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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 CONCERNING COST OF CYLINDER MANAGEMENT AND COST OF CAPITAL ISSUES

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I. INTRODUCTION

1.1 On December 12, 2003, Louisiana Energy Services, L.P. ("LES" or the "Applicant") filed an application with the NRC seeking authorization to construct and operate a uranium enrichment facility -- designated the National Enrichment Facility ("NEF") -- near Eunice, New Mexico. This partial initial decision addresses two discrete issues that are linked to LES's November 29, 2005 motion to supplement the record. Those two issues are the cost of managing empty depleted uranium ("DU") byproduct cylinders, and the "cost of capital" associated with building a private deconversion facility. Intervenors Nuclear Information and Resource Service and Public Citizen ("NIRS/PC") raised these issues in connection with the evidentiary hearings held from October 24-27, 2005. Subsequent to those hearings, LES requested the admission of proposed LES Exhibit 118, which is a November 23, 2005 letter from LES to the NRC Staff that further discusses the two matters identified above. In ruling on the motion, the Board afforded LES an opportunity to seek (and NIRS/PC an opportunity to contest) the admission of Exhibit 118 in the context of "an additional, albeit highly focused, evidentiary

hearing session." Memorandum and Order (Ruling on Motion to Supplement Record) (Dec. 13, 2005) at 2 n.2 ("December 13 Order"). An additional evidentiary hearing on the cost of capital and cylinder management matters was held in the NRC's hearing room in Rockville, Maryland on February 13, 2005.

1.2 For the reasons set forth below, the Board finds that LES, as supported by the NRC Staff, has demonstrated by a preponderance of the evidence that, with respect to the matters raised in response to the LES motion to supplement the record, LES's cost estimate for DU dispositioning complies with the applicable decommissioning funding requirements set forth in 10 C.F.R. §§ 30.35, 40.36, and 70.25. Thus, the Board concludes that LES and the NRC Staff have carried their respective burdens of proof to demonstrate the adequacy of the applicant's Safety Analysis Report ("SAR") and the Staff's Safety Evaluation Report ("SER") relative to the intervenors' claims. Accordingly, the NIRS/PC claims cannot be sustained.

II. BACKGROUND

2.1 As mentioned previously, the supplemental evidentiary hearing was held to address two issues that are related to an LES motion to supplement the record with proposed LES Exhibit 118. LES Exhibit 118 is a November 23, 2005 letter from LES to the NRC Staff that provides clarifying information on two issues raised by NIRS/PC and addressed by the parties during the evidentiary hearings in October. Those issues pertain to the alleged need to account for (1) the potential cost of washing and recertifying empty depleted uranium hexafluoride ("DUF_6") cylinders for reuse or, alternatively, the cost of dispositioning those cylinders; and (2) the "cost of capital" associated with the construction of a private facility for deconverting DUF_6 to DU_3O_8 for purposes of its disposal. These issues were raised in the context of Contention NIRS/PC EC-5/TC-2, which states, in relevant part:

> LES has presented additional estimates for the costs of deconversion, transportation, and disposal of depleted uranium for purposes of the

> decommissioning and funding plan required by 42 U.S.C. 2243 and 10 C.F.R. 30.35, 40.36, and 70.25. *See* LES Response to RAI dated January 7, 2005. Such presentations are insufficient because they contain no factual bases or documented support for the amounts of the following particular current LES estimates, *i.e.*, $2.69/kgU for conversion, $1.14/kgU for disposal, $0.85/kgU for transportation, and a total of $5.85/kgU including contingency, and cannot be the basis for financial assurance.

NIRS/PC, in other words, claim that LES did not account for the cost of DUF_6 cylinder management and the cost of capital in the deconversion component of its cost estimate, and should do so in the form of specific "line items" for those costs.

2.2 Subsequent to the October 2005 evidentiary hearings, the NRC Staff made an oral request that LES submit a letter providing clarifying information related to the cost of cylinder management and the cost of capital in LES's deconversion cost estimate. *See* Tr. at 3339. LES responded to that request on the docket in the November 23, 2005 letter.

2.3 With respect to the cost of cylinder management, LES stated in the letter that because the washing and recertification of cylinders likely would occur during the operational life of the NEF, as the cylinders are used and reused, it considered the associated cost to be an operational cost. LES also stated that it is unreasonable to assume that fully serviceable cylinders would be cut up and disposed of on a routine basis, insofar as those cylinders could be continuously reused or recycled for storing and/or transporting radioactive material. In this regard, LES characterized the empty cylinders as valuable commodities, not as waste material requiring disposal. Additionally, LES did not take any credit for the reuse or resale of these cylinders to offset the cost of dispositioning the depleted uranium byproduct generated by the NEF.

2.4 With respect to the cost of capital, LES stated in the letter that if funding in the amount of $2.67 per kgU (*i.e.*, LES's deconversion facility cost estimate in 2004 dollars) were financially assured over the proposed facility's nominal 30-year operating period, that

funding would be sufficient to cover the costs associated with the construction and operation of a private deconversion facility without the need to borrow money should LES not be able to fulfill its decommissioning obligations. That is to say, sufficient funds would be available at that time from the LES financial assurance instrument for the NRC to contract with a third party for the construction and operation of a deconversion facility. Because there would be no need to borrow funds for this purpose, there would be no debt to service, and hence, no cost of capital. LES further explained that sufficient funds would be available at any time to pay for a backup dispositioning path, *i.e.*, dispositioning of the DUF_6 by DOE. *See* LES Exh. 118.

