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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ATOMIC SAFETY AND LICENSING BOARD
(ASLB)

+ + + + +

OPEN HEARING

In the Matter of:

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

Thursday, October 27th, 2005

Room T-B345
NRC Building 2
11454 Rockville Pike
Rockville, Maryland

The above-entitled matter came on for
hearing, pursuant to notice, at 8:00 a.m.

BEFORE:

G. PAUL BOLLWERK, III	Chair
PAUL B. ABRAMSON	Administrative Judge
CHARLES N. KELBER	Administrative Judge

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CHERVERNE CLOYD
JONATHAN RUND
KAREN VALLOCH
JACK WHETSTINE
ANDREW WELKIE

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ALSO PRESENT: (Cont.)

LOUISIANA ENERGY SERVICES

PAUL HARDING

ROD KRICH

PAUL SCHNEIDER

LESLIE COMPTON

NUCLEAR INFORMATION & RESOURCE SERVICES AND
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MELISSA KEMP

ARJUN MAKHIJANI

BRICE SMITH

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I-N-D-E-X

EXAMINATION

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EXHIBIT INDEXKEY

I-Identified
A-Admitted into evidence
R-Rejected
W-Withdrawn
TUA-Taken under advisement

Official Hearing Document Exhibit #/letter Title	Disposition/ Page
NIRS/PC 171 Baird Report 8-90	I-3091
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Staff exhibit 47 FEIS 6-05	I-3131
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P-R-O-C-E-E-D-I-N-G-S

2:56 p.m.

CHAIR BOLLWERK: Thank you. I want to apologize for being a couple minutes late. We have someone stranded out in the Sierras that I have to deal with.

Let me raise quickly, before we go on to the portion of the proceeding dealing with the contingency factor. And I should mention, this part of the proceeding is now open again.

So be aware, I don't know who might be here that wasn't here before. But, everybody is welcome at this point. There are two exhibits I wanted to bring up.

One is NIRS/PC 171. I believe this was an exhibit that was cited in Dr. Makhijani rebuttal testimony on disposal. And I think I didn't mention it before we were going through.

And you didn't mention it either. I just want to make sure if there's a question or if it needs to be entered or doesn't need to be entered. It's a Baird Report of August 1990.

MR. LOVEJOY: My notes seem to indicate that it was admitted. But I'm not guaranteeing that that was right. I move its admission. It was

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1 identified, I believe, in the testimony.

2 CHAIR BOLLWERK: Well, we've been talking
3 about 170, not 171.

4 MR. LOVEJOY: Yes.

5 CHAIR BOLLWERK: Does anybody want to take
6 a look at it? Any questions? I don't know if the
7 court reporter -- neither Ms. Engle or I have it
8 listed.

9 MS. CLARK: Yes, we discussed it when we
10 had our --

11 CHAIR BOLLWERK: Okay. Did you have it
12 under another number?

13 MS. CLARK: I believe that's correct
14 because we wanted to admit it as one of our exhibits
15 but we didn't because we had determined it was already
16 admitted on behalf of the --

17 CHAIR BOLLWERK: Right. The June -- 170,
18 which is the June report was admitted. This is a
19 separate report. This is an August report, which is
20 numbered 171.

21 MS. CLARK: Okay, yes. Ours was June.

22 CHAIR BOLLWERK: Right, this is August.
23 This is a later. So, let's go ahead and at minimum
24 identify it for the record. It's the report by R.D.
25 Baird, Additional Radionuclide Concentration Limits

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1 for the Norm Disposal Site at Clive Utah, August 1990.
2 That would be NIRS/PC 171. And it's marked for
3 identification.

4 (Whereupon, the above-
5 referenced to document was
6 marked as NIRS/PC Exhibit No.
7 171 for identification.)

8 CHAIR BOLLWERK: Are there any objections
9 to its admission?

10 (No verbal response.)

11 CHAIR BOLLWERK: No? Then we will admit
12 NIRS/PC Exhibit 171 into the record.

13 (The document referred to,
14 having been previously marked
15 for identification as NIRS/PC
16 Exhibit No. 171 was admitted in
17 evidence.)

18 CHAIR BOLLWERK: And then the second one
19 would be Exhibit 243, which is the portions of the
20 deposition that at one point were used. I think we've
21 been talking with Mr. Lovejoy's staff.

22 And I think we've gotten it straightened
23 out. There were the portions of the deposition that
24 were originally put together, Black pages 43 and 44,
25 which were discussed briefly.

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1 So we've added those to the exhibit. And,
2 if it's acceptable to everyone, we will go ahead and
3 admit it with those pages and add it to it. I believe
4 all the other pages that were covered are already in
5 the excerpts.

6 So, given that, with respect to NIRS/PC
7 243, which is the portions of the August 30th, 2005
8 deposition of Krich and Potter, we'll mark it for
9 identification.

10 (Whereupon, the above-
11 referenced to document was
12 marked as NIRS/PC Exhibit No.
13 243 for identification.)

14 CHAIR BOLLWERK: And then any objections
15 to its submission into evidence?

16 (No verbal response.)

17 CHAIR BOLLWERK: There being none, then
18 NIRS/PC Exhibit 243 is admitted into evidence.

19 (The document referred to,
20 having been previously marked
21 for identification as NIRS/PC
22 Exhibit No. 243 was admitted in
23 evidence.)

24 CHAIR BOLLWERK: Okay. Anything else
25 procedural the parties have at this point?

1 (No verbal response.)

2 CHAIR BOLLWERK: And I should mention that
3 the close of the testimony on contingency factor we do
4 need to talk about a few procedural matters as well as
5 at least have a brief discussion about the mandatory
6 hearing.

7 And we do intend to do that. So, all
8 right. Let's then move to the LES panel dealing with
9 the contingency factor. And I believe we have at
10 least one new face here, Mr. LaGuardia.

11 WITNESS LAGUARDIA: Yes.

12 CHAIR BOLLWERK: All right, would you
13 stand please, sir and raise your right hand.
14 Whereupon,

15 THOMAS LAGUARDIA

16 ROD KRICH

17 were called as witness by Counsel for The Applicant
18 and, having been duly sworn, assumed the witness
19 stand, were examined and testified as follows:

20 CHAIR BOLLWERK: And, Mr. Krich, you
21 remain under oath, obviously.

22 WITNESS KRICH: I may be under oath for
23 the next three weeks.

24 (Laughter.)

25 CHAIR BOLLWERK: It does get warm in this

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1 room if you're planning on staying in that box when
2 they turn off the air conditioning.

3 MR. SMITH: Good afternoon. Do you have
4 in front of you a document entitled the prefiled
5 direct testimony of Rod Krich and Thomas LaGuardia on
6 behalf of Louisiana Energy Services LP regarding the
7 adequacy of the contingency factor applied by LES to
8 its cost estimate for depleted uranium dispositioning?

9 WITNESS KRICH: Yes.

10 WITNESS LAGUARDIA: Yes.

11 MR. SMITH: And was that testimony
12 prepared by you or under your supervision?

13 WITNESS LAGUARDIA: Yes.

14 WITNESS KRICH: Yes.

15 MR. SMITH: And do you have any
16 corrections to your testimony at this time?

17 WITNESS LAGUARDIA: No.

18 WITNESS KRICH: No.

19 MR. SMITH: Is the document true and
20 correct to the best of your knowledge and belief?

21 WITNESS KRICH: Yes.

22 WITNESS LAGUARDIA: Yes.

23 MR. SMITH: I would like to move that the
24 direct testimony be admitted into the record.

25 CHAIR BOLLWERK: All right, any

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1 objections?

2 (No verbal response.)

3 CHAIR BOLLWERK: Then the prefiled direct
4 testimony of Rod Krich and Thomas LaGuardia on behalf
5 of LES as to its cost estimate for depleted uranium
6 disposition -- I'm sorry, wrong testimony.

7 No, I do have it. The contingency factor
8 applied by LES to its cost estimate for depleted
9 uranium dispositioning is admitted into the record and
10 should be adopted as if read.

11 (Whereupon, the prefiled direct testimony
12 of Thomas LaGuardia and Rod Krich was bound into the
13 record as if having been read.)**

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gas centrifuge enrichment facility that would be located in Lea County, New Mexico and provide enrichment services principally to U.S. nuclear utilities. I also am responsible for implementing the Quality Assurance Program and ensuring that engineering products and services provided by contractors are of sufficiently high quality to be accepted by LES.

Q3. Please summarize your educational and professional qualifications.

A3. (RMK) I hold a B.S. in mechanical engineering from the New Jersey Institute of Technology and an M.S. in nuclear engineering from the University of Illinois. I have over 30 years of experience in the industry, covering engineering, licensing, and regulatory matters. This experience encompasses the design, licensing, and operation of nuclear facilities. A detailed statement of my professional qualifications is attached hereto.

Q4. Are you familiar with the proposed National Enrichment Facility ("NEF") and the operations that will take place there?

A4. Yes.

Q5. What is the basis of your familiarity with the NEF?

A5. (RMK) As Vice President of Licensing, Safety, and Nuclear Engineering for LES, I have the overall responsibility for licensing and engineering matters related to the NEF project. In this capacity, I oversaw preparation and submittal of the NEF license application, as well as the engineering design of the facility processes and safety systems. As a result, I am very familiar with the NEF license application, and NRC requirements and guidance related to the contents of such an application. Further, I serve as LES's lead contact with respect to matters related to the NRC Staff's review of the NEF license application. Finally, I also am responsible for the preparation of all state and federal permit applications related to the NEF.

Q6. What is the purpose of your testimony?

A6. (RMK) I will testify, as an expert, that the 25 percent contingency factor that LES has explicitly committed to apply to its overall commercial cost estimate for depleted uranium ("DU") dispositioning is appropriate and reasonable, insofar as the use of the 25 percent contingency factor is consistent with NRC Staff's recommendation in NUREG-1757 (Vol. 3, App. A. at A-29).

B. Thomas S. LaGuardia ("TSL")

Q7. Please state your name, occupation, and by whom you are employed.

A7. (TSL) My name is Thomas S. LaGuardia. I am President of TLG Services.

Q8. Please describe your current responsibilities.

A8. (TSL) As the President of TLG Services, I oversee the operations of a consulting engineering company whose principal objective is to provide planning and management of decontamination and decommissioning projects, and to support nuclear power plant utilities and other nuclear facilities in estimating and funding the costs of decommissioning. In this regard, I am thoroughly familiar with the handling, packaging, storage, and disposal requirements for radioactive waste, particularly as they relate to the preparation of nuclear facility decommissioning feasibility and cost studies.

Q9. Please summarize your educational and professional qualifications.

A9. (TSL) I hold a B.S. in Mechanical Engineering from Polytechnic Institute of Brooklyn and an M.S. in Mechanical Engineering from the University of Connecticut. I have also completed various courses in computer programming, radioactive waste management, and dynamic shock analysis and program management. I am a registered Professional Engineer in Connecticut, New York, New Jersey, Virginia, and California and I am also a Certified Cost Engineer. I have over 37 years of experience in the nuclear industry, and for the last the last 32 years, I have worked exclusively in the field of decontamination and decommissioning. I have

also published extensively in the area of decommissioning and serve on several committees on decommissioning. A detailed statement of my professional qualifications is attached hereto.

Q10. Are you familiar with the proposed National Enrichment Facility ("NEF") and the operations that will take place there?

A10. Yes.

Q11. What is the basis of your familiarity with the NEF?

A11. (TSL) I have reviewed relevant portions of the NEF license application that describe generally the facility and its operation, as well as information in the Safety Analysis Report ("SAR"). Based on my expertise in decommissioning, I have been retained by LES to evaluate the reasonableness of the contingency factor applied by LES to its DU dispositioning cost estimate.

