified moisture in the alluvium. (Rice, Tr. 775; LES Ex. 1 at 3.4-2; LES Ex. 3, Tab L, boring no. B-9). LES and Commission Staff have not explained why episodic recharge should not be expected to take place on the NEF site. Mr. Rice offered this as the most logical explanation, and his testimony has not been rebutted. (Tr.776, 822-23). LES's interrogatory answers stated ambiguously that the moisture in boreholes at the NEF site was "water trapped in the vadose zone." (NIRS/PC Ex. 30 at 8, response 7). Later, LES agreed that the moisture is episodic infiltration, stating that it is "likely infiltrated precipitation that had yet to evapotranspire (since CJI locates drilling locations in low spots rather than high spots, i.e., at top of a dune, rainfall may preferentially collect and infiltrate into the ground and then become available for evapotranspiration)." (Tr. 405; see also Tr. 809). Mr. Toblin stated that he was "not shocked" to see water at the depths at which it was found. (Tr. 729).

17. It is not decisive that the observed moisture does not constitute "saturation." (LES FF EC-1, 45-49). NIRS/PC have not claimed otherwise. (Rice, Tr. 810, note). Episodic recharge may be interspersed with periods of dry conditions. (Rice, Tr. 778 note 42; NIRS/PC Ex. 7). There is no reason not to expect recharge in the future. (Rice, Tr. 776).

18. The hydraulic properties of the alluvium, starting with its hydraulic conductivity, must be known to estimate the rate at which wastewaters from the NEF would flow along the alluvial/Chinle contact (Rice, Tr. 775).

19. Commission Staff point out that Mr. Toblin testified that precipitation recharge must be evidenced over a wide area in multiple borings. (NRC Staff FF 4.41).

However, Mr. Peery observed such a "repeated pattern" of moisture in the alluvium (Tr. 544). Moreover, the notion that evidence of precipitation recharge would be present throughout the site is incorrect. (LES FF EC-1, 51; NRC Staff FF 4.41). Both NIRS/PC (Rice, Tr. 776) and LES (Harper, Peery, Tr. 405; see also Rice, Tr. 809-10) have stated that precipitation can infiltrate along preferred pathways.

(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.

20. LES contends that any water infiltrating from the SSDB or the septic system would be lost due to evapotranspiration. (LES FF EC-1, 22-23). Commission Staff assert that field investigation and computer modeling show that no precipitation recharge occurs at sites with thick vadose zones, such as the proposed NEF. (NRC Staff FF 4.36). No data have been presented to support these theoretical contentions. No analyses have been presented to show the amount of water that would be lost by evapotranspiration or other processes. (Rice, Tr. 806).

21. LES and Commission Staff repeat the unproved assertion that the process modeled by Walvoord, et al. (LES Ex. 5), will occur at the NEF site. (LES FF EC-1, 49; NRC Staff FF 4.36). The Walvoord paper concerns thick desert soils generally; it is not based on studies near the NEF site. (Peery, Tr. 522-23). The model does not incorporate fractures, macropores, or preferential flow paths. (LES Ex. 5 at 44-5). There are no site-specific data showing that the general model of the Walvoord paper applies to the NEF site. (Rice, Tr. 811; Peery, Tr.

522-23).

22. Further, at the NEF site (Toblin, Tr. 725-26) and at the nearby WCS site (see paragraph 14, above), moisture has been found at the contact between the alluvium and the Chinle Formation—moisture that cannot be explained by the model of Walvoord, et al. That model cannot be reconciled with the data about the NEF site.

23. LES contends that the movement of the water located in the vadose zone at the NEF is "dominated largely by an upward hydraulic potential gradient." (LES FF EC-1, 49). Such assertion has no data to support it. Indeed, as to the moisture in borehole B-9, found in the vadose zone at 6 to 14 feet (Tr. 775, LES Ex. 1 at 3.4-2), neither Mr. Peery nor Mr. Toblin could say whether it was moving upward or downward. (Tr. 510-12; 723-24). Notably, moisture in borehole B-2 was found at the base of the alluvium. (Rice, Tr. 775; LES Ex. 3, Tab L, soil test boring record, B-2, at 35 feet).

24. LES asks the Board to find that moisture found by Holt at the WCS site does not represent recharge, claiming that such moisture was slight and in several instances occurred near the 220 foot groundwater zone. (LES FF EC-1, 53). However, LES's own witness, Mr. Peery, noted the "repeated pattern that we described on the first couple of logs, where there is a mention of moisture at the alluvial contact, the triassic red beds." (Tr. 544).

(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.

25. LES and Commission Staff assert that the Board may not look into deficiencies in

the Commission Staff's analyses in the DEIS of plumes emerging from the unlined SSDB and the septic system. (LES FF EC-1, 15-20; NRC Staff FF 4.24). However, the Board overruled this objection at the hearing, stating: "Well, frankly, counsel I would like to hear this information about how much gravel there is." (Tr. 704; see also Tr. 707-12).

26. Contrary to LES's assertion (LES FF EC-1, 20) and the repeated claims of Commission Staff (NRC Staff FF 4.17, 4.18, 4.19), the Commission Staff estimate of flow in the alluvium is not "conservative," because it does not account for the presence of gravel in the alluvium. Gravel channels are common in alluvial environments. (Rice, Tr. 818). NRC Staff's witness, Mr. Toblin, did not seek to defend the judgment that gravel is absent; instead, he fell back on the comment in a report that gravel is not "consistently present." (LES Ex. 3, Tab L, at 9) (Tr. 706-07, 710). However, gravel need not be "consistently present" to form a fast flow path. (Rice, Tr. 818). Mr. Toblin said that a gravel stream channel would be more permeable by one or two orders of magnitude than sand or silt. (Tr. 710-12).

g. There are other questions not adequately addressed in the ER which demand answers before the ER can be considered a complete and adequate assessment of potential impacts on groundwater. For example, there is a mystery as to the depth of the Santa Rosa Aquifer at the NEF site. LES states that the depth is 800 feet (SAR 1.3-9). This is contradicted by the statement that the top of the Permian is at a depth of 760 feet (ER 3.3-3). The Santa Rosa is above the Permian.[2] According to ER table 3.3-1, the top of the Santa Rosa is approximately 450 feet below land surface. There is a Dockum Group well approximately 3 miles from proposed NEF site (T22S, R38E Sec. 18, 234).[3] The water-bearing unit is at a depth of 325 feet. This may be the Santa Rosa Aquifer.

k. The permeabilities presented in ER table 3.3-2 of the Environmental Report may be derived from laboratory measurements. Laboratory measurements often underestimate the bulk

[2] Nicholson and Clebsch, 1961, table 3 (NIRS/PC Ex. 37).
[3] Nicholson and Clebsch, 1961, plate 2 (NIRS/PC Ex. 37).

permeability of a rock body because they do not account for fractures and other features that may act as fast flow paths.