2.5 Notwithstanding those views, in the interest of addressing the Staff's concerns and resolving these two issues expeditiously, LES (1) committed to an additional $0.60 per kgU to address the cost of cylinder management, and (2) indicated a willingness to commit, if necessary, to an additional $0.40 per kgU as a "cost of capital" line item. *See* LES Exh. 118.

III. FACTUAL FINDINGS AND LEGAL CONCLUSIONS

3.1 Against the preceding factual and procedural backdrop, the Board rules below on the two discrete NIRS/PC claims on which the parties presented testimony and evidence during the February 13, 2006 evidentiary session. We first address whether the LES cost estimate adequately accounts for potential DUF_6 cylinder management costs; we then resolve the "cost of capital" question.

3.2 Each of the parties presented witnesses with regard to the NIRS/PC issues identified above, each of whom, in turn, submitted written direct and rebuttal testimony for the record and, with the exception of Dr. Makhijani, delivered oral testimony at the evidentiary hearing. LES presented Rod Krich, Vice President of Licensing, Safety, and Nuclear

Engineering for LES.[1] Mr. Krich's relevant training, experience, and expertise are reflected in his prefiled direct testimony and the statement of professional qualifications attached thereto.

3.3 The Staff presented a panel of four witnesses: (1) Timothy C. Johnson, (2) Jennifer Mayer, (3) Craig Dean, and (4) John Collier.[2] Mr. Johnson is the NRC Project Manager overseeing the Staff's review of the NEF license application. Ms. Mayer, Mr. Dean, and Mr. Collier all are consultants with ICF Consulting. The relevant training, experience, and expertise of each Staff witness are reflected in the panel's prefiled direct testimony and the statements of professional qualifications attached thereto.

3.4 NIRS/PC presented Dr. Arjun Makhijani as their sole witness in support of their challenges to LES's deconversion cost estimate.[3]

A. The Cost of Empty DUF_6 Cylinder Management

3.5 NIRS/PC have argued that LES inappropriately excluded from the deconversion portion of its estimate the cost of managing empty DUF_6 cylinders. In particular, NIRS/PC have suggested that LES must provide a line item for the cost of disposing of DUF_6

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1 *See* "Supplemental Prefiled Direct Testimony of Rod Krich on behalf of [LES] Regarding Cost of Cylinder Management and Cost of Capital Issues" (December 29, 2005) ("LES Direct"), Tr. at 3279; "Supplemental Prefiled Rebuttal Direct Testimony of Rod Krich on behalf of [LES] Regarding Cost of Cylinder Management and Cost of Capital Issues" (Jan. 13, 2006) ("LES Rebuttal"), Tr. at 3281.

2 *See* "NRC Staff Prefiled Direct Testimony Concerning Clarifying Information Relating to Cost Estimate of Deconversion" (Dec. 29, 2005) ("Staff Direct"), Tr. at 3411; "NRC Staff Prefiled Rebuttal Testimony Concerning Clarifying Information Relating to Cost Estimate of Deconversion" (Jan. 12, 2006) ("Staff Rebuttal"), Tr. at 3413.

3 *See* "Revised Prefiled Direct Testimony of Dr. Arjun Makhijani in Support of NIRS/PC Contentions EC-3/TC-1, EC-5/TC-2, and EC-6/TC-3 Concerning LES's Deconversion Strategy and Cost Estimate (Cost of Capital and Cylinder Management" (Jan. 13, 2006)) ("NIRS/PC Direct"), Tr. at 3492; Revised Prefiled Rebuttal Testimony of Dr. Arjun Makhijani in Support of NIRS/PC Contentions EC-3/TC-1, EC-5/TC-2, and EC-6/TC-3 Concerning LES's Deconversion Strategy and Cost Estimate (Cost of Capital and Cylinder Management" (Feb. 1, 2006)) ("NIRS/PC Rebuttal"), Tr. at 3492.

cylinders as low-level radioactive waste. *See* NIRS/PC Deconversion Rebuttal A.11. During the October 2005 hearings, LES acknowledged that its cost estimate for deconversion did not include a "line-item" for the cost of managing empty DUF_6 cylinders.

3.6 During the October 2005 hearings, Mr. Krich testified that because the washing and recertification of cylinders likely would occur during the operational life of the NEF, as the cylinders are used and reused, the associated cost would be an operational cost. Tr. at 1968-69, 2313. Mr. Krich also previously testified, along with LES witness Dr. Paul Harding (Managing Director of Urenco's Capenhurst, U.K. facility), that it is unreasonable to assume that fully serviceable cylinders would be cut up and disposed of as a routine matter, insofar as those cylinders can be continuously reused or recycled for storing and/or transporting radioactive material. *See* Tr. at 1965-77. In this regard, Mr. Krich and Dr. Harding characterized the empty cylinders as valuable commodities, not as waste material requiring disposal. *Id.*