Q12. What is the purpose of your testimony?

A12. (TSL) I will testify as an expert that the 25 percent contingency factor applied by LES to its DU dispositioning cost estimate is fully adequate, in view of: (1) the NRC Staff's specific recommendation in NUREG-1757 that materials licensees apply a contingency factor of 25 percent to the sum of all estimated decommissioning costs, and (2) the nature of the facility to be decommissioned (an enrichment facility as opposed to a nuclear power reactor) and the radioactive waste (depleted uranium) to be dispositioned by LES.

II. REGULATORY BACKGROUND – APPLICABLE NRC REQUIREMENTS

Q13. Please describe the NRC regulatory requirements, and any related NRC guidance, applicable to the application of a contingency factor in a cost estimate for decommissioning the proposed NEF.

A13. (RMK, TSL) In accordance with 42 U.S.C. § 2243 and 10 C.F.R. §§ 30.35, 40.36, and 70.25, LES is required to present in its application an estimate of the costs of

decommissioning its proposed enrichment facility and dispositioning DU waste, as well as to identify an associated funding plan. See NEF Safety Analysis Report ("SAR") Sections 10.0 through 10.3; NEF Environmental Report ("ER") Section 4.13.11. In a related guidance document that is intended to facilitate compliance with the foregoing regulations, the NRC Staff has directed materials license applicants to apply a 25 percent contingency factor to their overall decommissioning cost estimate. See NUREG-1757, "Consolidated NMSS Decommissioning Guidance" (Sept. 2003), Vol. 3 (LES Exhibit 82). Specifically, NUREG-1757 provides that:

Because of the uncertainty in contamination levels, waste disposal costs, and other costs associated with decommissioning, the cost estimate should apply a contingency factor of 25 percent to the sum of all estimated decommissioning costs. The 25 percent contingency factor provides reasonable assurance for unforeseen circumstances that could increase decommissioning costs, and should not be reduced or eliminated simply because foreseeable costs are low.

See LES 82, App. A at A-29 (emphasis added). Notably, NUREG-1757 (at A-29) further states: "NRC's recommendation for the use of a 25 percent contingency factor is consistent with the analysis and guidance contained in NUREG/CR-6477, which applies a 25 percent contingency factor to all estimated costs associated with decommissioning various reference facilities."

III. RESPONSE TO SPECIFIC CLAIMS MADE IN CONTENTION NIRS/PC EC-5/TC-2 ("DECOMMISSIONING COSTS")

Q14. Are you familiar with Contention NIRS/PC EC-5/TC-2 ("Decommissioning Costs")?

A14. (RMK, TSL) Yes. As admitted and amended by the Atomic Safety and Licensing Board, Contention NIRS/PC EC-5/TC-2 states as follows:

CONTENTION: Louisiana Energy Services, L.P. (LES) has presented estimates of the costs of decommissioning and funding plan as required by 42 U.S.C. 2243 and 10 C.F.R. 30.35, 40.36, and 70.25 to be included in a license application. See Safety Analysis Report 10.0 through 10.3; ER 4.13.1. Petitioners contest the sufficiency of such presentations as based

on (1) a contingency factor that is too low; (2) a low estimate of the cost of capital; (3) an incorrect assumption that the costs are for low-level waste only; and (4) the lack of any relevant estimate of the cost of converting and disposing of depleted uranium, given it does not rely upon the three examples – the 1993 CEC estimate, the LLNL report, and the UDS contract – cited in its application.

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 USC 2243 and 10 CFR 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.

Q15. Do you agree with the assertion that the contingency factor applied by LES to its DU dispositioning cost estimate is too low?

A15. (RMK, TSL) No.

Q16. Please state the basis for your conclusion.

A16. (RMK) LES has committed to apply a 25 percent contingency specifically in response to an NRC Staff request for additional information ("RAI") in this proceeding. See LES Exhibit 83 (SAR), at Table 10.1-14; LES Exhibit 84, Attach. 1 at 2, 6; Staff Exhibit 37 (Safety Evaluation Report), at 10-10. The Staff's RAI, which directed LES to "provide a contingency factor of 25 percent for [depleted UF₆] tails disposition," expressly reflects the Staff's continuing position, as stated in NUREG-1757, that the addition of a 25 percent contingency provides an adequate level of assurance with respect to unforeseen cost increases that are within the scope of the identified activities.

(TSL) The contingency factor of 25 percent that LES has committed to apply to its facility decommissioning and DU dispositioning cost estimates is more than adequate given the

type of facility and dispositioning activities at issue. Based on my 37 years of experience in the industry, I am certain that a contingency factor of this magnitude is more than sufficient to account for unforeseen circumstances, to the extent such circumstances fall within the defined project scope, that could increase decommissioning and DU dispositioning costs.

Q17. Why does your experience lead you to this conclusion?

A17. (TSL) In short, my experience tells me that because 25 percent is an adequate cost contingency for the complex decommissioning of a power plant, it is, *a fortiori*, an adequate cost contingency for the comparatively simpler decommissioning and DU dispositioning activities required for the NEF. By way of background, my initial experience in decommissioning began with nuclear power plants in the 1970's, when I helped to prepare the first cost estimate study for the Atomic Industrial Forum ("AIF"), as well as the Decommissioning Handbook. See "An Engineering Evaluation of Nuclear Power Reactor Decommissioning Alternatives," W.J. Manion and T.S. LaGuardia, (AIF/NESP-009) (Nov. 1976); "Decommissioning Handbook," Manion, W. J. and T. S. LaGuardia, (DOE/EV/10128-1) (Nov. 1980). In preparing the AIF/NESP study, we developed a base cost estimate to decommission several types of nuclear power plants. After arriving at the base cost estimate, we then looked back at the individual elements of the base cost and performed an analysis of potential increases in costs for each area based on unexpected changes. When we compared the number generated from accounting for these cost increases to the base cost, we observed that the overall cost increased anywhere from 13 to 24 percent. In the final published report, the AIF recommended that a contingency on the order of 25 percent be applied to a base cost estimate to account for these changes. The upshot is that 25 percent contingency factor now customarily applied to nuclear facility decommissioning cost estimates was originally developed from experience gained in decommissioning nuclear power plants.

Around the same time we were preparing the AIF/NESP study, the NRC commissioned Battelle Pacific Northwest Laboratories to study the decommissioning of a pressurized water reactor. At that time, we met with the principal author of the Battelle study for the purpose of seeking an informal peer review of our own cost estimates. When Battelle published its NRC-commissioned report, it also recommended 25 percent as a reasonable contingency factor to add to the total estimated cost for decommissioning a pressurized water reactor. Battelle also was commissioned to prepare a cost estimate to decommission a boiling water reactor, and independently concluded, based on that additional work, that a 25 percent contingency factor was reasonable for power reactors, as well as for other types of nuclear facilities (e.g., research reactors and fuel cycle facilities).

Recently, the Department of Energy adopted the use of a 25 percent contingency in connection with various Department cost estimates. And, as noted previously, the NRC itself recently adopted 25 percent as its recommended contingency factor in the materials facilities decommissioning context. See LES Exhibit 82, App. A at A-29. These more recent developments also attest to the widespread acceptance and use of the 25 percent contingency factor that LES has applied to its facility decommissioning and DU dispositioning cost estimates.

Q18. You stated that the decommissioning of a power plant is "complex" compared to the "simple" decommissioning of a uranium enrichment facility. Please explain this distinction.

A18. (TSL) There are many complex operations associated with the dismantling of a nuclear power plant. Insofar as research reactors and fuel cycle facilities are much simpler than nuclear power plants in design and operation, the activities required to decommission the former are, relatively speaking, considerably less complex and less prone to uncertainty. With respect to the dispositioning of DU from the NEF, there are fundamentally three activities or operations to consider: transportation, deconversion, and disposal of DU. See LES Exhibit 84, Attach. 1, at

2; Staff Exhibit 37, at 10-11 to 10-12. All three of these activities, in my expert opinion, have relatively low levels of uncertainty.

Q19. Please state that basis for your opinion that the three DU dispositioning activities identified above have relatively low levels of uncertainty.

A19. (TSL) I do not expect there to be extensive uncertainties associated with the transportation of depleted UF_6 and U_3O_8 that would result in substantial cost increases. First, DU has been transported safely within the U.S. for decades. As Mr. Krich has testified in a related context, LES has developed its base transportation cost estimate from specific and conservative cost information obtained directly from a credible, experienced vendor (TLI) with a demonstrated safety record. See "Prefiled Direct Testimony of Rod Krich on Behalf of Louisiana Energy Services, L.P. Regarding the Adequacy of Applicant's Cost Estimate for the Transportation of Depleted Uranium from the Proposed National Enrichment Facility," dated September 16, 2005. The potential uncertainties associated with transportation are limited. For example, if a truck is delayed in traffic because of an accident, or bad weather, that delay would be covered by contingency dollars. I would not expect accidents to occur regularly because drivers responsible for transporting radioactive materials have exemplary driving records that are diligently checked, and the vehicles used to transport such materials are of high quality and are inspected before each trip.

As set forth in the testimony of other LES witnesses, the deconversion of depleted UF_6 to U_3O_8 is based on a well-understood chemical process that been successfully deployed on a commercial scale in Europe for over two decades. Moreover, LES's estimate of the potential costs associated with such a deconversion operation in the U.S. is based principally on specific cost information obtained from Urenco and COGEMA (the pertinent vendor of deconversion services). See "Prefiled Direct Testimony of Rod Krich, Leslie Compton, Paul Harding, and

Paul Schneider on Behalf of Louisiana Energy Services, L.P. Regarding Applicant's Strategy and Cost Estimate for Private Sector Deconversion of Depleted Uranium Hexafluoride from the Proposed National Enrichment Facility," dated September 16, 2005. These facts do not suggest significant potential for large unforeseen cost increases within the scope of anticipated deconversion activities.

Finally, LES's DU disposal cost estimate reflects disposal of DU in an engineered trench, a procedure which I consider to be fairly predictable in terms of both logistics and cost. In preparing decommissioning cost estimates for various TLG clients, I routinely evaluate the costs associated with the disposal of low-level radioactive waste. Indeed, because my company frequently is required to submit fixed-price bids, it is imperative that we ascertain disposal costs with a high degree of certainty. In this regard, I engage in fairly regular dialogues with vendors of commercial low-level radioactive waste disposal services, such as Envirocare and Duratek. As a result of these interactions, I can say with confidence that low-level radioactive waste disposal costs have stabilized considerably over the past several years, and more recent cost increases have largely coincided with the inflation rate. At Envirocare, for example, disposal costs typically average about \$25 per cubic foot, though they are subject to negotiation. In some instances they may be less than \$25 per cubic foot; in other situations they may exceed that amount (mainly when smaller quantities of waste are involved). Under any scenario, the proprietary disposal cost estimate (stated in dollars per cubic foot) that LES obtained from a Waste Control Specialists, LLC (*see* LES Exhibit 105), and which underlies LES's \$1.14/kgU cost figure, is certainly conservative for the type (bulk DU_3O_8) and volume of DU_3O_8 to be disposed of by LES.

In sum, the principal activities associated with DU dispositioning do not, in my expert opinion, create the potential for large unforeseen cost increases that would exceed the

considerable margin provided by the addition of a 25 percent contingency. As explained further below, this is particularly clear when one bears in mind that the 25 percent contingency is intended to address potential uncertainties that fall within the defined scope of DU dispositioning activities (as opposed to entirely speculative events that do not arise directly from the dispositioning activities themselves).

Q20. In your view, does the application of a "flat" 25 percent contingency factor to LES's overall DU dispositioning cost estimate raise any concerns? That is, is a more detailed or line-item type estimate of the type prepared for facility decommissioning necessary?