(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.

27. Neither LES nor Commission Staff have performed an investigation to determine whether fractures capable of acting as fast flow paths exist at the NEF site (Rice, Tr. 824).

28. LES and Commission Staff ask the Board to find that no further study is needed of the Chinle Formation at the NEF site. They assert that permeability is sufficiently measured by a single in situ test and laboratory measurements and that there is no indication of fracture zones that could facilitate increased vertical flow. (LES FF EC-1, 65; NRC Staff FF 4.48). However, claims that the characteristics of the Chinle Formation are well enough known to exclude the possibility of fracture flow toward underlying aquifers are not well founded.

29. The difference in the measured heads of the aquifers located at approximately 220 feet, 600 feet, and 1115 feet does not establish that there is no connection between them. (contrary to proposed LES FF EC-1, 66; NRC Staff FF 4.46). Based on actual experience at Los Alamos National Laboratory, Mr. Rice testified that aquifers may have large differences in hydraulic heads, and yet water may flow between them. (Tr. 854-55). Such head differences do not indicate the absence of fractures. (Tr. 854-56). No witness contested such statements.

30. LES also argues that flow across the Chinle Formation is not demonstrated by

examples introduced by NIRS/PC. (LES FF EC-1, 75). While some such instances involve rock bodies not present at the NEF site, they demonstrate flow through or into (i.e., cross-formation) the Chinle Formation, which is part of the Dockum Group. Thus, Langman et al., NIRS/PC Ex. 23, refers to

> "leakage from the deeper, confined aquifer of the Chinle Formation" (at 32).

Dutton and Simpkins, LES Ex. 6, states that

> "[i]n the Pecos and Canadian River valley ground-water basin, ground water from the Ogallala Formation, Edwards/Trinity Groups, and Permian formations flows into the Dockum Group" (at 32).

And Mehta et al., NIRS/PC Ex. 33, refers to

> "present recharge to the lower Dockum aquifer . . . primarily through downward leakage from the Ogallala aquifer." (at 851).

Flow into and through the Chinle Formation is quite possible; that possibility should be investigated.

31. Vertical recharge from the overlying alluvium into the Chinle is certainly not negated, as LES claims, by the lack of horizontal recharge through the Dockum Group itself, which is a very different process. (LES FF EC-1, 76-77).

32. LES and Commission Staff assert that the lack of interconnectivity of fractures in the Chinle Formation is established. (LES FF EC-1, 67-69; NRC Staff FF 4.47, 4.48). But in fact one cannot tell, from the limited investigations, whether the Chinle fractures are interconnected. (Rice, Tr. 842, 848-49). Mr. Peery testified that it is difficult to fracture the upper part of a formation without some movement that fractures the lower part of the formation. (NIRS/PC Ex. 17 at 22-23). Mr. Toblin stated that he could not tell from Mr. Holt's borehole logs whether fractures were interconnected. (Tr. 749-50). Mr. Peery did not dispute that he

could not tell from a well log whether fracturing is occurring on a localized scale. (Tr. 587-88). The reference to supposed "healing and closing of fault planes and joints" (LES FF EC-1, 79), the assertions that fractures "may be self-healing" (NRC Staff FF 4.47) and "subject to closure over time" (NRC Staff FF 4.48) are completely without data support and contradicted by the many instances of fractures found by Holt. (Rice, Tr. 824-25; Toblin, Tr. 749-50; LES Ex. 3, Tab G; see boreholes B-43, B-4, B-49, B-18, B-32, B-46, B-21, B-50, B-36, B-44, B-35, B-20, B-45).

33. LES argues that the report by Rainwater shows that the fractures in the Chinle did not contribute to its permeability. (LES FF EC-1, 70). However, Dr. Rainwater only examined cores 6-B and 9-G. (LES Ex. 3, Tab H at 8). The log of well 6-B is not contained in the Holt report. (LES ex. 3, Tabs E, F, G). The log of well 9-G reports a "45 degree slickenside at 186' with calcite crystallization along slip plane . . . sl. increased crumbly texture below 186" (LES Ex. 3, Tab G at boring B-21, approx. 190'). Plainly, a fracture and crumbly texture do not reflect a "continuous, solid, and tight" (LES FF EC-1, 70) formation.

34. Mr. Peery said that he would look for moisture in fractures as an indication of an interconnected flow path (Tr. 580-81), but Holt reports moisture at some fractures. (See LES Ex. 3, Tab G, boreholes B-23, B-18, B-32, B-46, B-25, B-20, B-45.). Moreover, mineralization indicates that a fracture has functioned as a flow path, and numerous borehole logs show mineralization. (Tr. 573, 576, 579, 749-50). In his written testimony Mr. Peery stated that the minerals were deposited thousands to millions of years ago (LES FF EC-1, 72), but at the hearing he admitted: "I don't know that you can tell specifically when they were

deposited." (Tr. 590).

35. It is asserted that recent investigations of a fault at the WCS site established that faulting in the Dockum Group "did not create joints or fractures that acted as fast flow paths." (LES FF EC-1, 79). However, NIRS/PC have not asserted that *faulting* caused fractures. NIRS/PC have asserted that *fractures are present,* may create fast flow paths, and should be investigated. (See Rice, Tr. 805).