3.7 Based upon its position that the cost of managing empty DUF_6 cylinders is an operational cost (as opposed to a decommissioning cost) and that cylinders are a valuable commodity, LES has expressed the view that such a cost is *not* an essential element of its initial site-specific cost estimate. Nonetheless, LES, in its November 23, 2005 response to the Staff's inquiry, committed to add $0.60 per kgU to its current cost estimate to address the putative cost of DUF_6 cylinder management. *See* LES Exh. 118. As LES explained during the October 2005 hearings and in LES Exhibit 118, the $0.60 per kgU estimate is based on cost estimates contained in the Urenco business study (as are the other components of LES's estimated cost for constructing and operating a private deconversion facility) as well as other pertinent information. *See* LES Exh. 91 at 11; Tr. at 1981-82; *see also*, LES Direct at A.15. The Staff has found this figure to be reasonable. Staff Proposed Findings at ¶ 5.5; Staff Direct at A.13. Indeed, the NIRS/PC expert derived approximately the same number in the October hearing from the

pertinent cost information in the Urenco business study, and counsel for NIRS/PC represented at the February 2006 hearing that NIRS/PC "can agree on the 60 cents for what it does." *See* NIRS/PC Disposal Rebuttal A.11; Tr. at 3390-91.

3.8 LES demonstrated that $0.60 per kg U is, in fact, a conservative cost estimate. First, Mr. Krich testified that it assumes that the entire inventory of DUF_6 to be produced during the licensed life of the facility is contained in cylinders, and that each cylinder will not be recertified/reused. Tr. at 2311. The Board agrees that such an assumption represents a *worst case* scenario. Tr. at 2312. As Mr. Krich testified, in practice, the filled cylinders will be continually reused, and recertified every five years. *See* LES Direct at A.16. The Staff witnesses testified that LES is not required to assume a worst case situation, and that it is reasonable to assume that DUF_6 cylinders will be reused throughout the life of the plant. *See* Staff Direct at A.11. Lastly, Mr. Krich emphasized that LES has not taken any credit for the reuse or resale of the cylinders to offset the cost of dispositioning DUF_6 from the NEF. *See* LES Rebuttal at A.4.

3.9 LES also furnished evidence from a third-party commercial source to further support the position that $0.60 per kgU is a conservative estimate of the cost of managing empty DUF_6 cylinders. Specifically, LES confirmed that Cameco routinely performs cylinder washing and recertification in accordance with the ANSI N14.1 standard for external customers (including U.S. companies). *See* LES Exh. 123. As the Staff acknowledged, Cameco has extensive experience with such activities. *See* Staff Direct at A.13; Tr. at 3476. Based on that experience, Cameco advised LES that the cost of performing cylinder washing and recertification is about $2,500 per cylinder, or $0.29 per kgU. *See* LES Exh. 123. According to Cameco, the $2,500 per cylinder price quotation includes overhead and profit margin. *See* LES Exh. 123. The price quote provided by Cameco further substantiates that $0.60 per kgU is a very conservative estimate of DUF_6 cylinder management costs.

3.10 Although Dr. Makhijani acknowledged that the information in the Urenco business study underlying LES's $0.60 per kgU cost estimate reflects the cost of cylinder "refurbishment," he asserted that there are "problems" with that information. NIRS/PC Direct at A.8. In particular, Dr. Makhijani claimed that the pertinent cost figures in the Urenco business study correspond to a washing process that is designed to meet European, as opposed to U.S., standards. *Id.* Mr. Krich, however, confirmed that Urenco washes and recertifies cylinders to meet the American National Standards Institute ("ANSI") N14.1 standard for uranium hexafluoride packaging (Tr. at 3384; LES Rebuttal at A.5), the same standard that applies to the washing and recertification of DUF_6 cylinders in the United States and Canada. *See* LES Exh. 123; LES Direct at A.5; Tr. at 3384-85; *see also* LES Exh. 124 at 1.1-6 (noting that LES will use the ANSI N14.1 standard); Staff Direct at A.10 (same); Tr. at 3466 (same). Mr. Johnson testified that cylinder washing conducted in accordance with this standard is not a highly technical or complex process. *See* Tr. at 3478-79; Staff Direct at A.10.

3.11 Based on the foregoing testimony and evidence, we find that the $0.60 per kgU is sufficiently conservative to bound the cost of washing and recertifying the empty DUF_6 cylinders. NIRS/PC presented no testimony or evidence to support a contrary conclusion.

3.12 Dr. Makhijani also claimed that LES must account for the cost of disposing of the cylinders as low-level radioactive waste. *See* NIRS/PC Direct at A.9. This view, however, is not consistent with industry practice or the NRC's financial assurance requirements. According to Cameco, the need to scrap cylinders is rare, as evidenced by the fact that the company has disposed of only "a very few damaged cylinders" during its extensive operational history. *See* LES Exh. 123; LES Rebuttal at A.6. In this regard, LES has committed in its license application (and through the SER) to implement a cylinder management program that will require LES to surveil all storage cylinders and repair damaged cylinders. *See* Tr. at

3400. The Staff, for its part, confirmed that once the cylinders are washed and recertified, they can be re-used or recycled by another party and hence, disposal costs are not required to be included in the decommissioning cost estimate. *See* Staff Direct at A.7, A.9.