A20. (TSL) No. For the reasons discussed above, I believe that the 25 percent factor applied by LES is more than adequate. To be sure, with respect to more complex projects, such as the decommissioning of a nuclear power plant, contingencies are likely to be estimated on a line-item basis. That is, the estimator breaks down each activity, such as decontamination, removal, packaging, shipping, and disposal, and assigns a recommended contingency to each discrete activity. For example, in the case of nuclear power plant decommissioning, project management is assigned a relatively low contingency factor (on the order of 15 percent), whereas reactor vessel segmentation is assigned a very high contingency factor (on the order of 75 percent). The need for such high contingency factors, as it exists for reactor vessel segmentation, will not exist for the LES facility. In any event, substantial "real-world" experience has shown that when such contingencies are individually "costed" out and averaged, the result is an overall contingency of no more than 25 percent. Thus, it is certainly reasonable to apply a one-time or "across the board" contingency factor of 25 percent to the comparatively much simpler activities associated with DU dispositioning, *i.e.*, DU deconversion, transportation, and disposal.

Q21. In discussing the contingency factor concept, NUREG-1757 refers to costs arising from "unforeseen circumstances." Please explain how the contingency factor is intended to capture such costs.

A21. (TSL) A contingency factor is meant to account for differences between the base cost and unforeseen costs. The base cost estimate defines the project scope and accounts for the known and reasonably anticipated costs of decommissioning. A contingency factor, by contrast, is intended to account for any unforeseen costs within the defined project scope, i.e., events that may occur in the field during implementation of the work, and which are not accounted for in the base cost estimate. In the case of DU dispositioning, the "defined project scope" includes the transportation of DU to and from a deconversion facility, the deconversion of DUF_6 to DU_3O_8 , and the near-surface disposal of the DU_3O_8 at a licensed low-level radioactive waste disposal facility. LES's "base" cost estimate for DU dispositioning, in turn, is the aggregate of the costs associated with each of these constituent activities, as derived from cost information provided by relevant third party commercial sources.

For example, the breaking of a drill, the mechanical failure of heavy equipment, the flooding of a trench, and industrial accidents are all unforeseen events that increase the cost of decommissioning activities. Such cost increases are deemed to be within the scope of the project because they occur during the conduct of an activity that is included in the base estimate. At the same time, they are unforeseeable because no one can predict when equipment will break, an accident will occur, or when the weather will cause delays.

Q22. Please summarize your conclusions regarding the assertions made in Contention NIRS/PC EC-2.

A22. (RMK, TSL) The 25 percent contingency factor that LES has applied to its overall cost estimate for DU dispositioning is more than adequate. LES's commitment to use

such a factor, which LES made in response to a Staff RAI, reflects adherence to applicable NRC guidance. Volume 3 of NUREG-1757 states explicitly that it "provides guidance relevant to demonstrating compliance with 10 CFR 30.35, 30.36, 40.36, 40.42, 70.25, 70.38, 72.30, and 72.54." See LES Exhibit 82. Those regulations encompass the decommissioning funding and financial assurance requirements with which LES must comply. Accordingly, LES's compliance with NUREG-1757 provides clear evidence that LES has applied an appropriate contingency factor to its estimated facility decommissioning and DU disposition costs. In addition, extensive historical experience in decommissioning nuclear power plants has shown that 25 percent is an appropriate contingency for those more complex types of facilities. In other words, experience teaches that considerable margin is inherent in the use of a 25 percent contingency factor, even for decommissioning projects that involve activities substantially more complex than those associated with the dispositioning of DU.

Q23. Does this conclude your testimony?

A23. (RMK, TSL) Yes.

DC:433033.2

RESUME

Rod M. Krich
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Lisle, IL 60532
(H) 630 428 1967
(W) 630 657-2813

EDUCATION

MS Nuclear Engineering - University of Illinois - 1973
BS Mechanical Engineering - New Jersey Institute of Technology - 1972

EXPERIENCE

1998 to
Present

Exelon (formerly Com Ed)

Vice President, Licensing Projects for Exelon Nuclear, with the overall responsibility for leading Exelon Nuclear's licensing activities on future generation ventures, predominantly leading the licensing effort for a U.S. gas centrifuge enrichment plant. In addition, I have been assisting with the Yucca Mountain project licensing effort and served as the lead on strategic licensing issues with the responsibility of working with the Nuclear Regulatory Commission and the Nuclear Energy Institute on the development of a new approach to licensing new reactors.

Vice President-Regulatory Services responsible for interface with the NRC and State regulatory agencies, and regulatory programs. This responsibility covers all 12 ComEd nuclear units and the Nuclear Generation Group headquarters. With respect to regulatory programs, responsibilities include programs such as the change evaluation process (i.e., 10 CFR 50.59, "Changes, tests and experiments), the operability determination process, and the Updated Final Safety Analysis revision process). In this capacity, I was responsible for improving the relationship with the regulatory agencies such that, taken together with improved plant performance, the special scrutiny applied to the ComEd operating plants will be replaced with the normal oversight process. The Regulatory Services organization consists of a group located at the Nuclear Generation Group headquarters and a Regulatory Assurance group at each plant that has a matrix reporting relationship to the Vice President-Regulatory Services.

1994 to
1998

Carolina Power & Light Company

As Chief Engineer from November 1996 to April 1998, I was head of the Chief Section of the Nuclear Engineering Department. In this capacity, I was responsible for maintaining the plant design bases and developing, maintaining and enforcing the engineering processes procedures. In addition to the corporate Chief Section, the Design Control groups at each of the nuclear plant sites reported to me starting in February 1997.

As Manager - Regulatory Affairs at the H. B. Robinson Steam Electric Plant, Unit No. 2 (Westinghouse PWR) from February 1994 to November 1996, the managers of Licensing/Regulatory Programs, Emergency Preparedness, and Corrective Action/Operating Experience Program organizations reported to me. As such, I was responsible for all interface and licensing activities involving the NRC headquarters and regional office, environmental regulatory agencies, and the Institute of Nuclear Power Operations. My responsibilities also included implementation of the Emergency Preparedness program, and administration of the Corrective Action and Operating Experience programs. After assuming my position in Carolina Power &

Light Company, I was instrumental in revising and upgrading the IOCFR50.59 safety evaluation program, and was responsible for its implementation at the plant site. My group was also responsible for leading the team that prepared the NRC submittal containing the conversion to the improved Technical Specifications.

1988 to
1994

Philadelphia Electric Company

As Manager - Limerick Licensing Branch at the Nuclear Group Headquarters, responsible for all licensing activities for the two unit Limerick Generating Station (General Electric BWR) conducted with the NRC headquarters and all enforcement issues involving NRC Region I, including completion of the final tasks leading to issuance of the Unit 2 Operating License. Special projects included assisting in the development of the Design Baseline Document program, obtaining NRC approval for an Emergency Operations Facility common to two sites, preparation of the Technical Specification changes to extend the plant refueling cycle to 24 months and to allow plant operation at uprated power, and obtaining NRC approval of a change to the Limerick Operating Licenses to accept and use the spent fuel from the Shoreham plant. I was also responsible for the development and implementation of the IOCFR50.59 safety evaluation process used throughout the nuclear organization, development of the initial Updated Final Safety Analysis Report for Limerick Generating Station, and served as the Company's Primary Representative to the BWR Owners' Group.

1986 to
1988

Virginia Power Company

As the Senior Staff Engineer in the Safety Evaluation and Control section, my activities involved responding to both routine and special licensing issues pertaining to North Anna Power Station (Westinghouse PWR). My duties ranged from preparing Technical Specification interpretations and change requests, exemption requests, and coordinating responses to NRC inspection reports, to developing presentations for NRC enforcement conferences and coordinating licensing activities associated with long-term issues such as ATWS and equipment qualification. I was also the Company representative to the utility group formed to address the station blackout issue, and was particularly involved in developing an acceptable method by which utilities can address equipment operability during station blackout conditions.

1981 to
1986

Consumers Power Company

During my employment with Consumers Power Company, I worked at the General Office in the Nuclear Licensing Department and the Company's Palisades Plant (Combustion Engineering PWR). While in the Nuclear Licensing Department, I held the position of Plant Licensing Engineer for the Big Rock Point Plant (General Electric BWR), Section I-lead - Special Projects Section, and Section Head - Licensing Projects and Generic Issues Section. My responsibilities while in these positions included managing the initial and continuing Palisades Plant FSAR update effort, developing and operating a computerized commitment tracking system, managing the licensing activities supporting the expansion of the Palisades Plant spent fuel storage capacity, and coordinating activities associated with various generic issues such as fire protection and seismic qualification of equipment. As the administrative point of contact for INPO, I coordinated the Company's efforts in responding to plant and corporate INPO evaluations. At the Palisades Plant, I was head of the Plant Licensing Department. My responsibilities primarily entailed managing the on-site licensing activities, including preparation of Licensee Event Reports and responses to

inspection reports, interfacing with NRC resident and regional inspectors, and serving as chairman of the on-site safety review committee. I also administered the on-site corrective action system and managed the on-site program for the review and implementation of industry operating experience.

1974 to
1981

General Atomic Company

My positions while at the General Atomic Company were principally concerned with fuel performance development efforts for the High Temperature Gas-Cooled Reactor (HTGR). Specific responsibilities included two assignments to the French Atomic Energy Commission laboratories at Saclay and Grenoble (France) for the purpose of coordinating a cooperative test program. I was also assigned as a consultant to the Bechtel Corporation, Los Angeles Power Division, and worked in the Nuclear Group of the Alvin M. Vogtle Nuclear Project for Georgia Power.

RELATED EXPERIENCE

University of Illinois

As a graduate research assistant, I assisted in both the experimental and analytical phases of a NASA-funded program in the study and modeling of far-field noise generated by near-field turbulence in jets.

PUBLICATIONS

General Atomic Company

"CPL-2 Analysis: Fission Product Release, Plateout and Liftoff."

University of Illinois

"Prediction of Far-Field Sound Power Level for Jet Flows from Flow Field Pressure Model," paper 75-440 in the AIAA Journal, co-authored by Jones, Weber, Hammersley, Planchon, Krich, McDowell, and Northranandan.

MEMBERSHIPS

American Nuclear Society
Pi Tau Sigma - Mechanical Engineers 1-Honorary Fraternity
American Association for the Advancement of Science

REFERENCES

Furnished upon request

THOMAS S. LaGUARDIA, PE, CCE

President

SPECIAL QUALIFICATIONS:

Planning and management of decontamination and decommissioning programs; planning and development of the design of low-level waste facility projects; heat transfer and fluid flow systems analysis of nuclear and conventional power plant operation and process equipment; development, implementation and audit of quality assurance programs; organization, management and supervision of engineering personnel; expert witness on decontamination, decommissioning and waste management.

EDUCATION:

Polytechnic Institute of Brooklyn, Brooklyn, New York
B.S. Mechanical Engineering - 1962

University of Connecticut, Storrs, Connecticut
M.S. Mechanical Engineering - 1968

Various short courses in computer programming, radioactive waste management, dynamic shock analysis and program management.

PROFESSIONAL CERTIFICATION:

Registered PE - Connecticut 10393, New York 059389, New Jersey 38193, Virginia 033747, California Contractor's License 636542

Certified Cost Engineer, AACE 1679

EXPERIENCE:

TLG Services, Inc.
President
1982 to Present

Responsible for the operation of this consulting engineering company whose principal objective is to provide planning and management of decontamination and decommissioning projects, and to support nuclear power plant utilities and other nuclear facilities in estimating and funding the costs of decommissioning. Thoroughly familiar with approaches, methodologies and regulatory requirements associated with handling, packaging and storage of radwaste, and responsible for the

preparation of decommissioning feasibility and cost studies for over 300 nuclear and fossil plants. Provided expert witness testimony in over 125 utility rate hearings, and one civil lawsuit.