36. Mr. Rice testified that laboratory measurements of rock permeability usually understate permeability (Tr. 779). LES and Commission Staff claim that such measurements usually overstate permeability. (LES FF EC-1, 73; NRC Staff FF 4.54). Mr. Rice showed, however, that samples taken from fractured zones often omit fractures present in the field, fail to be recovered from the core barrel, or fall apart when removed and cannot be measured. (Tr. 816). Therefore, lab tested samples often show lesser permeability than the rock body as a whole. (id.). "Flow in solution cavities or rock fractures and the effect of large boulders in gravel aquifers cannot be duplicated in a permeameter." (Linsley, et al., NIRS/PC Ex. 25 at 131).

37. There is agreement in the literature that laboratory measurements of permeability tend to be lower than in situ measurements. (Rice, Tr. 779, note 48). The Commission Staff witness testified that rock samples would show greater permeability in laboratory tests (Toblin, Tr. 692), but neither Commission Staff nor LES presented any data or analyses of permeability testing that conflict with the general view that laboratory tests typically understate permeability, both of soils and of rock bodies.

38. LES has made no attempt to measure the permeability of *fractured* zones at the

NEF site in the laboratory. (Tr. 815-16). Plainly, where fractures exist, their permeability far exceeds that of the matrix. (Rice, Tr. 805, 816, 777).

e. LES also should have determined the ages of water in the Chinle and Santa Rosa. Relatively young water would indicate that water reaches these units along fast flow paths.

39. LES points out that water in the Santa Rosa Formation is old (LES FF EC-1, 76). But that is not the question. The question is whether there is a component of young water contained within it, indicating a fast flow path. (Rice, Tr. 817-18). No data have been presented on that question.

Conclusions of Law

40. The Board finds that the prospect of infiltration of water from the NEF is a real one, that infiltrating water may well be contaminated, that such water may penetrate through the alluvium and flow along the top of the Chinle Formation to emerge via wells or natural flow at Monument Draw, and that such water may penetrate further into the Chinle Formation to reach the aquifers present therein and be extracted by wells—all processes leading to release of contaminants.

41. On several relevant points LES and Commission Staff have failed to present evidence relevant to the impact of the proposed NEF on ground water, e.g.:

    a. No estimate of the probability of leakage of lined basins.

    b. No estimate of the quantity of water that would leak from lined basins.

    c. No demonstration of the absorption of uranium by clay liners.

    d. No demonstration of contaminants expected to be present in stormwater runoff.

    e. No demonstration of the claimed ability of the alluvium to absorb contaminants.

f. No demonstration of the expected characteristics of runoff from the UBC storage pad.

g. No data on hydrologic characteristics of the alluvium.

h. No demonstration on extent of evapotranspiration and recharge at the NEF site.

i. No showing of the extent of gravel deposits at the NEF site.

j. No investigation of extent and interconnections of fracture zones in the Chinle Formation or their permeability.

k. No data supporting the assertion that laboratory tests overstate permeability.

l. No data on age of Chinle or Santa Rosa Formation water at the NEF site.

42. The Board finds that the likelihood of releases to ground water can and should be addressed in the ER and the DEIS by estimating the amount of leakage from the basins and the septic system. There should be further investigation of the hydrologic characteristics of the alluvium as they relate to recharge and flow and of the hydrologic characteristics of the Chinle Formation as they relate to fractures, permeability, recharge, and flow. Methods such as in situ permeability testing, ground water dating, and additional core hole drilling should be strongly considered.

43. The Board sustains contention NIRS/PC EC-1 and holds that the ER and the DEIS do not contain a complete or adequate assessment of the potential environmental impacts of the proposed project on ground and surface water. LES and Commission Staff shall revise the ER and the DEIS in conformity with the Board's findings of fact. LES shall resubmit the ER, and Commission Staff shall

circulate the DEIS again for comment.

b. Proposed Findings of Fact concerning NIRS/PC Contention EC-2:

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.

44. LES and Commission Staff avoid the principal question that hangs over LES's use of water for the NEF: The issue here is whether the ER and the DEIS show the future environmental impact of the NEF throughout its operating life. As of 2004, the average usage rate of the proposed NEF is within the capacity of the Hobbs and Eunice water systems. (LES Ex. 1 at 4.4-6). However, the proposed NEF would not be a water user like all others. The NEF could not accept an interruptible supply; rather, water supply for the NEF must be uninterrupted for reasons of "asset protection." (Tr. 1303-04). Further, an uninterruptible water supply must be committed for the entire 30 year licensing period. (NEF Staff Ex. 1A at 2-1, 2-8). Most critically, the Hobbs well field, from which the NEF would take its supply, is being depleted at a far greater rate than its recharge. (LES Ex. 26 at 5-4; Tr. 1286-87). The question is not the impact of NEF's usage in 2004 but the impact in future years, continuing to 2036 and possibly later.

45. Mr. Peery, witness for LES, testified that the saturated thickness of the Hobbs Well Field at present is approximately 160 feet. (Tr. 1210). Mr. Toblin, testifying for the

Commission Staff, used the State Engineer's model (NRC Staff Ex. 21) of the Lea County Underground Water Basin ("LCUWB") to project the impact of withdrawals for the NEF. He calculated that, with continued withdrawals at the 1993-96 rate, the saturated thickness at the point of withdrawal would fall to 38.2 feet by 2040 and to 37 feet if usage by the NEF is considered. (Tr. 1316). A decline from 160 feet to 38.2 feet amounts to a 76% loss in saturated thickness.

46. Importantly, the State Engineer's model (NRC Staff Ex. 21) assumes continued withdrawals by other users at the historical rate prevailing in 1993-96 (Tr. 1341). The model thus assumes irrigation of about 51,000 acres. (NRC Staff Ex. 21 at 53). It warns: "According to [Office of the State Engineer] record there are approximately 120,000 acres with permitted irrigation rights (annual report of basin administration). The annual rate of water level decline could increase if additional permitted acreages are brought back into irrigation." (id.).