3.13 As Dr. Harding and Mr. Krich testified during the October 2005 evidentiary hearings, empty DUF_6 cylinders are valuable operational commodities. Such cylinders can be continuously reused or recycled for storing and/or transporting radioactive material. *See* Tr. at 1965-77. Dr. Harding, drawing from his extensive familiarity with enrichment-related operations in Europe, emphasized that empty DUF_6 cylinders are considered a commercial resource. *See* Tr. at 1975-76. The inclusion of a cost estimate for a cylinder washing facility in the Urenco business study reflects this fact. *See* Tr. at 1973; LES Exh. 91 at 11. Mr. Krich elaborated on this point during the February hearings, when he noted that approximately 50-year old cylinders are still in circulation (Tr. at 3386), and that used cylinders from the Sequoyah Fuels facility were "snapped up by the industry." Tr. at 3388. As LES further points out, the fact that Cameco routinely provides cylinder washing and recertification services to outside customers indicates that used DUF_6 cylinders have intrinsic commercial value. *See* LES Rebuttal at A.6. Clearly, the industry expectation is that such cylinders will be continuously reused; disposal of such cylinders in not the norm.

3.14 Contrary to NIRS/PC's suggestion, LES does not need to provide a "marketing study" to address the disposition of cylinders more than 30 years into the future. That a market exists now, and will exist for the *foreseeable* future, provides sufficient basis for an initial decommissioning funding plan cost estimate. *See* Tr. at 3396-97; Tr. at 3468 (Mr. Johnson). To the extent any future changes in the market for used cylinders might affect LES's cost estimate, LES could make appropriate adjustments thereto throughout the periodic (annual) update process. Tr. at 3390, 3398 (Mr. Krich); Tr. at 3470 (Mr. Johnson); *see also*, LES Exh.

LES Exh. 82 at A-29 ("Adjustments should be made to account for inflation, for other changes in the prices of goods and services (*e.g.*, disposal cost increases), for changes in facility conditions or operations, and for changes in expected decommissioning procedures."); LES Exh. 82 at A-29; LES Exh. 119 at 57,332 col. 1.

3.15 Based on the record before us, we conclude that it is unreasonable to assume, as NIRS/PC do, that fully serviceable cylinders would be used once, washed, and then disposed of, as such a practice would disregard a valuable commercial resource.

3.16 Notwithstanding, the record also supports the conclusion that cleaning a cylinder to meet unrestricted use levels (*i.e.*, by washing, cutting and manually grit-blasting the cylinder), and disposing of the small amount of any resultant radioactive material, is bounded by LES's $0.60 per kgU cost estimate for cylinder washing and recertification. *See* LES Direct at A.17; Tr. at 2309-10. Cameco confirmed this in its January 9, 2006 letter to LES. *See* LES Exh. 123. Cameco indicated that the process of cleaning a cylinder to meet Canadian "free release" standards requires about 30 person-hours, and that based on its knowledge of the activities involved in that process, $0.60 per kgU is sufficient to cover the cost of cleaning a cylinder to meet Canadian free release standards. *Id.*

3.17 Both Mr. Krich and Mr. Johnson testified that the free-release standard referenced in the Cameco letter is the International Atomic Energy Agency standard, which is more stringent than the levels outlined in the NRC's Branch Technical Position ("BTP"), "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use," which, in turn, is referenced in Regulatory Guide 1.86. *See* Tr. at 3392-94 (Mr. Krich), Tr. at 3471, 3485-88 (Mr. Johnson). Since the decommissioning cost estimate need not include disposal of non-radioactive materials (*i.e.*, cleaned cylinders) beyond that necessary to terminate the NRC license, meeting the Canadian free-release standard (and thus the BTP levels) is

sufficient to release the cylinders from regulatory control. *See* Staff Direct at A.7; LES Exh. 82 at A-26; LES Exh. 120 at 24,031 col. 2; *see also Consolidated Edison Co. et al.* (Indian Point, Units 1 and 2), CLI-01-19, 54 NRC 109, 145 (citing 53 Fed. Reg. 24,018, 24,031 (June 27, 1988)) ("[W]e cannot require the Applicants to provide funds above and beyond those required for standard decommissioning as defined by NRC rules. Decommissioning funding under NRC regulations does not include costs relating to nonradioactive structures and materials beyond those necessary to terminate the NRC license.")

3.18 In sum, the testimony and evidence presented by LES and the Staff demonstrates that $0.60 per kgU is sufficiently conservative to bound the cost of cleaning DUF_6 cylinders to unrestricted use levels. Tr. at 2310. NIRS/PC have presented no testimony or evidence to support a contrary conclusion.

3.19 Based upon our review of the entire record, and the Applicant's and the Staff's proposed findings, the Board resolves this issue in favor of the Applicant. We agree with LES that $0.60 is a very conservative estimate, insofar as it (1) assumes that the entire DUF_6 inventory is contained in cylinders that are filled and emptied only once by the NEF; and (2) bounds the cost of cylinder washing and recertification, as well as the cost of cleaning cylinders to meet unrestricted use levels. NIRS/PC have presented no testimony or evidence to show otherwise. While the addition of $0.60 per kgU may result in an overly conservative cost estimate, the Board reiterates its desire to ensure that LES's cost estimate reflects a "reasonable minimum sum." The periodic update process will allow LES adjust its cost estimate upward or downward, as appropriate, as actual operating experience becomes available.