As a contractor to DOE, directed the decommissioning activities for piping and component removal from the Shippingport Atomic Power Station. Directed the preparation of the Pathfinder reactor Decommissioning Plan, and the structural analysis of the Pathfinder reactor vessel to secure an NRC license for transport as its own container. Participated in the preparation of the Trojan steam generator and pressurizer Certificate of Compliance (C of C) for transport, and the C of C for the Trojan reactor vessel. Supervised the demolition of the Mallinkrodt cyclotron facility near San Francisco. Supervised the evaluation of decommissioning alternatives and costs for decommissioning the Rancho Seco Nuclear Power Plant. Supervised the cost estimate for decommissioning the Shoreham Nuclear Power Station, and the preparation of draft Decommissioning Plan. Participated in the LILCO Nuclear D&D Safeguards Committee. Directed the preparation of the Cintichem Research Reactor DP and cost estimate. Participated in the Cintichem Nuclear Safeguards Committee. Prepared a verification review of the Fort St. Vrain decommissioning cost estimate to support a letter of credit for decommissioning funding.

Supervised the preparation of decommissioning cost estimates for the U.S. Department of Energy's Gaseous Diffusion Plants located in Oakridge, Tennessee, Paducah, Kentucky, and Portsmouth, Ohio. Participated in DOE Red Team Reviews for the Hanford Purex Facility, and in a DOE FETC decommissioning brainstorming team for decontamination and demolition of the Rocky Flats Buildings 776 and 777.

Prepared a detailed study for the AIF National Environmental Studies Project to develop guidelines for producing decommissioning cost estimates on a consistent basis in a standard format. Prepared a cost benefit study for the NRC on techniques to facilitate decommissioning by reducing exposure and radioactive wastes.

Provided planning and cost estimating support for the decommissioning of the Gentilly Unit 1 reactor in Canada, and managed the removal of piping and components during the decommissioning of the Shippingport Atomic Power Station.

Nuclear Energy Services, Inc.
1974 - 1982

**General Manager, Waste Management Services
1979-1982**

Responsible for the management and technical direction of the engineering staff in the areas of decontamination, decommissioning and waste management services. Prepared reactor decommissioning feasibility/cost estimates, and testified in licensing and rate-making hearings. Prepared decommissioning conceptual study for the Shippingport Reactor and West Valley Nuclear Fuel Service Center, and bid specifications for Ames Laboratory Research Reactor. Project Engineer for the detailed engineering and planning for the Shippingport reactor decommissioning program. Prepared the Decommissioning Handbook for the U.S. Department of Energy.

**Group Manager, Engineering Support Services
1977-1979**

Responsible for the management and technical direction of the engineering staff in the areas of fluid, nuclear, electrical and systems analysis. Evaluated the post-accident combustible gas generation and control for the LACBWR containment system. Prepared and evaluated the Shoreham off-gas system design with respect to hydrogen detonations. Provided licensing assistance to LILCO on the Shoreham and Jamesport projects. Responded to intervenor questions and comments. Participated in the BWR Mark II Containment Evaluation.

**Quality Assurance Manager
1975-1977**

Prepared the QA manuals and implementing procedures for design engineering. Qualified lead auditor for independent third party audits of utility QA programs in both construction and operating phases.

**Manager of Plant Systems Engineering
1973-1975**

Participated in support service contracts with Dairyland Power Cooperative for LACBWR, Potomac Electric Power for Douglas Point, and General Public Utilities for Oyster Creek. Performed a study of PWR, BWR and HTGR decommissioning for the Atomic Industrial Forum.

Gulf United Nuclear
Sr. Mechanical Engineer, Power Plant Engineering
1968-1973

LACBWR - Provided engineering assistance during the preoperational and operational plant phases. Redesigned the off-gas system to reduce iodine, particulate and noble gas effluents.

BONUS - Served as site representative for Gulf United during decommissioning and entombment construction. Prepared detailed procedures for facility closeout.

Elk River - Assisted in evaluation of methods for final shipment of ERR spent fuel. Prepared activity specifications, schedules and cost estimates for removal of all reactor piping and components as part of the reactor dismantling program. Supervised, inspection team performing underwater dimensional, borescopic and CCTV inspections of irradiated fuel at Dresden I, CT Yankee and LACBWR reactors. Participated in conceptual design study of the Gulf United Environmental Test Loop program. Responsible for the preparation of Gulf United Nuclear fuel specifications.

Combustion Engineering, Inc.
Thermal Performance Group Leader, Marine Department
1962-1968

Responsible for the selection, design and performance calculations of merchant and naval main propulsion boiler and associated equipment.

COMMITTEES:

ANS 15.10 - Decommissioning of Research Reactors
ANS 11.18 - Decommissioning
ANS E10.03.06 - Decommissioning
AIF NESF Subcommittee on Decommissioning

PUBLICATIONS: See attached sample listing.

EXPERT

TESTIMONY: Upon request

LaGuardia, T.S., et al.:

"Identification and Evaluation of Facilitation Techniques for Decommissioning Light Water Power Reactors", USNRC, NUREG/CR-3587, June 1987

"Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

"TMI Accident: 1981 Perspective, Technical Problems and/or Opportunities," presented at the Southeastern Electric Exchange, Ashville NC, September 1981

"Decommissioning Handbook," prepared for US Department of Energy, DOE/EV/10128-1, November 1980

"Reactor Decommissioning Information Pertinent to Planning," presented at ANS meeting, Washington DC, November 1978

"An Engineering Evaluation of Nuclear Power Reactor Decommissioning Alternatives," AIF/NESP-009, November 1976

"Decommissioning of First-Generation Nuclear Power Plants in the United States," presented at the International Conference on Nuclear Power Performance and Safety, Vienna, Austria, October 1, 1987

"Removal of Shippingport Station Primary System Components and Piping," presented at the 1987 International Decommissioning Symposium, Pittsburgh, PA, October 5, 1987

"Electro-Chemical Decontamination," presented at The International Decommissioning Symposium 2000 (IDS 2000), Knoxville, TN, June 2000

LaGuardia, T.S.:

"Recovery of Nuclear Power Plant Decommissioning Costs," presented at the Regulatory Conference at Iowa State University, May 1977

"Reactor Decommissioning: Information Pertinent to Planning," presented at the ANS Winter Meeting, Washington, DC November 1978

"Nuclear Power Reactor Decommissioning," Nuclear Safety, Volume 20, No. 1, January 1979

"Decommissioning Methods and Equipment," presented at the ANS Meeting on Decontamination and Decommissioning of Nuclear Facilities, Sun Valley, Idaho, September 1979

"Concrete Decontamination and Demolition Methods," presented at the Concrete Decontamination Workshop, CONF-800542, PNL-SA-8855, May 1980

"Cost Benefit Analysis for Shippingport "Decontamination," presented at the ANS Winter Meeting, San Francisco, November 29, 1981

"State-of-the-Art Technology in Nuclear Decommissioning," presented to the ASME/ANS Nuclear Engineering Conference, Portland, OR, July 25, 1982

"Decommissioning Funding: A Primer for the Health Physicist," presented at the Health Physics Symposium on Decontamination and Decommissioning, in Knoxville, TN, February 1986

"Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," ANS Summer Meeting, Reno, Nevada June 1986

"Removal of Shippingport Station Primary System Components and Piping," presented at the 1987 International Symposium, Pittsburgh, PA, October 8, 1987

"Decommissioning Cost Estimating and Contingency Application," presented at the 1987 International Symposium, Pittsburgh, PA, October 8, 1987

"Environmental Report of the Current Decommissioning Status of Dresden 1," prepared for Commonwealth Edison Company, Docket No. 50-10, February 1988

"Decommissioning of the Cintichem Reactor," ANS 1992 Winter Meeting, Chicago, IL November 1992

"The U.S. DOE and Commercial Decommissioning Programs," presented at the IBC Technical Services, Ltd., 3rd International Conference on Decommissioning of Nuclear Facilities, London, UK February 1993

"An Approach to Decommissioning & Decontamination of Uranium Enrichment Sites," presented at US Council of Energy Awareness (CEA) 1993 International Enrichment Conference, Washington, DC, June 1993

"Decommissioning ALARA Programs: Cintichem Decommissioning," presented at the NRC & BNL ALARA Center: 3rd International Workshop, Hauppauge, NY, May 1994

"Creating Successful US Client-Contractor Relations," Nuclear Engineering Magazine, March 1996

"Commercial Decommissioning Programs in the U.S.," presented at the IBC Technical Services, Ltd., Summer School on Decommissioning, Cambridge, UK June 1996

"Recent Developments in U.S. Policy, Strategy, and Funding of Decommissioning," presented at the Institution of Mechanical Engineers Conference on Nuclear Decommissioning 1998, London, UK, December 1998

"Commercial Decommissioning Programs in the U.S.," presented at the IBC Technical Services, Ltd., Decommissioning of Nuclear Facilities, London, UK, June 1999

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

Louisiana Energy Services, L.P.

(National Enrichment Facility)

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Docket No. 70-3103-ML

ASLBP No. 04-826-01-ML

CERTIFICATE OF SERVICE

I hereby certify that copies of the "PREFILED DIRECT TESTIMONY OF ROD KRICH AND THOMAS LAGUARDIA ON BEHALF OF LOUISIANA ENERGY SERVICES, L.P. REGARDING THE ADEQUACY OF THE CONTINGENCY FACTOR APPLIED BY LES TO ITS COST ESTIMATE FOR DEPLETED URANIUM DISPOSITIONING" in the captioned proceeding has been served on the following parties indicated by ** for overnight delivery via Federal Express this 15th day of September 2005. All other parties have been served by U.S. First Class mail this 15th day of September 2005.

Chairman Nils J. Diaz
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Commissioner Jeffrey S. Merrifield
U.S. Nuclear Regulatory Commission
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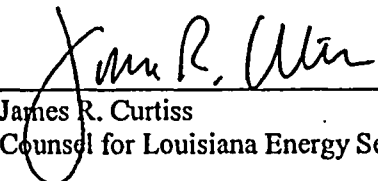
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James R. Curtiss
Counsel for Louisiana Energy Services, L.P.

1 MR. SMITH: And do you have also in front
2 of you a document entitled prefiled rebuttal testimony
3 of Rod Krich and Thomas LaGuardia on behalf of
4 Louisiana Energy Services LP Regarding the adequacy of
5 the contingency factor applied by LES to its cost
6 estimate for depleted uranium dispositioning?

7 WITNESS KRICH: Yes.

8 WITNESS LAGUARDIA: Yes.

9 MR. SMITH: And was that testimony
10 prepared by you or under your supervision?

11 WITNESS KRICH: Yes.

12 WITNESS LAGUARDIA: Yes.

13 MR. SMITH: And do you have any
14 corrections to your rebuttal testimony at this time?

15 WITNESS LAGUARDIA: No.

16 WITNESS KRICH: No.

17 MR. SMITH: Is the document true and
18 correct to the best of your knowledge and belief?

19 WITNESS KRICH: Yes.

20 WITNESS LAGUARDIA: Yes.

21 MR. SMITH: I would therefore like to move
22 that their rebuttal testimony be admitted into the
23 record.

24 CHAIR BOLLWERK: All right. Any
25 objections?

(No verbal response.)

CHAIR BOLLWERK: Then the prefiled rebuttal testimony of Rod Krich and Thomas LaGuardia on behalf of LES regarding the adequacy of the Applicant's contingency factor is admitted into the record and is adopted as if read.

(Whereupon, the prefiled rebuttal testimony of Rod Krich and Thomas LaGuardia was bound into the record as if having been read.)**

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October 11, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

Louisiana Energy Services, L.P.