47. The State Engineer's model also emphasizes the uncertainty of future pumping rates: "The exact pumping rates from the basin are not known and there is a high degree of uncertainty about future water uses in this region in both states." (NRC Staff Ex. 21 at 62). LES's witness, Mr. Stokes, testified that water use for agriculture "varies dramatically." (Tr. 1271). The Board finds that there is a high degree of uncertainty about future water uses in the region served by the LCUWB. Mr. Rice, addressing the calculations by Mr. Toblin, questioned whether the projection was a conservative one. (Tr. 1372-73).

48. LES argues that the Hobbs and Eunice water systems own water rights to divert an additional 13,000 acre-feet per year of water (LES FF, EC-2, 23) and that the NEF is "just putting water to beneficial use that is already permitted by the state engineer's

office." (LES FF, EC-2, 23, quoting Peery, Tr. 1284). However, according to the Lea County Regional Water Plan ("LCRWP"), if all existing water rights are used, annual water use in Lea County would increase to approximately 360,000 acre-feet, a 105% increase from 1995. (LES Ex. 26, executive summary at 2).

49. Neither LES nor Commission Staff have modeled the LCUWB over the life of the NEF, with assumed water withdrawals different from the historical 1993-96 rate. Nor have they presented a model based upon the projection, contained in the LCRWP, of use of all existing water rights.

50. The actual amount of water that will be withdrawn from the LCUWB during the operating life of the NEF is unknown. However, if usage significantly exceeds the historical amount assumed in the State Engineer's model, the saturated thickness would diminish to less than 37 feet—how much has not been estimated. In such case, given that the NEF requires an uninterruptible water supply for a 30-year period, difficult questions of priority of water users would arise. Reduced availability of water would lead to reduced usage either by the NEF or by other water users. Conceivably, the supply to the NEF could be interrupted, with impacts not yet examined. Alternatively, supply to other users could be interrupted so that water can be provided to the NEF, and the environmental impacts of such interruptions have not been examined. Such possible impacts are not discussed in the ER or the DEIS.

51. The Commission Staff asks the Board to bar NIRS/PC from pursuing contention EC-2, claiming that NIRS/PC should have moved to amend the contention after Staff served its prefiled testimony. (NRC Staff FF 4.89). However, the Board previously resolved the dispute over whether Commission Staff properly served that prefiled testimony, directing that it would "permit Mr. Rice to provide 'live' rebuttal testimony relative to Mr.

Toblin's prefiled testimony at the time NIRS/PC makes its evidentiary presentation on contention NIRS/PC EC-2." (Memorandum and Order (Ruling on in Limine Motions Regarding Prefiled Direct and Rebuttal Testimony and Providing Administrative Directives) at 6 (Feb. 4, 2005). When Mr. Rice offered such rebuttal, Commission Staff did not object to his testimony; thus, any issue of admissibility was waived. (Tr. 1371-72).

52. Mr. Rice noted the difficulty of evaluating Mr. Toblin's analyses without the backup material, such as input files and output files, underlying Mr. Toblin's analyses. (Tr. 1374-75). These materials have not been produced by Commission Staff. The Board has consistently required that any materials relied upon by experts be marked as an exhibit. (Memorandum and Order (Regarding NIRS/PC Prefiled Testimony and Exhibits), at 1-2, Jan. 18, 2005. See the hearing order, 69 Fed. Reg. 5873, 5875 (Feb. 6, 2004); 10 CFR 2.336(b)). In this respect Commission Staff has departed from established practice.

Conclusions of Law

53. NEPA analysis requires that the ER and the DEIS "include a preliminary analysis that considers and weighs the environmental effects of the proposed action; the environmental effects of alternatives to the proposed action; and alternatives available for reducing or avoiding adverse environmental effects." 10 CFR 51.71(d); see also 51.45(c). Further, "[t]he Commission intends to follow the standard in 40 CFR 1502.22(a)" (49 Fed. Reg. 9352, 9353)(March 12, 1984), which calls for certain disclosures when "information relevant to reasonably foreseeable significant adverse impacts" is difficult to obtain, viz: a statement describing what is unknown, a statement of its relevance, a summary of existing information, and the agency's evaluation of such impacts. Such a discussion should be included in the ER and the DEIS concerning the impact of the NEF on water

resources.

54. *Mid States Coalition for Progress v. Surface Transportation Board,* 345 F.3d 520 (8th Cir. 2003), illustrates the process directed by 40 CFR 1502.22. In *Mid States* the agency had failed to evaluate the impact of new rail lines upon usage of coal and attendant pollution. The parties had identified computer models that could forecast the relevant usage, but the agency did not use them. (at 550). The court found a NEPA violation, pointing out that "when the *nature* of the effect is reasonably foreseeable but its extent is not, we think that the agency may not simply ignore the effect." (at 549). Here, likewise, the DEIS lacks supportable projections with which the impact of the NEF on water supplies could be evaluated.

55. It is appropriate to present a high, middle, and low case of an uncertain impact. See, e.g., *Private Fuel Storage* (Independent Spent Fuel Storage Installation), 60 NRC 125, 142, CLI-04-22 (Aug. 17, 2004). Here, the final EIS should show overall water usage from the LCUWB during the operating life of the proposed NEF at high, middle, and low values, so that the impacts of the addition of the NEF's 30-year uninterruptible demand for water can be assessed. Environmental impacts of possible curtailments in water usage by the NEF or other users should be analyzed.

56. The Board sustains contention NIRS/PC EC-2 and holds that the ER and the DEIS do 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. LES and Commission Staff shall revise the ER and the DEIS in conformity with the Board's findings of fact. LES shall resubmit the ER, and Commission Staff shall circulate the DEIS again for comment.

c. **Proposed Findings of Fact concerning NIRS/PC Contention EC-4:**

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 ("UF_6") waste that is required in conjunction with the proposed enrichment plant.

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.