B. <u>The Cost of Capital</u>

3.20 As stated above, NIRS/PC claim that LES's DUF_6 dispositioning cost estimate is insufficient because it fails to account for a "cost of capital," *i.e.*, the cost of

borrowing funds and the return on investment for the deconverter to construct and operate a private deconversion facility. Specifically, Dr. Makhijani argues that: (1) LES omitted a cost of capital in its decommissioning cost estimate; (2) such an omission cannot be accounted for by any excess allowance for operations and maintenance in the cost estimate; (3) such an omission cannot be accounted for by escalation of some portion of the revenues; (4) LES's proposal to fund deconversion at the end of the facilities operating life is a new strategy and inconsistent with the representations made by LES to the State of New Mexico in the parties' August 2005 Settlement Agreement; (5) LES's *pro forma* estimate of $0.40 per kgU as a cost of capital is inadequate. *See* NIRS/PC Direct at A.2-A.6; NIRS/PC Rebuttal at A.5-A.5.

3.21 For the reasons set forth below, we conclude that each of Dr. Makhijani's claims is without merit. LES has complied with the applicable NRC regulations by committing to provide sufficient financial assurance over the life of the proposed NEF to fund all activities necessary to disposition DUF_6 from the proposed NEF -- including the deconversion of DUF_6 to DU_3O_8. Specifically, LES will ensure that sufficient funds are available at the end of NEF's nominal 30-year operating life to allow a third party to pay for the deconversion of all DUF_6 generated by the facility. Therefore, the construction of a deconversion facility at that time would not require the borrowing of funds. *See* LES Direct at A. 27; Staff Direct at A.15.

3.22 At this juncture, LES is required to submit a decommissioning funding plan ("DFP"). *See* 10 C.F.R. § 30.35, 40.36, and 70.25. The DFP must contain: (a) a site-specific cost estimate for decommissioning; (b) a description of the means for adjusting the cost estimate and associated assurance level periodically over the life of the facility; (c) a certification by the licensee that financial assurance has been provided in the amount of the cost estimate; and (d) identification of one or more financial assurance mechanisms (including supporting documentation). *See* LES Exh. 82 at A-30; LES Direct at A.22. The DFP is intended to ensure

that an applicant provides a *reasonable* site-specific cost estimate for possible future decommissioning activities, and commits to the use of a financial assurance mechanism that is acceptable to the NRC. *See* LES Exh. 81; LES Exh. 82 at 4-1 to 4-2. Furthermore, the cost estimate for dispositioning the depleted uranium that is part of the DFP, in turn, is to be based on a plausible strategy. As set forth in its DFP, LES intends to use a surety bond method to provide reasonable assurance that adequate funds are available to the NRC to decommission the NEF and to disposition any DUF_6 generated by the facility, in the event that LES itself is unable to do so.

3.23 LES has complied with each of the DFP requirements enumerated above. First, in accordance with NUREG-1757, Volume 3, LES submitted a DFP that contains a cost estimate for general facility decommissioning based on detailed unit cost estimates and DU dispositioning based on the identification of a plausible strategy. *See* LES Direct at A. 24. The bases for this DU dispositioning cost estimate are set forth in detail in the prefiled testimony and proposed findings submitted by LES relative to the October 2005 evidentiary hearings. In short, LES has estimated the total cost of decommissioning the NEF to be approximately $942 million (in 2004 dollars). This includes an estimated cost of approximately $622 million to disposition DU byproduct produced over the licensed operating period of the NEF. *See* LES Exh. 83, at Table 10.1-14 ("Total Decommissioning Costs"). When expressed in terms of dollars per kgU, LES's estimated DU dispositioning cost is $4.68/kgU in 2004 dollars. This figure includes: (1) $2.69/kgU for deconversion of DUF_6 to DU_3O_8 (of which CaF_2 disposal accounts for $0.02/kgU), (2) $0.85/kgU for transportation of DUF_6 and DU_3O_8, and (3) $1.14/kgU for near-surface disposal of DU_3O_8. In computing the total lifetime estimated DU dispositioning cost of $622,169,000, LES conservatively assumed that the NEF will generate 132,942 MT of DU over a nominal 30 year operational period. This is conservative insofar as LES expects to end facility production about nine years earlier. *See* LES Direct at A.24; Tr. at 3331-32. As discussed above,

LES has committed to include an additional $0.60 per kgU to bound the cost of cylinder management activities.

3.24 Second, LES will be required by license condition to update its facility decommissioning and DU dispositioning financial assurance cost estimates at regular intervals, to revise its associated funding instruments accordingly, and to submit final executed copies of the instruments to the NRC. *See* Staff Exh. 37 at 10-14 to 10-16. The license condition will require LES to update its financial assurance cost estimate for facility decommissioning at least once every three years, *i.e.*, the interval specified in 10 C.F.R. §70.25(e). *See id.* With regard DU dispositioning, the license condition will require LES to update its financial assurance cost estimate annually on a forward-looking (*i.e.*, prospective) basis, so that the financial assurance level reflects current projections of LES's DU byproduct inventory. *See id.* As set forth in Section 10.2.1 of the NEF SAR (LES Exh. 83), LES will utilize a surety bond to provide reasonable financial assurance that adequate funds will be available to decommission the NEF, and to disposition the DUF_6 generated during facility operations. *See also* Staff Exh. 37 at 10-13.

3.25 When LES's estimated deconversion cost of $2.67 per kgU (as adjusted over time through the periodic update process) is multiplied by the *total* number of kilograms of DU to be generated by the NEF during its nominal 30-year operational period (*i.e.*, 133,942,000 kgU), the resulting figure reflects the amount of financial assurance that will be available at the end of facility life. According to LES and the Staff, that level of financial assurance will be sufficient to pay for the construction and operation (by a third party) of a deconversion facility that could process all of the DUF_6 generated by the NEF during its operating life. *See* Tr. at 3294 (Krich), 3433 (Mr. Johnson). LES and the Staff further testified that because there would

be no need to borrow funds for this purpose, there would be no debt to service or internal return on investment, *i.e.*, cost of capital. *See id.*; LES Direct at A.27.