(National Enrichment Facility)

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Docket No. 70-3103-ML

ASLBP No. 04-826-01-ML

**PREFILED REBUTTAL TESTIMONY OF ROD KRICH AND THOMAS LAGUARDIA
ON BEHALF OF LOUISIANA ENERGY SERVICES, L.P.
REGARDING THE ADEQUACY OF APPLICANT'S CONTINGENCY FACTOR**

I. WITNESS BACKGROUND

Q1. Please state your name, occupation, employer, and responsibilities relative to the licensing of Louisiana Energy Services, L.P.'s ("LES") proposed National Enrichment Facility ("NEF").

A1. I, Rod M Krich ("RMK"), am Vice President of Licensing, Safety, and Nuclear Engineering for LES, the applicant in this matter. I am presently "on loan" to LES from Exelon Nuclear, where I am Vice President Licensing Projects. I am responsible for leading the effort on behalf of LES to obtain a license from the U.S. Nuclear Regulatory Commission ("NRC"), as well as other necessary state and federal permits, to construct and operate the proposed NEF. A full statement of my professional qualifications was included with LES's initial prefiled direct testimony in this proceeding, submitted on September 16, 2005. See "Prefiled Direct Testimony of Rod Krich and Thomas LaGuardia on Behalf of Louisiana Energy Services, L.P. Regarding the Adequacy of the Contingency Factor Applied by LES to its Cost Estimate for Depleted Uranium Dispositioning" (Sept. 16, 2005) ("LES Contingency Factor Direct Testimony").

I, Thomas S. LaGuardia ("TSL"), am President of TLG Services, a consulting engineering company that provides planning and management of decontamination and decommissioning projects, and supports nuclear power plant utilities and other nuclear facilities in estimating and funding the costs of decommissioning. I have over 37 years of experience in the nuclear industry, and for the last the last 35 years, I have worked exclusively in the field of decontamination and decommissioning. A full statement of my professional qualifications was included with LES's initial prefiled direct testimony in this proceeding, submitted on September 16, 2005. *See* LES Contingency Factor Direct Testimony.

Q2. What is the purpose of this rebuttal testimony?

A2. (RMK, TSL) The purpose of this rebuttal testimony is to respond to certain claims contained in the prefiled direct testimony of Arjun Makhijani regarding the adequacy of the contingency factor applied by LES to its overall depleted uranium ("DU") disposition cost estimate, as submitted on behalf of Nuclear Information and Resource Service and Public Citizen ("NIRS/PC") on September 16, 2005. *See* "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 the Contingency Factor Applied to LES's Cost Estimate" (Sept. 16, 2005) (hereinafter "Makhijani Direct Testimony"). Our rebuttal testimony concerns only those portions of Dr. Makhijani's direct testimony that were not excluded by the Licensing Board in its Memorandum and Order (Ruling on In Limine Motions and Motion to Dismiss) of October 4, 2005. Specifically, we demonstrate that in his prefiled direct testimony, Dr. Makhijani fails to contest in any meaningful way the adequacy of the contingency factor applied by LES to its overall cost estimate for DU dispositioning. We also point out that, rather than contesting the adequacy of the contingency factor, Dr. Makhijani seeks to contest the adequacy of one component of the cost estimate, itself, the cost of DU disposal.

II. RESPONSE TO CLAIMS MADE IN THE PREFILED DIRECT TESTIMONY OF NIRS/PC WITNESS ARJUN MAKHIJANI

Q3. On pages 11 to 12 of his prefiled direct testimony, Dr. Makhijani discusses the issue of "scaling uncertainties" relative to any commercial deconversion facility that might be built to deconvert depleted uranium hexafluoride ("DUF₆") to depleted U₃O₈. How does this issue relate to the adequacy of LES's contingency factor?

A3. (RMK) The issue of facility "scaling" for cost-estimating purposes does not relate to the adequacy of LES's contingency factor. In any event, Dr. Makhijani himself states that "scaling uncertainties are significant enough to argue for the continued inclusion of at least a 25 percent contingency factor." Makhijani Direct Testimony, Answer 7 at 12. As set forth in our prefiled direct testimony, LES has committed to apply a 25 percent contingency specifically in response to an NRC Staff request for additional information ("RAI") in this proceeding. See LES Exhibit 83 (SAR), at Table 10.1-14; LES Exhibit 84, Attach. 1 at 2, 6; Staff Exhibit 37 (Safety Evaluation Report), at 10-10. The Staff's RAI, which directed LES to "provide a contingency factor of 25 percent for [depleted UF₆] tails disposition," expressly reflects the Staff's continuing position, as stated in NUREG-1757, that the addition of a 25 percent contingency provides an adequate level of assurance with respect to unforeseen cost increases that are within the scope of the identified activities.

Notwithstanding, Dr. Makhijani's assertion that LES must account for "scaling" uncertainties through its contingency factor is based on the premise that LES's commercial deconversion cost estimate is, or should be, based on the price paid by Urenco for deconversion services performed at COGEMA's Pierrelatte, France plant, under an existing European contract between those two parties. Dr. Makhijani reasons that, because the Pierrelatte plant has larger

"throughput" than "a deconversion plant that would be built to handle the DUF₆ from the proposed NEF," LES must account for the cost uncertainties associated with "scaling" down to a facility with a smaller throughput or deconversion capacity. Makhijani Direct Testimony, Answer 7 at 11-12. Dr. Makhijani is flat-out wrong. First, LES's deconversion cost estimate is based on information contained in a 2004 Urenco business study concerning the construction of a deconversion plant at Urenco's Capenhurst, U.K, site. Second, based on the information provided by Urenco and COGEMA, LES, by scaling up, was able to prepare a cost estimate for a 7,000 MT U/year capacity facility, *i.e.*, for a facility appropriately sized to handle the amount of DUF₆ to be generated annually by the NEF. The basis for that estimate is discussed in detail in LES's prefiled direct and rebuttal testimony on deconversion strategy and cost issues. Thus, scaling concerns of the sort cited by Dr. Makhijani (*i.e.*, scaling down) are not an issue.

Q4. On pages 16 to 18 of his direct testimony, Dr. Makhijani questions LES's reliance on cost information from WCS and Envirocare. How does this issue relate to the adequacy of LES's contingency factor?

A4. (RMK, TSL) Again, the issue raised by Dr. Makhijani has no bearing on the adequacy of LES's contingency factor. Rather, Dr. Makhijani seeks to challenge one component (*i.e.*, disposal costs) of LES's base overall cost estimate for DU dispositioning. The basis for LES's commercial cost estimate for DU disposal is presented in full in LES's prefiled direct testimony on disposal strategy and cost issues. Where, as is established there, the underlying cost estimate has a reasonable basis, a contingency factor of 25 percent is more than adequate.

Q5. In Answer 14 of his prefiled direct testimony, Dr. Makhijani states that "[t]he triennial cost adjustments [required by 10 C.F.R. § 70.25(e)] are meant to allow minor modifications of the decommissioning cost estimates to reflect changes such as adjusting inflation rates." He adds that such adjustments are "not meant to provide a mechanism for major

adjustments to the cost to reflect significant departures from the decommissioning plan set forth at the time the license is granted. Do you agree with those statements?

A5. (RMK, TSL) No. While we do not dispute that an applicant's initial decommissioning funding plan cost estimate must be based on reasonable and documented assumptions, we believe that Dr. Makhijani takes an unduly narrow view of the purpose and function of the periodic update process. In doing so, he downplays its importance.

The triennial update is intended to account for changes in costs as they occur. Pursuant to 10 C.F.R. § 70.25(e), an applicant is required to adjust cost estimates and associated funding levels at least every three (3) years. Notably, LES has committed to update its DU dispositioning cost estimate on an annual forward-looking basis, and will be required to do so by license condition. See NRC Staff Exhibit 37, at 10-15. The obligation to periodically update decommissioning cost estimates also is also highlighted in NUREG-1757. See LES Exhibit 82, at 4-10. In implementing the triennial update requirement, the NRC explained the purpose of that requirement as follows:

The proposed requirement to update decommissioning cost estimates every 3 years will help ensure that financial assurance obtained by licensees will not become inadequate as a result of changing disposal prices or other factors. Increasing waste disposal costs have been and continue to be a concern for NRC. However, decommissioning costs also may change for a variety of licensee-specific reasons (e.g., due to changes in the size and scope of operations), as well as for other reasons that may be out of a licensee's control (e.g., inflation). The proposed 3-year cost estimate updates are intended to capture changes in estimated costs regardless of cause, and to help ensure that the level of financial assurance required of each licensee is appropriate. Therefore, the proposed requirement is appropriate even for licensees that are not expecting to incur any significant waste disposal costs, as well as for licensees that may be taking steps to reduce the volume of decommissioning waste (which is only one component of decommissioning costs). 68 Fed. Reg. 57,327, 57,332 col. 1 (Oct. 3, 2003) (emphasis added).

As the NRC Staff confirmed in its prefiled direct testimony, once an additional cost or increase in cost -- major or minor -- is foreseeable, a licensee must account for the cost and provide appropriate funding. Thus, the periodic update process provides yet an additional layer of assurance that a licensee will maintain adequate funds for facility decommissioning and waste dispositioning.

Q6. Does this conclude your testimony?

A6. (RMK, TSL) Yes.

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 "PREFILED REBUTTAL TESTIMONY OF ROD KRICH AND THOMAS LAGUARDIA ON BEHALF OF LOUISIANA ENERGY SERVICES, L.P. REGARDING THE ADEQUACY OF APPLICANT'S CONTINGENCY FACTOR" in the captioned proceeding has been served on the following by e-mail service, designated by **, on October 11, 2005 as shown below. Additional service has been made by deposit in the United States mail, first class, this 11th day of October 2005.

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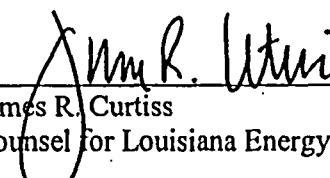
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1 MR. SMITH: There are no LES exhibits
2 associated with the contingency panel testimony.

3 CHAIR BOLLWERK: All right.

4 MR. SMITH: And I have nothing more for
5 the panel. And so, they're ready for cross
6 examination by the parties.

7 CHAIR BOLLWERK: All right. Thank you
8 very much. I appreciate it. Anything from the Staff?

9 MS. CLARK: no.

10 CHAIR BOLLWERK: All right. Mr. Lovejoy?

11 EXAMINATION BY MR. LOVEJOY OF

12 THOMAS LAGUARDIA

13 ROD KRICH

14 MR. LOVEJOY: Good afternoon, Mr.
15 LaGuardia.

16 WITNESS LAGUARDIA: Good afternoon, Mr.
17 Lovejoy.

18 MR. LOVEJOY: Mr. LaGuardia, your company
19 that you're presently with does something like 10-15
20 studies a year on the decommissioning costs of
21 reactors, is that right?

22 WITNESS LAGUARDIA: Reactors in other
23 facilities, yes.

24 MR. LOVEJOY: And you actually prepared a
25 manual on decommissioning any nuclear facility, right?

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1 WITNESS LAGUARDIA: Several manuals, yes.

2 MR. LOVEJOY: And you found the methods
3 that you were dealing with to be so predictable that
4 you could write a manual that would tell you how to
5 clean up, for example, the Rock Flats Plant.

6 WITNESS LAGUARDIA: The manual was written
7 in a nature so that anyone could learn from it and
8 apply the principals to plan and to implement the
9 decommissioning of a plant like Rocky Flats, yes.

10 MR. LOVEJOY: And your approach to
11 estimating decommissioning costs is to use what you
12 cal a bottoms-up approach, is that right?