57. With respect to construction and operation of a deconversion plant, the ER and the DEIS do not, themselves, contain the matters called for by 10 CFR 51.45 and 10 CFR 51.71, e.g., a description of the proposed action, a statement of purposes, description of the environment affected, the impact of the proposed action on the environment, adverse effects that cannot be avoided, discussion of appropriate alternatives, a balancing of the environmental effects of the proposed action and alternatives, and a discussion of economic, technical, and other benefits and costs of the proposed action and alternatives. (Tr. 953-54).

58. Dr. Makhijani testified that Revision 2 of the ER does not contain a discussion of the environmental impacts of deconversion, because discussion in a technical sense requires an actual evaluation, and "in terms of an analytical independent look, I would not call it a discussion in that sense." (Tr. 1118). He explained that, "In my opinion, a simple reference and incorporation of numbers in somebody else's work doesn't constitute a technical evaluation or discussion." (Tr. 1119).

59. Commission Staff discuss at length Dr. Palmrose's review of the DOE Programmatic EIS (NRC Staff FFCL 4-103 through 4.108; Tr. 1000-04; LES Ex. 18). However, the DEIS (NRC Staff Ex. 1A) refers to the PEIS only in enumerating disposition options, without adopting or incorporating any impact analyses (at 2-42), and Dr. Palmrose stated that this

was intentional, since the DOE PEIS does not contain the most current analysis. (Tr. 1052):

> "MR. LOVEJOY: Okay. And isn't it true that the DEIS doesn't make reference explicitly to any analyses in the DOE programmatic EIS?
> WITNESS PALMROSE: That's correct.
> MR. LOVEJOY: Anyway, so you did not adopt any of those analyses in the draft EIS?
> WITNESS PALMROSE: That's correct, because they weren't the most current."

60. Both LES and Commission Staff emphasize that Staff may use existing environmental impact statements in preparing the DEIS. (LES FFCL at 8, par. 15; NRC Staff FF at 11 and FF 3.17-3.21). Such arguments are directed at LES's citation of, and Commission Staff's reliance upon, the EISs prepared by the U.S. Department of Energy ("DOE") for deconversion plants at Portsmouth, Ohio and Paducah, Kentucky. (LES Ex. 16, 17).

61. LES's preferred alternative (Tr. 887), and Commission Staff's first-listed option (DEIS, NRC Staff Ex. 1A at 4-53), is to manage depleted uranium from the NEF by (a) deconversion to U_3O_8 at a private deconversion plant and (b) disposal of the U_3O_8 at a licensed private disposal site.

62. Neither LES nor Commission Staff have checked and verified the environmental impact analyses contained in the DOE EISs for the Portsmouth and Paducah plants (LES Ex. 16, 17); rather, they have assumed that the DOE analyses were correctly carried out. (Krich, Tr. 965-66; Palmrose, Tr. 1041, 1044). Commission Staff concede that Dr. Palmrose

> "assumed the impacts for deconversion of DUF_6 to U_3O_8 would be similar to those for the Paducah, Kentucky and Portsmouth, Ohio facilities, and therefore he used the values from the DOE analyses in reaching his conclusions regarding the expected impacts in Section 4.2.14.3 of the DEIS." (NRC Staff FF 4.109).

63. Insofar as deconversion at the DOE plants is *one* alternative, the impacts of such deconversion are examined in the DOE EISs for such plants, although impacts of

transportation and disposal are not examined.

64. However, deconversion at a private plant differs from deconversion at a DOE plant in many ways that are *not* examined in the DOE EISs. For example, a private plant may use a process that generates anhydrous hydrofluoric acid ("AHF") (Tr. 1044-45, 1133-34), which presents significantly greater risks than a process that neutralizes hydrofluoric acid and generates CaF_2. (LES Ex. 17, Appx. D at 18-19). Although LES now states that it does not intend to use an AHF process, since DOE analyzed the AHF process in the programmatic EIS (LES Ex. 18 at F-11, -12), and Cogema has pursued an AHF process (NIRS/PC Ex. 61), the alternative is clearly a realistic one and should be examined. Counsel for LES closely examined Dr. Makhijani on the issue of impacts of an AHF process. (Tr. 1120-34). Commission Staff argue that the DOE programmatic EIS analyzes an AHF process (NRC Staff FF 4.110), but the DEIS makes no use of the DOE PEIS analysis, because it is not "current" (Tr. 1052), and Dr. Makhijani confirmed that the DOE PEIS analysis is out of date. (Tr. 1073-76; 1102-04).

65. Dr. Makhijani also testified that in the DOE site-specific EISs there is no analysis of the exhaust gases generated by deconversion using various different processes and under various different filtration systems. (Tr. 1076-77). There is no analysis of the specific amounts of various process chemicals requiring transportation and storage for a new private plant. (Tr. 1105-06). There is no analysis of transportation routes associated with a plant sited elsewhere than the DOE facilities (Tr. 1136-39), nor of serious transportation accidents (Tr. 1106). Obviously, the DOE EISs do not analyze the same or substantially the same project as may be carried out at a private deconversion plant.

Conclusions of Law

66. Commission Staff's reliance upon the DOE EISs must be examined separately as to

analysis of impacts of (a) deconversion at a private deconversion plant and (b) deconversion at the DOE Portsmouth or Paducah plants.

67. Commission Staff emphasize that regulations of the Council on Environmental Quality ("CEQ") do not apply to Commission NEPA actions without Commission adoption of such regulations. (NRC Staff FFCL at 11 note 3). In fact, the Commission *has* adopted the regulations. Commission NEPA regulations state:

> "The techniques of tiering and incorporation by reference described respectively in 40 CFR 1502.20 and 1508.28 and 40 CFR 1502.21 of CEQ's NEPA regulations may be used as appropriate to aid in the presentation of issues, eliminate repetition or reduce the size of an environmental impact statement. In appropriate circumstances, draft or final environmental impact statements prepared by other federal agencies may be adopted in whole or in part in accordance with the procedures outlined in 40 CFR 1506.3 of CEQ's NEPA regulations." 10 CFR Part 51, Subpart A, Appx. A.1(b).