3.26 The NRC Staff's witnesses reached the same conclusion, testifying as follows:

> If it is assumed that the flow of funds is designed to result in the collection of a sum of money *at the end of the lifetime* of the NEF that is sufficient to finance $88 million in construction, licensing, and engineering costs to build a plant to carry out [DUF_6] tails deconversion, then we believe that there would be *no need* to include the $0.40 [per kgU cost of capital] figure at all.

See Staff Direct at A.15 (emphasis added); Tr. at 3433.

3.27 The Board agrees with LES and the Staff on this point. There is no regulatory basis for the assertion that LES must include a line item for the cost of capital in its DFP cost estimate. As Mr. Krich testified, NRC regulations reflect the Commission's intent to use a "step-by-step" or graded approach to decommissioning financial assurance that spans the operating life of a given facility. *See* LES Direct at A.21. The Commission described that approach as follows:

> [The] [c]ombination of these steps, first establishing a general level of adequate financial responsibility for decommissioning early in life, followed by periodic adjustment, and then evaluation of specific provisions close to the time of decommissioning, will provide reasonable assurance that the Commission's objective is met, namely that *at the time of permanent end of operations*, sufficient funds are available to decommission the facility in a manner which protects public health and safety. More detailed consideration by NRC early in life beyond the certification is not considered necessary because of the steps discussed above.

LES Exh. 120 at 24,030-31 (emphasis added).[4] Quoting the very same passage, the Commission reaffirmed the continuing validity of this approach as recently as 2001, in a license transfer

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[4] *Cf. Pub. Serv. Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-88-10, 28 NRC 573, 585 (emphasis added) ("[T]he rule contemplated a *step-by-step*

proceeding. The Commission emphasized that its rules "take into account the possibility of changes over time" and accordingly rely on the use of certain "end-of-license" requirements. *See Indian Point*, CLI-01-19, 54 NRC at 144. With respect to Part 70 licensees, these end-of-life requirements include the submittal of a decommissioning plan ("DP"). The DP must contain, among other items, an updated and detailed cost estimate for decommissioning, along with a comparison of that cost estimate to the amount of the financial assurance for decommissioning. *See* LES Exh. 81 at 10-1; LES Exh. 82 at 4-4 to 4-6. Therefore, as Mr. Krich testified, LES is not required at this stage to make pinpoint projections of decommissioning and depleted uranium dispositioning costs that will be incurred years to decades in the future. *See* Tr. at 3313-15. Moreover, changes in LES's projected costs will be accounted for through periodic updates of its cost estimate. *See* Tr. at 3313, 3363.

3.28 The upshot is that LES is not required to commence DUF_6 deconversion activities *before* the NEF ceases operations; nor is it required to compute as associated "cost of capital." Any decision by LES to commence such activities before the end of licensed NEF operations lies within LES's business discretion. *See* Tr. at 329192. Moreover, should LES opt to do so as a commercial matter, any deconversion costs would be paid for out of LES's operational budget. No funds would be withdrawn from LES's financial assurance instrument for that purpose. *See* Tr. at 3292-93, 3358.

3.29 Although LES will financially assure the disposition of DU incrementally, we nonetheless conclude that sufficient financial assurance will be available at any point during the NEF's operating lifetime to disposition all DUF_6 generated by the facility and awaiting

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decommissioning assurance process over a long period of time with an initial certification of funding, periodic updates, a preliminary decommissioning plan at or a about 5 years before projected end of operations, and a decommissioning plan submitted as part of the application for license termination.").

dispositioning up to that point in time. Specifically, by providing financial assurance in the amount of its current "private sector" cost estimate (and by updating that estimate over time), LES will ensure that sufficient funds are available at any time up to the end of the 30-year operating life of the NEF in its financial assurance instrument to allow the NRC to pay the DOE to disposition DUF_6 from the NEF if LES is unable to do. *See* Tr. at 3321, 3365-66, 3379-80, 3434-35, 3442. In fact, given the addition of $0.60 per kgU for to LES's cost estimate for cylinder management costs, LES's commercial cost estimate now equals $5.28 per kgU. That figure significantly exceeds DOE's estimated cost of $4.68 per kgU. *See* LES Direct at A.29; LES Rebuttal at A.12; *see also.*, Tr. at 3367-68, 3380, 3433-35 (Mr. Johnson).

3.30 Based upon the foregoing, we conclude that LES has complied with the applicable NRC decommissioning financial assurance requirements. By providing financial assurance in increments on an annual, forward-looking basis, LES will ensure that sufficient financial assurance is available -- at the end of the facility's nominal 30-year operating period -- to decommission the facility. Should the NRC need to draw on LES's financial assurance instrument at that time, sufficient funds would be available to pay for the construction and operation of a deconversion facility, without resorting to borrowed funds or accounting for return on investment for that purpose. As discussed above, sufficient funds also would be available to pay the DOE to disposition the DU *at any time* in the NEF's operating life. *See* LES Direct at A.27, A.29, Tr. at 3433-35.