13 WITNESS LAGUARDIA: Typically we do a
14 bottoms-up approach, yes.

15 MR. LOVEJOY: And you developed line item
16 costs for the elements of the job, right?

17 WITNESS LAGUARDIA: Yes.

18 MR. LOVEJOY: And you apply cost factors
19 to various units that measure the size of the task,
20 right?

21 WITNESS LAGUARDIA: Yes.

22 MR. LOVEJOY: Like pipes, or pumps, or
23 ducts, or other elements of what has to be handled,
24 right?

25 WITNESS LAGUARDIA: Generally, that is

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1 correct.

2 MR. LOVEJOY: And then your practice is to
3 develop contingency values on a line item basis also,
4 right?

5 WITNESS LAGUARDIA: For a very large
6 project, yes, that is correct.

7 MR. LOVEJOY: And, in developing
8 contingency values for individual activities, you
9 conduct studies to determine what costs are actually
10 incurred, first of all, in connection with those
11 activities, right?

12 WITNESS LAGUARDIA: Yes, we develop a cost
13 estimate.

14 MR. LOVEJOY: And, from there you try to
15 think about the range of variation that could apply to
16 the cost of those activities, right?

17 WITNESS LAGUARDIA: In general we develop
18 the cost estimate based on known activities, such as
19 decontamination, removal, packaging, shipping, and
20 disposal and apply line item contingencies to those
21 factors, plus staffing issues and specific tasks
22 within each of those activities.

23 And I should say, that level of detail we
24 would apply to the decommissioning of a large nuclear
25 power plant where there's a complex number of

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1 operations going on.

2 MR. LOVEJOY: And some line items would
3 have a big contingency factor and some would have a
4 smaller one, right?

5 WITNESS LAGUARDIA: That is correct.

6 MR. LOVEJOY: Like, I think you gave an
7 example when we had the deposition of dismantling
8 highly radioactive core elements of a reactor. There
9 could be a large contingency factor, right?

10 WITNESS LAGUARDIA: Yes, for that aspect
11 of the work.

12 MR. LOVEJOY: And, for some simpler types
13 of work where the chances for variation were smaller,
14 you could have a smaller contingency factor, right?

15 WITNESS LAGUARDIA: Or simpler types of
16 activities such as cutting pipe, removing vales and
17 tanks, there would be a lower contingency factor.

18 MR. LOVEJOY: The contingency value is
19 related to the difficulty of the work, right?

20 WITNESS LAGUARDIA: It's related to the
21 opportunity for a problem to arise that's again,
22 within the project scope but that would occur on a
23 daily basis in the field as the job is being
24 implemented.

25 MR. LOVEJOY: So, if you don't know the

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1 methods that are planned to be followed in connection
2 with a particular piece of work, you can't establish
3 a contingency factor, right?

4 WITNESS LAGUARDIA: No, that's not true.
5 The techniques that are used are pretty much standard
6 in the industry.

7 MR. LOVEJOY: Okay.

8 WITNESS LAGUARDIA: Cutting pipe, there's
9 only two or three accepted technologies that are cost
10 effective to use using a cutting torch, or in some
11 cases a reciprocating saw or a circular saw.

12 But, cutting a reactor vessel involves
13 remote robotic tools prone to break down on almost a
14 daily basis. And therefore we would apply a much
15 higher contingency for that type of activity.

16 MR. LOVEJOY: But you need to know the
17 type of activity that you're involved with before you
18 can estimate a contingency factor, right?

19 WITNESS LAGUARDIA: In general terms, yes.
20 And we do know that.

21 MR. LOVEJOY: So, is it true that, as you
22 use the term contingency, you say contingency factor
23 or contingency allowance, what's the parlance that we
24 should be using here?

25 WITNESS LAGUARDIA: We use the term

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1 percentage.

2 MR. LOVEJOY: Contingency percentage?

3 WITNESS LAGUARDIA: Yes.

4 MR. LOVEJOY: Okay. So, the purpose of
5 the contingency percentage then is to address events
6 that occur in the field implementation of the work
7 within a defined scope of a project, right?

8 WITNESS LAGUARDIA: That's generally
9 correct, yes.

10 MR. LOVEJOY: So, within a particular
11 defined project scope, applying and following the plan
12 on a day-to-day basis, for example, equipment can
13 break down, that's possible, right?

14 WITNESS LAGUARDIA: Some of the -- you're
15 referring to some of the cutting equipment?

16 MR. LOVEJOY: For example.

17 WITNESS LAGUARDIA: Dismantling, yes, that
18 could occur.

19 MR. LOVEJOY: And, if there was expense
20 and delay involved in that, that would be covered by
21 the contingency allowance, right?

22 WITNESS LAGUARDIA: Yes.

23 MR. LOVEJOY: And delays caused by
24 weather, like when a construction area is flooded,
25 that would be covered by contingency allowance, right?

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1 WITNESS LAGUARDIA: Yes.

2 MR. LOVEJOY: Industrial accidents, they
3 to would be covered by a contingency allowance, right?

4 WITNESS LAGUARDIA: Yes.

5 MR. LOVEJOY: Okay. But the contingency
6 allowance, kind of to draw the line between its scope
7 and what's outside its scope, it would not take into
8 account things like inflation, right?

9 WITNESS LAGUARDIA: That is correct.

10 MR. LOVEJOY: It would not take into
11 account changes in regulations.

12 WITNESS LAGUARDIA: That is correct.

13 MR. LOVEJOY: It would not take into
14 account changes in the methods to be used in following
15 out a particular task, right?

16 WITNESS LAGUARDIA: I presume you mean the
17 dismantling method.

18 MR. LOVEJOY: For example, yes.

19 WITNESS LAGUARDIA: Yes.

20 MR. LOVEJOY: Okay.

21 WITNESS LAGUARDIA: Within a range, or
22 whether you use a cutting torch or a saw would not
23 make a difference. But, whether you had to use a
24 robotic tool as opposed to using a manual tool, that
25 might make a difference in scope.

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1 MR. LOVEJOY: And you would not include in
2 contingency dollars something that you call
3 extraordinary waste disposal cost, would you?

4 WITNESS LAGUARDIA: That is correct.

5 MR. LOVEJOY: In accordance with your
6 practice, a cost like that would be something you
7 would address in a periodic update process, right?

8 WITNESS LAGUARDIA: Yes.

9 MR. LOVEJOY: Okay. If there were some
10 change in regulations that called upon you to adopt
11 new and different waste preparation practices, that
12 would be an extraordinary cost, which would be
13 reviewed during the periodic update.

14 WITNESS LAGUARDIA: I would probably
15 review that on a case-by-case basis to determine
16 whether there was a significant impact. If it was
17 truly extraordinary, a doubling in the waste disposal
18 cost, that would certainly trigger a reason for
19 relooking at the scope of the estimate.

20 But, if it were within the short --
21 because of some simple change in procedure that didn't
22 impact the cost significantly, we wouldn't bother with
23 changing the base estimate.

24 MR. LOVEJOY: Okay. Just assume I'm
25 talking about dollars that are worth talking about.

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1 So, in the estimate stage, in your view, you review
2 the cost estimate for the whole project and then you
3 take a look at inflationary changes, changes in
4 technology or methodology that you have to use on the
5 project, regulatory changes.

6 And you treat them in the periodic update
7 of overall cost of the project, right?

8 WITNESS LAGUARDIA: That is correct.

9 MR. LOVEJOY: And you could, in that
10 phase, deal with issues that go outside of the scope
11 of the contingency, right?

12 WITNESS LAGUARDIA: Yes.

13 MR. LOVEJOY: And you could change the
14 scope of the work and change the cost of the work,
15 right?

16 WITNESS LAGUARDIA: Yes.

17 MR. LOVEJOY: You can change the cost
18 estimate for the project.

19 WITNESS LAGUARDIA: Yes.

20 WITNESS KRICH: Based on the periodic
21 update. I'm trying to follow your questions.

22 MR. LOVEJOY: Now, you've said that you
23 think a 25 percent value would be an appropriate
24 contingency amount in this instance, right?

25 WITNESS LAGUARDIA: Yes.

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1 MR. LOVEJOY: And you say you're familiar
2 with transportation and disposal but you're not quite
3 familiar so much with deconversion, right?

4 WITNESS LAGUARDIA: In terms of the
5 process, I'm not that familiar with the process. But,
6 in terms of the process representing the dismantling
7 of pumps and valves, and tanks, and heat exchangers,
8 it's the same type of material that we deal with in
9 nuclear power plants and in many cases fossil power
10 plants because we do dismantling estimates for fossil
11 plants as well.

12 It is not that much different from our
13 perspective for the dismantling cost estimate.

14 MR. LOVEJOY: So, what you're saying is
15 that the 25 percent is adequate to cover industrial
16 accidents or mechanical failures occurring in the
17 process of constructing and operating a deconversion
18 plant, right?

19 WITNESS LAGUARDIA: Dismantling.

20 MR. LOVEJOY: And dismantling it as well,
21 yes. So, is your testimony with respect to
22 dismantling but not the constructing and operating?

23 WITNESS LAGUARDIA: That is correct.

24 MR. LOVEJOY: Okay. So --

25 WITNESS KRICH: I think, Mr. Lovejoy, I'd

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1 have to add something to that. Mr. Lovejoy is here to
2 -- I'm sorry?

3 MR. LOVEJOY: Go ahead.

4 WITNESS KRICH: Thank you. Mr. Lovejoy is
5 here to be a witness about the appropriateness of the
6 contingency factor and not on the particular issues
7 that it's applied to.

8 I'm the one who is on the hook for those
9 questions.

10 MR. LOVEJOY: Okay.

11 WITNESS KRICH: So he's here simply to
12 talk about or to bring his expertise to bear on
13 whether or not we applied an appropriate contingency
14 factor.

15 (Pause.)

16 MR. LOVEJOY: And, Mr. LaGuardia, it's
17 your testimony that 25 percent is adequate to cover
18 increased costs arising from industrial accidents or
19 mechanical failures in connection with transportation.
20 That's a part of this project.

21 WITNESS LAGUARDIA: Yes, the contingency
22 associated with that.

23 MR. LOVEJOY: And you're saying that 25
24 percent is adequate to cover industrial accidents and
25 mechanical failures occurring in the course of

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1 carrying out disposal as is planned by LES, right?

2 WITNESS LAGUARDIA: Yes.

3 MR. LOVEJOY: But you for yourself have
4 not looked into the underlying estimates that LES has
5 made for deconversion or disposal or transportation,
6 right?

7 WITNESS LAGUARDIA: That is correct.

8 MR. LOVEJOY: So --

9 WITNESS LAGUARDIA: That's Mr. Krich's
10 role.

11 MR. LOVEJOY: So, you have not examined
12 the underlying estimates in any detail?

13 WITNESS LAGUARDIA: No, I have not.

14 MR. LOVEJOY: Okay. You're assuming that
15 LES has appropriately described the scope of work and
16 the cost factors that apply to that work in the
17 underlying estimates?

18 WITNESS LAGUARDIA: Yes.

19 MR. LOVEJOY: And you're assuming that
20 they were accurately prepared?

21 WITNESS LAGUARDIA: Yes.

22 MR. LOVEJOY: You're assuming that the
23 depleted uranium is considered a low level waste and
24 can be disposed of in a facility like Envirocare, is
25 that right?

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1 WITNESS KRICH: That's not Mr. LaGuardia's
2 -- that was not what we asked Mr. LaGuardia to
3 consider. That's really my role.

4 MR. LOVEJOY: Well, I'm asking you if --

5 WITNESS KRICH: You're asking Mr.
6 LaGuardia? Mr. LaGuardia was brought in because of
7 his expertise and because he has been doing this for
8 so many years in the industry, to be an expert on
9 commenting on our application of the 25 percent
10 contingency factor, not to make a decision as to
11 whether this material is class A waste or not.