68. NUREG-1748, Environmental Review Guidance for Licensing Actions Associate with NMSS Programs, authorizes reliance on existing EISs when:

    i. An existing EIS, e.g., in connection with a license application, covers the proposed activity (at 1-8), or

    ii. by adoption, when the action covered by the previous EIS and the proposed action are substantially the same (sec. 1.6.1, at 1-9), or

    iii. if the actions are not substantially the same, the Commission may adopt the previous EIS by treating it as part of the DEIS, describing the portion of the existing EIS that is being adopted (at 1-9), or

    iv. By tiering, when the proposed action is within the scope and conclusions of a more general EIS. (Sec. 1.6.2, at 1-10). The action must be within the policy or program described in the first EIS.

69. Tiering is limited to a situation where a broad EIS with respect to a program or policy is followed by an action "included within the entire program or policy," 40 CFR 1502.20.

See also 40 CFR 1508.28. Thus, tiering only applies when the second action is part of the program or policy analyzed in an earlier EIS. But LES's preferred alternative—construction and operation of a private deconversion plant—is not part of any program or policy analyzed in any DOE EIS. Therefore, tiering is not available.

70. Adoption of an existing EIS is allowed as between federal agencies. If the action covered by the EIS and the proposed action are "substantially the same," the second agency may adopt the EIS as a final statement. The rules state further: "Otherwise the adopting agency shall treat the statement as a draft and recirculate it." 40 CFR 1506.3. Here, the Commission Staff might have adopted the DOE EISs for the Portsmouth and Paducah sites as NEPA analyses of *deconversion at those sites by DOE,* but it has not done so. However, Commission Staff may not adopt the DOE EISs as analyses of deconversion *at a private plant*, the preferred alternative (Tr. 887), because the DOE EISs do not analyze such activity, it is not "substantially the same" as deconversion at the DOE plants, and Commission Staff has not done as 40 CFR 1506.3 requires—namely, "treat the statement as a draft and recirculate it."

71. It must be kept in mind that, when the DOE site-specific EISs were circulated for comment, residents of Lea County, such as those here represented by NIRS/PC, had no notice that such documents would later be put forward as analyses of an entirely different private deconversion plant, located in their own neighborhood and affecting their environment. It would be quite unfair to impose the final DOE EISs upon them, immune from comment or correction.

72. The limits of the Commission's power to rely upon previous EISs are shown in cases cited by LES. Thus, in *Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), 54 NRC 403, LBP-01-35 (Dec. 6, 2001), the applicant sought

to construct a fuel fabrication facility at DOE's Savannah River Site ("SRS"). Related activities at SRS had been the subject of previous DOE EISs. (at 423). The ER expressly adopted and incorporated such DOE EISs, without "open[ing] them to challenge in the discrete proceeding on the MFFF." (at 424). However, an intervenor asserted that certain waste generation was not analyzed in DOE EISs. The Board sustained such claim, where the waste generation was not covered in the existing EISs. (at 443-44). Thus, NEPA analysis in an existing EIS only suffices if it analyzes the *same* activity as the current proposal.

73. Indeed, in the *DCS* decision, the applicant asserted, as do LES and Commission Staff here, that "environmental impacts of the MFFF waste are bounded by existing analyses." (at 443). The Board ruled that environmental impacts of the new waste stream were not covered by existing analyses and, therefore, must be fully analyzed in the ER. (id.). Similarly, here impacts of private deconversion are not addressed in the DOE EISs and must be analyzed in the ER and the DEIS.

74. Other precedents relied upon by LES and Commission Staff are not to the contrary. In *Conservation Law Foundation v. FHA,* 24 F.3d 1465 (1st Cir. 1994), relied upon by Commission Staff (NRC Staff FFCL at 11), the agency looked to its own previous EISs on cumulative impacts of the same project. (24 F.3d at 1473). Here, the Commission Staff has done no previous EISs on deconversion plants. In *Brooks v. Volpe,* 350 F. Supp. 269 (W.D. Wash. 1972)(cited at NRC Staff FFCL at 14), the court spoke of studies "which show the environmental effects of a similar project under substantially identical conditions" (at 279-80)—a circumstance that does not exist here, where the private deconversion option differs in several respects from the DOE plants. In *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), 15 NRC 423, LBP-82-43A

(June 1, 1982), relied upon by LES (LES FFCL at 8 note 21), a previous EIS by another federal agency covered portions of the same activity. The Board stated that the existing EIS could not be adopted without further inquiry, and it required Commission Staff to do its own independent review of the findings and cost-benefit analysis. (at 29.). Here, in contrast, Commission Staff have done *no* independent inquiry, and the private deconversion alternative is plainly *not* the same activity as was analyzed in the previous EISs.

75. The Portsmouth and Paducah EISs have not been adopted by Commission Staff. Further, construction and operation of a private deconversion plant is not the same, nor substantially the same, activity as is covered in the Portsmouth and Paducah EISs. Therefore, for the purpose of analyzing the environmental impacts of a private deconversion plant, such EISs were not, and could not have been, adopted by Commission Staff without recirculating them as drafts for comment and revision, which has not been done.

76. For purposes of analyzing the environmental impacts of a private deconversion plant, neither LES in the ER nor Commission Staff in the DEIS has analyzed environmental impacts as required by NEPA. The contention made by NIRS/PC in the Petition regarding the ER, made applicable to the DEIS upon its publication, and contained in the amendment authorized on November 22, 2004, that the ER and the DEIS "fail[] to discuss the environmental impacts of construction and operation of a conversion plant for the depleted uranium hexafluoride waste," is sustained.

77. Further, the contention made by NIRS/PC with regard to the DEIS, and contained in the amendment authorized on November 22, 2004, that Commission Staff may not rely upon the Portsmouth and Paducah EISs to analyze the impacts of a private deconversion plant

"because the DOE plants are unlike the private conversion plant contemplated by LES" is sustained.