3.31 NIRS/PC and Dr. Makhijani, for their part, incorrectly assume that funds would need to be borrowed and a return on investment accounted for to pay for a deconversion facility, and that LES must account for such borrowing and return on investment (*i.e.*, the cost of capital) in its financial assurance for the disposition of depleted uranium. As the October 2005 hearing transcript reflects, NIRS/PC took great pains to highlight LES's ostensibly material

omission of the cost of capital from its deconversion cost estimate. In that context, LES witnesses Krich and Leslie Compton acknowledged that LES did not include a line item for cost of capital, but further testified that LES's estimated O&M cost contained sufficient margin to cover any assumed cost of capital. *See, e.g.*, Tr. at 2007, 2016, 2277. They also explained how the cost could be accounted for in the escalation of LES's financial assurance amount over time. *See* Tr. at 3337-38. Accordingly, NIRS/PC focused much of their February 2006 evidentiary presentations (and cross-examination of LES's expert witness) on those issues. However, for the reasons stated above, the O&M "margin" and escalation issues are, in fact, immaterial to LES's compliance with the NRC's decommissioning financial assurance requirements. *See id.* Namely, there is no need for LES to provide a line item for the cost of capital, insofar as LES's financial assurance instrument will "accrue" sufficient funds over the NEF's operating life to pay for a deconversion facility.

3.32 In any event, we note that the calculation of a cost of capital "line item" at this early stage is largely an academic exercise and rife with uncertainties. As both Mr. Krich and Mr. Collier testified, there is more than one viable method to compute the cost of capital, and, more importantly, the end result is heavily assumption-driven. *See* Staff Direct at A.17-A.18.; Tr. at 3319-20 (Krich); Tr. at 3455-56 (Collier); *cf. Wabash Valley Power Ass'n and Pub. Serv. Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 & 2), DD-81-18, 14 NRC 925, 928 (stating, albeit in the financial qualifications context, that "[t]he financing of any undertaking is obviously a dynamic process," and that "[e]ven after consideration of the fundamental underlying assumptions of a financing plan ... one can only view a financial plan to be one possible way by which a company's projected capital requirements, including those resulting from the construction of a facility, might reasonably be obtained"). In the Board's view, the assumptions underlying LES's *pro forma* calculation of a $0.40 per kgU line item for

the cost of capital (*see* LES Exh. 118) are as reasonable as any given the uncertainties inherent in such a computation. Notwithstanding, the Board stresses that such a computation is not material to LES's showing of compliance with the NRC's decommissioning financial assurance regulations, nor is the specific financing mechanism that LES might employ should it decide, as a business matter, to commence deconversion before the NEF ceases operations.

3.33 NIRS/PC also incorrectly claim that LES's proposal to fund deconversion at the end of the facility's operating life constitutes a new dispositioning strategy, and is inconsistent with representations made by LES to the State of New Mexico in the parties' Settlement Agreement. *See* NIRS/PC Rebuttal at A.5. However, as Mr. Krich consistently testified (*see, e.g.*, Tr. at 3309-13, 3327-28, 3337-38, 3405-06), and as set forth in the NEF application (*see* LES Exh. 83 at 10.2-1, 10.3-1), LES always has conservatively assumed, for the specific purpose of computing its total decommissioning cost estimate, that the NEF will operate for 30 years and then shut down (resulting in the production of approximately 133 million metric tons of DU). Assuming that LES is unable financially to meet its decommissioning obligations at that time, the NRC could draw upon the NEF surety bond. Funds from the surety bond would be placed in a standby trust fund, and the NRC would determine how those funds are expended to decommission the NEF and to disposition all DUF_6 generated by the facility. *See* Tr. at 3292, 3312, 3362, 3435. As we concluded earlier, LES is not required to build a deconversion facility during the operating life of the NEF.

3.34 In support of their cost of capital argument, NIRS/PC also devoted considerable attention to a January 2006 Memorandum of Understanding ("MOU") between LES and AREVA. *See* LES Exh. 88. The MOU includes, among other things, a tentative timeline for the design, licensing, and construction of a private deconversion facility that would process DUF_6 from the NEF. Mr. Krich testified that LES offered the MOU as an exhibit during the

October 2005 hearings to demonstrate that the construction and operation of a private deconversion facility in the U.S. is plausible, or "more than mere speculation," in response to a specific NIRS/PC contention (Contention NIRS/PC EC-3/TC-1). *See* Tr. at 3401-02. The MOU was never placed on the licensing docket. *See* Tr. at 3313, 3402-03. Moreover, LES has never stated categorically that it will build a deconversion facility in 2012, nor has LES decided who will build and operate such a facility. *See* Tr. at 3301. In this regard, Mr. Krich emphasized again that for financial assurance purposes, LES assumed that such a facility would be built at the end of the nominal 30-year operating life of the NEF. Tr. at 3402. Regardless, any decision by LES to construct a deconversion facility in 2012, or at some other point prior to the end of the NEF's licensed operating life, is purely a commercial matter that does not bear on the sufficiency of LES's financial assurance showing. *See* LES Direct at A.28; Tr. at 3352. As the Staff pointed out, "there is no regulatory requirement that deconversion occur before termination of the license." Staff Rebuttal at A.6.