12 MR. LOVEJOY: Well, so I don't think it's
13 inconsistent with that statement, Mr. Krich, to ask
14 Mr. LaGuardia if in fact he isn't assuming rather than
15 making a judgment, assuming that the depleted uranium
16 is low level waste and can be disposed of at the
17 facility such as Envirocare.

18 WITNESS KRICH: The information that I
19 provided Mr. LaGuardia to work with was that we would
20 be -- we were going to be -- for decommissioning or
21 the treating of depleted uranium byproduct that would
22 be involved with deconversion, transportation, and
23 disposal.

24 We didn't ask Mr. LaGuardia about whether
25 the classification was appropriate or not. He looked

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1 at the steps involved in those actions and made his
2 determination.

3 MR. LOVEJOY: May I get an answer from the
4 witness?

5 CHAIR BOLLWERK: Well, I think the
6 appropriate thing here is to ask Mr. LaGuardia what
7 assumptions he was given, which I think is where you
8 were going, but maybe wording the question in a
9 slightly different way.

10 MR. LOVEJOY: I'm trying to move it along
11 by specifying assumptions.

12 CHAIR BOLLWERK: Right.

13 MR. LOVEJOY: And finding out if that's
14 underlying his testimony.

15 CHAIR BOLLWERK: Basically all he's asking
16 is what assumptions you were given to work with, what
17 you were told in terms of if you were told anything
18 about the waste and how it was supposed to be
19 classified.

20 WITNESS LAGUARDIA: I was told -- I was
21 asked to testify to the level of contingency
22 appropriate for deconversion, transportation, and
23 disposal with the input that the waste would be
24 converted to a form but be suitable for disposal in a
25 landfill, in a low level radioactive waste landfill.

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1 Did I say landfill? Disposal site,
2 forgive me.

3 MR. LOVEJOY: So you were told to assume
4 that it could be disposed of at a low level
5 radioactive waste disposal site like Envirocare?

6 WITNESS LAGUARDIA: Yes.

7 MR. LOVEJOY: Okay. But you're not here
8 to testify about whether that's legal or the
9 performance of that kind of disposal, right?

10 WITNESS LAGUARDIA: That is correct.

11 MR. LOVEJOY: Okay. You didn't try to
12 verify any of the assumptions LES has made in coming
13 to its own estimate of the cost of disposal?

14 WITNESS LAGUARDIA: That is correct.

15 MR. LOVEJOY: Okay. And, looking at the
16 deconversion aspect, you're assuming that LES has
17 received a cost estimate originally from some
18 Europeans and that has been converted into dollars and
19 some other changes made for application in the United
20 States and that future estimates or escalations, or
21 inflation effects will be based on 2004 dollars, is
22 that right?

23 WITNESS LAGUARDIA: That is correct.

24 MR. LOVEJOY: Okay. You haven't checked
25 to see whether that's true?

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1 WITNESS LAGUARDIA: I took that as the
2 input to my work, my request for my services.

3 WITNESS KRICH: Could you repeat the
4 question, Mr. Lovejoy? Because I'm not sure of what
5 you're implying.

6 MR. LOVEJOY: I'm not sure I can do it
7 verbatim. There was something --

8 WITNESS KRICH: Give it your best shot.

9 MR. LOVEJOY: You're assuming that LES has
10 received an estimate from some Europeans and that that
11 has been converted into dollars and some changes made
12 to apply it to the United States and t all future
13 estimates or escalations, or inflation effects will be
14 based on the 2004 dollar.

15 WITNESS KRICH: Okay, thank you.

16 MR. LOVEJOY: And, Mr. LaGuardia, you're
17 satisfied that the dollar amount of the contingency
18 allowance, the contingency percentage that you're
19 talking about is sufficient?

20 WITNESS LAGUARDIA: A 25 percent
21 contingency allowance is sufficient, yes.

22 MR. LOVEJOY: Okay. Do you know what the
23 25 percent of the total decommissioning cost estimate
24 is in this case?

25 WITNESS LAGUARDIA: I don't have that

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1 number on the top of my head, no.

2 WITNESS KRICH: It's the 188 million
3 dollars.

4 MR. LOVEJOY: Mr. LaGuardia, are you
5 saying that that's sufficient?

6 WITNESS KRICH: He said 25 percent was
7 sufficient.

8 CHAIR BOLLWERK: I think we need to let
9 counsel deal with the witness to whom he's directing
10 the question for the most part.

11 MR. LOVEJOY: Right.

12 CHAIR BOLLWERK: I understand, Mr. Krich,
13 that you want to make sure that the testimony is
14 accurate. But it's really up to counsel to object if
15 he has a problem with the way the question is framed
16 or the answer is outside the scope of whatever it
17 might be.

18 So, let's let LES counsel, Mr. Curtiss do
19 his job, and you should be a witness.

20 WITNESS KRICH: All right.

21 MR. CURTISS: Thank you, Your Honor.

22 MR. LOVEJOY: So, Mr. LaGuardia, your view
23 is that if there's a determination at some point that
24 the depleted uranium in question here actually is not
25 -- well, for example, is not class A low level waste

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1 or is not amendable to disposal at a site like
2 Envirocare, that would have to be addressed outside
3 the contingency sphere, is that right?

4 WITNESS LAGUARDIA: The base estimate
5 would have would have to be readdressed based on
6 whatever new information were necessary. And then a
7 25 percent contingency on my opinion would still
8 apply.

9 JUDGE ABRAMSON: To the new number?

10 WITNESS LAGUARDIA: To the new numbers,
11 yes. Thank you.

12 MR. LOVEJOY: And, when you say 25 percent
13 would apply to the new number, you would need to
14 either assume or look closely at the new number to
15 make sure you were satisfied with the new number as an
16 estimate for the project cost, right?

17 WITNESS LAGUARDIA: No, for the nature of
18 the work that is involved here from transportation,
19 deconversion, and disposal, those activities do not
20 involve any complex operations that would trigger a
21 different contingency than 25 percent.

22 So, if they changed a specific methodology
23 for disposal, that would be costed out, and I would
24 still apply the same 25 percent contingency to the
25 total new base cost.

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1 MR. LOVEJOY: Well, let's just kind of
2 assume for the moment that the methods of disposal had
3 to be changed and it was some new method which was not
4 quite as simple, as you used the term, as near surface
5 disposal in trenches.

6 MR. CURTISS: Let me raise an objection
7 here if the purpose of the questioning is to ask the
8 witness to testify on contingency factor to comment
9 about the underlying plausibility of the steps or
10 whether there is a basis, a reasonable basis for the
11 underlying cost estimate.

12 We spent three or four days establishing
13 that, or litigating that, I should say. And I think
14 he has made clear that he is not here to testify about
15 the underlying cost estimate but is assuming it's
16 reasonable.

17 Nor is he here to testify about the
18 underlying plausibility of the steps, assuming it's
19 plausible. He's here to talk about, on that basis,
20 whether the contingency factor of 25 percent is
21 appropriate.

22 And so, these questions that are going to
23 whether this witness has any view about the basis for
24 the cost estimate or the plausibility of the strategy
25 is what the other panels have testified about.

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1 We can take that as a given, although I
2 know the counsel disagrees with that, and get on to
3 the adequacy of the 25 percent contingency.

4 MR. LOVEJOY: I'm just asking an expert to
5 change an assumption.

6 MR. CURTISS: Well, he's asking a
7 hypothetical question that assumes something different
8 than is LES' case, which is they have a plausible
9 strategy and a reasonable cost estimate.

10 CHAIR BOLLWERK: Well, I would say that
11 their position has been that maybe a different
12 strategy needs to be followed in the context. And, if
13 he wants to change that assumption, change the
14 assumption and we'll see what the answer is.

15 And if he can't answer, he can't answer.
16 He may not have a basis for saying anything about it.

17 MR. LOVEJOY: May I try again?

18 CHAIR BOLLWERK: Sure.

19 MR. LOVEJOY: So, Mr. LaGuardia, if
20 information came to you that the method of disposal
21 outlined in LES' current plans involving near surface
22 disposal of depleted uranium was not going to work and
23 that instead a method of disposal involving what I
24 would call geologic disposal or repository disposal
25 was going to be necessary, and you wished to apply a

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1 contingency factor to that activity, would you not
2 need to take a close look at the cost estimate for
3 that activity and satisfy yourself that it was valid
4 and satisfy your usual correct before assigning a
5 contingency value to that cost estimate?

6 WITNESS LAGUARDIA: I would certainly be
7 interested to find out what processing was necessary
8 to dispose of the waste in a geological repository to
9 see what physical activities had to be performed and
10 how they would differ shallow land burial.

11 My experience is that, if this waste were
12 put in 55 gallon drums and placed in a repository, the
13 handling would not be very much different except to
14 have to use an elevator system to get it down into the
15 disposal site as they do in Sweden -- I've visited
16 that facility -- as opposed to being off-loaded from
17 a truck into a shallow land disposal site.

18 The level of difficulty is not that much
19 different. The opportunities for problems to be
20 created are not that much different. I would still
21 most likely recommend a 25 percent contingency for
22 that activity. It's not a difficult process.

23 MR. LOVEJOY: Is the process of
24 identifying a site, obtaining regulatory approval, and
25 constructing a geologic repository something you would

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1 call simple?

2 JUDGE ABRAMSON: I don't think that's
3 where he is supposed to be going here, Mr. Lovejoy.
4 The premise for him is there's a process identified
5 and it's where they want to go, what a contingency
6 does he apply, not what uncertainties are there in
7 getting that process to be an acceptable process.

8 WITNESS LAGUARDIA: Thank you, Your Honor.

9 MR. LOVEJOY: So, in talking about a
10 repository, you're talking about an existing
11 repository and just bringing more drums. That's how
12 you picture it?

13 WITNESS LAGUARDIA: Any cost associated
14 with a repository of the nature you're discussing
15 would be dealt with in the base cost estimate.
16 Physical activities to deposit the waste in the
17 repository would not be a difficult complex operation.

18 And the same 25 percent contingency would
19 be adequate to cover both instances, either instance.

20 MR. LOVEJOY: But you're not saying it
21 would be enough to cover the activities starting with
22 building a new repository, are you?

23 WITNESS LAGUARDIA: It would only deal
24 with the disposal activities of placing the waste from
25 the transport vehicle into the repository final

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1 setting.

2 MR. LOVEJOY: Okay. I'm not sure I
3 covered this. But, I think the implication was that
4 the cost of this new disposal activity would be
5 addressed in an update or re-negotiation, right?

6 WITNESS LAGUARDIA: That's what I
7 testified to, yes.

8 MR. LOVEJOY: I looked at your resume and
9 I noticed -- and correct me if I'm wrong -- but, have
10 you spent your entire career in the private sector?

11 WITNESS LAGUARDIA: As opposed to the
12 Government sector?

13 MR. LOVEJOY: Yes.

14 WITNESS LAGUARDIA: Yes, in the private
15 sector.

16 MR. LOVEJOY: So you've never stood in the
17 shoes of a public regulator with the responsibility to
18 make sure that cleanup takes place even if the owner
19 of a project is bankrupt?

20 WITNESS LAGUARDIA: No. I have been a
21 contractor where I've had to bid projects on a fixed
22 price and make sure I deliver. That has the same
23 pressure, I assure you.

24 MR. LOVEJOY: You have to make sure --

25 WITNESS LAGUARDIA: I've lost enough

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1 night's sleep about that issue.

2 MR. LOVEJOY: You have to make sure the
3 numbers are right the first time, don't you?

4 WITNESS LAGUARDIA: Yes.

5 MR. LOVEJOY: And are you aware that,
6 under the principals applicable to decommissioning
7 cost estimates for the NRC, one of the assumptions to
8 make is that decommissioning work is to be performed
9 by a third party contractor rather than the owner?