78. LES and Commission Staff must undertake additional analyses of the impacts of a private deconversion plant, including specifically the appropriate alternative processes, input requirements, air emissions, and transportation impacts. Such analyses should include as one alternative a location near the NEF site but across the state border in Texas. (LES Ex. 79; Tr. 934).

79. The Board sustains contention NIRS/PC EC-4 and holds that the ER and the DEIS fail to discuss the environmental impacts of construction and operation of a conversion plant for the depleted uranium hexafluoride waste that is required in connection with the proposed enrichment plant. LES and Commission Staff shall revise the ER and the DEIS in conformity with the Board's findings of fact. LES shall resubmit the ER, and Commission Staff shall circulate the DEIS again for comment.

d. Proposed Findings of Fact concerning NIRS/PC Contention EC-7:

CONTENTION: 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.

80. The burden of proof is upon LES and Commission Staff to establish that the ER and the DEIS sufficiently analyze the need for the proposed NEF. (10 CFR 2.325). LES asserts that "need" has been shown, inter alia, by the market study undertaken by Mr. Schwartz of ERI. (LES FF EC-7, 9-20). In this study Mr. Schwartz calculates that there is likely to be a shortage of enrichment capacity after 2010, if the NEF is not built along with other centrifuge facilities announced by USEC and AREVA. (Tr. 1459). Commission Staff endorse the analysis by Mr. Schwartz. (NRC Staff FF 4.135, 4.136). LES and

Commission Staff ask the Board to find that new facilities will be needed in large part simply to replace existing enrichment capacity lost due to the shutdown of the gaseous diffusion plants (LES FF EC-7, 20, 22; NRC Staff FF 4.136).

81. Mr. Schwartz's study assumes that the existing gaseous diffusion plants of USEC (Paducah, Kentucky and Portsmouth, Ohio) and AREVA (Eurodif Georges Besse plant) will be shut down. (Tr. 1513-15). He acknowledges that there is a "cost basis" for the shutdowns. (Tr. 1528). He did not use economic data, such as data about the cost of operating or replacing those plants, in concluding that they would be closed. (Tr. 1527). He did not use economic data in preparing his table of enrichment suppliers. (LES Ex. 30, Table 1.1-5; Tr. 1527). Mr. Schwartz based his assumption that the gaseous diffusion plants will close upon statements by the operators of these plants. (Tr. 1514; 1527-29).

82. Mr. Schwartz's study contains unstated assumptions about the price of enrichment and the price of uranium that will prevail in the time period of the proposed NEF's operation. He conceded that in the enrichment market "economics are always a consideration" and "it can be reduced to price." (NIRS/PC Ex. 80 at 61). When asked whether there may be a shortage of $100 SWUs but no shortage of $125 SWUs, he did not answer. (Tr. 1521). He did not disclose the basis for his determinations that certain enrichment producers will be "competitive." (Tr. 1451). He has cost information concerning the gaseous diffusion plants but did not employ it or disclose it in this case. (Tr. 1527, 1521-22).

83. Mr. Krich said that "there was a separate business case that was developed" for the NEF (Tr. 1524). This was not made available in discovery or at the hearing. Mr. Schwartz, in his analysis, assumed that the NEF would enter the market because NEF said it would, and he assumed that the USEC centrifuge plant would enter the market because USEC said it would. (Tr. 1529; see also NIRS/PC Ex. 80 at 54). In assuming that the LES

facility and the new USEC centrifuge facility would compete side-by-side, he made no assumptions about prices that would prevail. (Tr. 1530).

84. Without the underlying economic information it is not possible to conclude, as LES claims, that Mr. Schwartz's analysis of need for the facility is "conservatively" estimated. (LES FF EC-7, 10, 13, 14).

85. Mr. Nevin, witness for NRC Staff, did no analysis of price or cost of enrichment. (Tr. 1570). He did no analysis of the cost of operating a gaseous diffusion plant or replacing such a plant with a centrifuge plant. (Tr. 1570). He gave no consideration to recent increases in the price of uranium. (Tr. 1569).

86. If the new centrifuge plants planned by LES, USEC, and AREVA are not built on the assumed schedule, presumably the gaseous diffusion plants could be kept in operation to meet demand. (Tr. 1514-15; LES Ex. 30 at 1.1-19, -20). In addition, Urenco is permitted to supply enrichment from Europe to meet LES contracts. (Tr. 1409).

(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.

87. LES and Commission Staff contend that the enrichment market is a global one, and this is correct in a general sense. (LES FF EC-7, 41; NRC Staff FF 4.143, 4.144; Tr. 1571). However, NIRS/PC have asserted that in assessing the impact of the entry of a new United States-based enrichment supplier, there should also be examination of the market for sales to United States utilities, because of the specific role played by United States trade restrictions. (Sheehan prefiled direct testimony at 29-30, Jan. 7, 2005). Such evidence has been excluded. (Memorandum and Order (Ruling on in Limine Motions and Providing Administrative Directives), at 12-13, Jan. 21, 2005).

(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.

88. LES and Commission Staff contend that the contracts made by LES establish that the NEF will meet a need and generate some public benefit. (LES FF EC-7, 8, 43-48; NRC Staff FF 4.148 through 4.151). However, LES has declined to disclose the prices of these contracts. (Tr. 1411). Further, the contracts are subject to cancellation if no license issues to LES or if LES decides not to construct the NEF. (Tr. 1410; LES Ex. 65, Art. 3; Ex. 66, Art. 3, Ex. 67, Art. 3, Ex. 68, Art. 3, Ex. 69, Art. 3, Ex. 70, Art. 3). Therefore, since it is not known (a) whether the contracts were entered into in response to below-market pricing, (b) whether LES or the purchasers considered it likely that the NEF would be built, or (c) whether the NEF's growing market share reflects customer expectations of the continuation of foreign domination of U.S. enrichment supply—it is not possible to assess the significance of the contracts as evidence of "need" or "public benefit." (Tr. 1650, 1675-76).