3.35 The Board also rejects the Intervenors' argument that the Settlement Agreement between LES and the State of New Mexico in any way undermines LES's plausible strategy or associated DU dispositioning cost estimate. *See* NIRS/PC Rebuttal at A.5. NIRS/PC point to the fact that the Settlement Agreement imposes certain quantity and time limits on the storage of DUF_6 cylinders at the NEF site. *See* Tr. at 3330; *see also* NIRS/PC Exh. 262. First, the Board made quite clear at the hearing that the terms of the Settlement Agreement are irrelevant to the cost of capital associated with building a private deconversion facility -- the issue of concern here. *See* Tr. at 3335-37 (Judge Abramson). Nonetheless, as Mr. Krich explained, the Settlement Agreement presents LES with a number of options, beyond the suspension of enrichment operations, as the NEF approaches the 5,016-cylinder storage limit set forth in the Agreement. These include tendering proof that an application to construct and

operate a deconversion facility has been docketed or approved by the relevant reviewing agency, or using another method to remove the DUF_6 stored onsite. *See* Tr. at 3333-34; NIRS/PC Exh. 262 at 3. Assuming that LES opted to store DUF_6 cylinders at an offsite location, any associated transportation or storage costs would be paid for out of NEF operating funds, and would not constitute decommissioning costs. *See* Tr. at 3335-36.

3.36 In summary, the Board concludes that LES has complied with the NRC's decommissioning financial assurance regulations. LES has demonstrated that it will provide sufficient financial assurance to fund all activities necessary to disposition all DUF_6 from the proposed NEF. Those activities include the deconversion of DUF_6 to DU_3O_8. The Board agrees with LES and the Staff that, under the specific financial assurance approach contemplated by LES, in which LES will accrue sufficient financial assurance over the NEF's operating life to cover the cost of a deconversion facility, there is no need to account for a cost of capital.

IV. SUMMARY FINDINGS OF FACT AND CONCLUSIONS OF LAW

4.1 The Licensing Board has considered all of the testimony and evidentiary materials presented by the parties on the two supplemental issues. Based upon a review of the entire evidentiary record and the parties' proposed findings of fact and conclusions of law, and in accordance with the findings/conclusions set forth in Section III above, the Board has decided the matters in controversy concerning those contentions in the favor the Applicant and/or NRC Staff.

4.2 With respect to the cost of cylinder management, the Board finds that LES, as supported by the NRC Staff, has demonstrated by a preponderance of the reliable, material, and probative evidence in the record that its cost estimate for empty DUF_6 cylinder management is highly conservative and complies with the applicable decommissioning funding plan requirements set forth in 10 C.F.R. §§ 30.35, 40.36, and 70.25, and relevant guidance in

Volume 3 of NUREG-1757. LES, in other words, has presented a cost estimate for DUF_6 cylinder management ($0.60 per kgU) that is based on documented and reasonable assumptions.

4.3 With respect to the cost of capital question, the Board finds that LES, as supported by the NRC Staff, has demonstrated by a preponderance of the reliable, material, and probative evidence in the record that its cost estimate for private sector DU dispositioning does not need to provide for a cost of capital, since it complies with the applicable decommissioning funding plan requirements set forth in 10 C.F.R. §§ 30.35, 40.36, and 70.25, and relevant NRC guidance. Specifically, LES has committed to ensure that sufficient financial assurance will be available at the end of NEF's nominal 30-year operating life to allow a third party to pay for the deconversion of all DUF_6 generated by the facility.

4.4 Based upon the evidentiary record before it, and prior Commission and Board rulings in this proceeding, the Board finds that, with respect to both supplemental issues, the matters placed in controversy may be resolved in favor of LES on an alternative ground. Specifically, in its license application, LES has identified the transfer of depleted uranium to the DOE for disposal as a "backup" plausible strategy, and has put into evidence a corresponding cost estimate prepared specifically for LES by the DOE.[5] *See* LES Exhs. 85-87. Because the Commission has held that disposal of DU in this manner is a "plausible strategy," and because this Board has held that the cost estimate provided by DOE to LES is not contestable in this proceeding,[6] we find that LES also has demonstrated compliance with the Commission's

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[5] As explained above, Section 3113 of the USEC Privatization Act, 42 U.S.C. § 2297h-11, requires the DOE, at the request of an NRC-licensed enricher, to "accept for disposal" LLRW, including DU, at the DOE's disposal costs (including a *pro rata* share of any of DOE's capital costs).

[6] *See* CLI-05-5, 61 NRC at 36 (holding that "pursuant to Section 3113 of the USEC Privatization Act, disposal of the LES depleted uranium tails at a DOE facility represents a 'plausible strategy' for the disposition of the tails"); August 2005 Ruling on Late-Filed Contentions at 22 (finding "challenges to the DOE cost calculations [to be] outside the scope of this proceeding and lacking

decommissioning financial assurance requirements on that alternative basis. The availability of the backup DOE option ensures that, at any juncture during the NEF's operating life, sufficient financial assurance will be available to disposition all DUF_6 produced by the NEF up to that point.

Respectfully submitted,

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Dated at Washington, District of Columbia
this 1st day of March 2006

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materiality in that the agency has no basis for assuming DOE has erred in computing its fees and no authority to direct or challenge DOE's fee estimates established pursuant to its own statutory authority").

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 CONCERNING COST OF CYLINDER MANAGEMENT AND COST OF CAPITAL ISSUES in the captioned proceeding has been served on the following by e-mail service, designated by **, on March 1, 2006 as shown below. Additional service has been made by deposit in the United States mail, first class, this 1st day of March 2006.

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G. Paul Bollwerk, III, Chair
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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
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