89. One asserted need to be met by the proposed NEF is the need for *diverse* domestic suppliers, i.e., more than one potential enrichment supplier. (LES FF EC-7, 6; NRC Staff FF 4.131; Tr. 1436-37, 1651-52). To assess whether the NEF have this effect, the Board must project the economic impact of the entry of the NEF. The principal domestic producer, USEC, faces significant financial and engineering challenges in bringing its centrifuge plant into operation. (LES Ex. 30 at 1.1-18). The market for enrichment is in an unstable condition. (Tr. 1676-77, 1679-80). Moreover, the international enrichment market is dominated by several large producers, one of which is Urenco. (LES Ex. 30, Table 1.1-5). In this situation it cannot be assumed that the entry of the NEF would not adversely affect the construction of the USEC centrifuge plant. (Sheehan, Tr. 1654).

90. Neither LES nor Commission Staff introduced economic evidence that the proposed

USEC centrifuge plant could enter the market and survive in competition with the NEF. Without cost and price information to show that both USEC and NEF centrifuge enrichment facilities can economically supply enrichment to United States utilities, as LES asserts (LES FF EC-7, 23), the Board cannot conclude that such would be the outcome. Therefore, the Board cannot conclude that the NEF would meet the asserted need for diversity of supply.

91. Another asserted need to be filled by the NEF, from the standpoint of energy security, is the need for an additional U.S. domestic enrichment supplier. (LES FF EC-7, 6; NRC Staff FF 4.133). The Board cannot determine on the present evidence that such need would be met by the NEF, because it cannot be assumed that the NEF would not adversely affect the viability of the USEC centrifuge plant—the only U.S.-owned centrifuge plant planned to be built—narrowing the domestic supply choice to NEF, the instrumentality of an aggressively expanding European supplier. (Tr. 1654, 1647-49, 1667). Such result would increase concentration in a market already dominated by large suppliers (Tr. 1667) and would not contribute to domestic energy security. Therefore, the Board cannot conclude that the NEF would meet the asserted need for energy security.

92. Moreover, from the standpoint of national security, it must be mentioned that USEC is the entity that markets surplus highly enriched uranium from Russia. If the advent of the NEF leads to the demise of USEC, the continued marketing of Russian highly enriched uranium may be in jeopardy. Such an outcome would clearly be detrimental to United States security. (Tr. 1674).

93. Indeed, without information as to the cost of production at existing and planned enrichment plants and the likely price of enrichment, the Board cannot conclude that there is a supply deficit in enrichment expected in 2010 or thereafter, since it is clear that

the available supply is a factor of cost and price, and such data have not been presented.

Conclusions of Law

94. Under NEPA, impacts to be assessed include economic impacts. See 10 CFR 51.45(c), 51.71(d); *Private Fuel Storage* (Independent Spent Fuel Storage Installation), 60 NRC 125, 141-51, CLI-04-22 (Aug. 17, 2004); *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), 47 NRC 77, 89, CLI-98-3 (April 3, 1998); *City of Sausalito v. O'Neill,* 386 F.3d 1186, 1214-15 (9th Cir. 2004); *Lee v. United States Air Force,* 354 F.3d 1229, 1245 (10th Cir. 2004); *Laub v. U.S. Department of the Interior,* 342 F.3d 1080, 1087 (9th Cir. 2003); *Hughes River Watershed Conservancy v. Johnson,* 165 F.3d 283, 289 (4th Cir. 1999); *Friends of the Boundary Waters Wilderness v. Dombeck,* 164 F.3d 1115, 1125-26 (8th Cir. 1999).

95. Need for a facility that would enter and serve a market is largely demonstrated by evidence of economic benefits from the proposal. In *Mid States Coalition for Progress v. Surface Transportation Board,* 345 F.3d 520 (8th Cir. 2003), the agency examined potential alternatives from the standpoint of economic viability, discarding alternatives that could not economically be operated. (at 546-47). In *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), 60 NRC 125, CLI-04-22 (Aug. 17, 2004), the Commission approved a cost-benefit analysis of proposed spent fuel storage, after closely examining how it had weighed the net economic benefits. (at 141-53). In *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), 47 NRC 77, CLI-98-3 (April 3, 1998), the Commission emphasized that NEPA requires a "weighing of the environmental costs against the economic, technical, or other public benefits of a proposal" (at 88) and cautioned against licensing decisions based upon "[m]isleading information on the economic benefits of a project." (id. 89).

96. Here, LES and the Commission Staff have not brought forward substantial evidence of the economic effects of the NEF. There is no showing of the anticipated market shares and price levels that would prevail, assuming construction of the NEF. Having failed to provide underlying assumptions about the anticipated prices of enrichment or about the costs of operation of gaseous diffusion plants and centrifuge plants, and projections of market participation by the NEF and the benefits of such participation, LES and Commission Staff have failed to support their assertions as to the need for the NEF, which must be balanced against the environmental costs. (*Private Fuel Storage,* 60 NRC at 144; *LES,* 47 NRC at 88-89). Thus, they have not carried their burden of proof to support the presentations in the ER and in the DEIS as to need for the facility. Neither have they shown that the proposed facility will enhance energy security or national security objectives, having failed to show whether the licensing of the NEF will lead to multiple domestic sources of supply without foreign domination.

97. The Board sustains contention NIRS/PC EC-7 and holds that the ER and the DEIS do not adequately describe or weigh the environmental, social, and economic impacts and costs of operating the National Enrichment Facility. LES and Commission Staff shall revise the ER and the DEIS in conformity with the Board's findings of fact. LES shall resubmit the ER, and Commission Staff shall circulate the DEIS again for comment.

Respectfully submitted,

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April 4, 2005

CERTIFICATE OF SERVICE

Pursuant to 10 CFR § 2.305 the undersigned attorney of record certifies that on April 4, 2005, the foregoing Reply Proposed Findings of Fact and Conclusions of Law based upon Evidentiary Hearing held on February 7 through 10, 2005 Submitted on behalf of Intervenors Nuclear Information and Resource Service and Public Citizen was served by electronic mail and by first class mail upon the following:

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