10 JUDGE ABRAMSON: What's the relevance of
11 this to the contingency?

12 MR. LOVEJOY: I think it's something that
13 was suggested by the witness' answer to the previous
14 question. If you let me take it a couple more steps
15 I think it will be apparent.

16 JUDGE ABRAMSON: You can answer the
17 question, I'm sorry.

18 WITNESS LAGUARDIA: Okay.

19 MR. LOVEJOY: Do you want to repeat the
20 question, Mr. Lovejoy?

21 WITNESS LAGUARDIA: Would you repeat the
22 question?

23 MR. LOVEJOY: Let me ask this question.
24 Well, first, are you aware that, under the guidance
25 applicable to development of decommissioning cost

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1 estimates, one of the matters to be considered in
2 arriving at a cost estimate is the decommissioning may
3 need to be carried out by a third party contractor
4 other than the owner?

5 WITNESS LAGUARDIA: I don't see the
6 connection to my testimony related to contingency, I'm
7 sorry.

8 MR. LOVEJOY: But you didn't know that or
9 you did know that?

10 WITNESS LAGUARDIA: I understand that that
11 may be a requirement.

12 MR. LOVEJOY: Okay. Well, do you
13 understand that there's a requirement that
14 decommissioning funding be available in the event the
15 owner is bankrupt or otherwise unavailable so that
16 decommissioning can be carried out, even in that case?

17 WITNESS LAGUARDIA: In general, yes.
18 That's the case no matter whether it's any type of
19 facility.

20 MR. LOVEJOY: Okay. But, if LES does fail
21 and a third party has to carry out decommissioning,
22 there's only going to be the source of funds provided
23 by the decommissioning financial assurance, right?

24 WITNESS LAGUARDIA: Again, this is not my
25 area of testimony in this proceeding.

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1 MR. LOVEJOY: Okay. But, if LES goes
2 bankrupt -- could we repeat the hypothetical -- and
3 the decommissioning funding financial assurance needs
4 to be used as the source of money to carry out
5 decommissioning, there's no periodic update to do, is
6 there?

7 WITNESS LAGUARDIA: Again, this is not
8 part of my testimony in this proceeding.

9 MR. LOVEJOY: So you're assuming in your
10 testimony that there's always a chance to carry out a
11 periodic update and change the cost estimate, right?

12 WITNESS LAGUARDIA: Yes, that is the plan.

13 MR. LOVEJOY: And the periodic update
14 involves negotiations with LES, right?

15 WITNESS LAGUARDIA: No, it's not a
16 negotiation. I'm not sure I understand your question.
17 Who would be negotiating with les?

18 MR. LOVEJOY: Well, doesn't the periodic
19 update of the cost estimate involve LES in that
20 process?

21 WITNESS LAGUARDIA: It's my understanding
22 LES would be responsible to develop the periodic
23 update.

24 MR. LOVEJOY: And, upon the periodic
25 update, the decommissioning financial assurance, the

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1 amount might change?

2 WITNESS LAGUARDIA: Yes.

3 MR. LOVEJOY: And, if LES is no longer
4 there, you can't do that process, right?

5 WITNESS LAGUARDIA: LES would still be
6 responsible for coming up with the estimate and have
7 to present that to the NRC.

8 MR. LOVEJOY: And, if LES were bankrupt,
9 would that matter to the process?

10 JUDGE ABRAMSON: Can we cut to the quick
11 here? I understand the point you're trying to make.
12 And if you'd like to just make it, then we can move
13 on.

14 You don't need to make it by examining Mr.
15 LaGuardia who's here to talk about contingency. If
16 your point relates to the contingency and the
17 interplay between contingency and bankruptcy and
18 periodic update, lets' make the -- let's play the
19 issue there and get on with it.

20 CHAIR BOLLWERK: The only thing I'd say,
21 I mean, even when they go bankrupt, it's not like
22 they're not there. They're there. There's maybe a
23 question if you'd have the bankruptcy court that's
24 interposed themselves and have to deal with it through
25 the bankruptcy court. I mean, I think that's solved.

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1 MR. LOVEJOY: But it does tend to make
2 money a little harder to get.

3 CHAIR BOLLWERK: I'm not disputing that.
4 But it's not like they're not around.

5 MR. CURTISS: If the witness is -- if the
6 question is challenging the underlying purpose of
7 financial assurance, which is to account for a
8 situation to provide for the decommissioning in the
9 event that the company is not available to do it,
10 that's a different issue than has been alleged in this
11 -- than is the subject of this panel.

12 I think it's been clear that he's here to
13 testify on the contingency factor, not on the
14 underlying purpose and rationale of why we have
15 financial assurance.

16 MR. LOVEJOY: Okay. That's all I have.

17 CHAIR BOLLWERK: All right. No other
18 cross examination then for either of these two
19 gentlemen on this point?

20 MR. LOVEJOY: No.

21 CHAIR BOLLWERK: Staff?

22 MS. CLARK: No questions.

23 CHAIR BOLLWERK: Mr. Curtiss, do you have
24 any?

25 MR. CURTISS: No redirect.

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1 CHAIR BOLLWERK: All right. If there's
2 nothing else then, gentlemen, thank you very much for
3 your effort. We thank you for appearing before the
4 Board and for providing testimony.

5 MS. CLARK: Could we have a five minute
6 break before we begin with the Staff panel?

7 CHAIR BOLLWERK: Yes, how about five
8 minutes?

9 MS. CLARK: Okay.

10 (Whereupon, the above-entitled matter
11 went off the record at 3:35 p.m. and
12 went back on the record at 3:40 p.m.)

13 CHAIR BOLLWERK: I think we're ready now
14 for the Staff panel on the contingency factor. Staff
15 Counsel?

16 Whereupon,

17 TIM JOHNSON

18 JENNIFER MAYER

19 CRAIG DEAN

20 were recalled as witnesses by Counsel for the Staff
21 and, having been previously duly sworn, assumed the
22 witness stand, were examined and testified as follows.

23 MS. CLARK: I do have before you a
24 document entitled NRC Staff testimony regarding the
25 contingency factor used by LES in the decommissioning

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1 cost estimate.

2 CHAIR BOLLWERK: You do. And you're also
3 all under oath. You all are familiar faces, so we're
4 not going to swear anybody in. Why don't you identify
5 yourselves just, for the record, for the court
6 reporter?

7 WITNESS MAYER: Jennifer Mayer.

8 WITNESS JOHNSON: Tim Johnson.

9 WITNESS DEAN: Craig Dean.

10 CHAIR BOLLWERK: There we go.

11 MS. CLARK: Did you prepare this testimony
12 for submission in this proceeding?

13 WITNESS MAYER: Yes.

14 WITNESS DEAN: Yes.

15 WITNESS JOHNSON: Yes.

16 MS. CLARK: Do you have any corrections or
17 revisions to make at this time?

18 WITNESS MAYER: No.

19 WITNESS DEAN: No.

20 WITNESS JOHNSON: No.

21 MS. CLARK: Do you adopt this written
22 testimony as your sworn testimony in this proceeding?

23 WITNESS MAYER: Yes.

24 WITNESS DEAN: Yes.

25 WITNESS JOHNSON: Yes.

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1 MS. CLARK: I would now like to move to
2 have this testimony admitted into the record of this
3 proceeding.

4 JUDGE ABRAMSON: Direct and rebuttal?

5 CHAIR BOLLWERK: Both the direct and the
6 rebuttal?

7 MS. CLARK: Just the direct.

8 CHAIR BOLLWERK: Just the direct? All
9 right. We'll do the direct first then. There's been
10 a request made that the NRC Staff testimony regarding
11 contingency be adopted into the record. Any
12 objections?

13 (No verbal response.)

14 CHAIR BOLLWERK: All right. Hearing none,
15 then the NRC Staff testimony regarding contingency
16 factors used by LES for its decommissioning estimate
17 is adopted into the record as if read.

18 (Whereupon, the prefiled direct testimony
19 of Craig Dean, Jennifer Mayer, and Tim Johnson was
20 bound into the record as if having been read.)**

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Facility (NEF).

A.2. (TJ) As Project Manager, my current job responsibilities include coordinating the review of the application for construction and operation of the proposed uranium enrichment facility submitted by LES and the preparation of NUREG-1827, "Safety Evaluation Report, for the National Enrichment Facility in Lea County, New Mexico", June 2005, (SER) that documents the safety review prepared by NRC Staff including the portion relevant to this proceeding, Chapter 10 ("Decommissioning"), attached as Staff Exhibit 37. In the review of the application, I focused particularly on the decommissioning funding and waste management aspects of the proposed facility.

A.2. (JM) I have assisted the NRC Staff in evaluating the proposed decommissioning funding plan for the NEF and was the principal author of the decommissioning cost sections of Chapter 10 of the SER.

A.2. (CD) I am the manager responsible for the technical support provided by ICF Consulting to NRC in evaluating the financial assurance provisions in LES's decommissioning funding plan. In that capacity, I was the principal evaluator of the financial assurance instruments and the assessment of the adequacy of the contingency factor.

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

A.3. (TJ, JM, CD) The purpose of our joint testimony is to provide the NRC Staff's views concerning the admitted contentions regarding the contingency factor used by LES in estimating the cost of decommissioning. The specific Contention we address here is EC-5/TC-2.

Q.4. Are you familiar with Contention EC-5/TC-2?

A.4. (TJ, JM, CD) Yes. Contention EC-5/TC-2, as relevant, states:

Louisiana Energy Services, L.P., (LES) has presented estimates of the

costs of decommissioning and funding plan as required by 42 U.S.C. 2243 and 10 C.F.R. 30.35, 40.36, and 70.25 to be included in a license application. See Safety Analysis Report 10.0 through 10.3; ER 4.13.1. Petitioners specifically contest the sufficiency of such presentations as based on (1) a contingency factor that is too low . . .

Q.5. Please explain what is meant by a "contingency factor."

A.5. (TJ, JM, CD) A contingency factor is a specified percentage which is added to the sum of decommissioning costs.

Q.6. Has LES included a contingency factor in its decommissioning cost estimate?

A.6. (TJ, JM, CD) Yes. LES has added an additional 25% as a contingency factor to the overall cost of decommissioning, in the amount of \$188,318,000.

Q.7. What is the purpose of using a contingency factor?

A.7. (TJ, JM, CD) The purpose of the contingency factor is to ensure that the cost estimate is large enough to provide reasonable assurance that funds will be available to pay for any unforeseen circumstances that could increase the decommissioning costs.

Q.8. What about costs that can be foreseen but are not known for certain?

A.8. (TJ, JM, CD) Those costs are expected to be included and accounted for in the decommissioning cost estimate. The Staff recognizes that some costs cannot be predicted with certainty but nevertheless can be expected. In these cases, applicants such as LES must account for them in their cost estimate, using the best available documentation.

Q.9. What if those costs change over time?

A.9. (TJ, JM, CD) As circumstances change and developments occur licensees must account for those changes in the periodic updates to their decommissioning funding plan. If these changes cause the funding estimate to increase, licensees must adjust the funding put aside for decommissioning to account for the increase. In this way, licensees must account for changes that impact the cost of decommissioning over

the life of the facility. In the case of LES, these updates will be made on a yearly basis for tails disposition costs and at least every three years for facility decommissioning.

Q.10. Assuming that LES becomes a licensee and some circumstance occurs which will increase the cost decommissioning, can LES choose to keep its funding level the same on the premise that the increase is accounted for by the contingency factor?

A.10. (TJ, JM, CD) No. LES would be required by 10 C.F.R. 10 C.F.R. §§ 70.25(e), 30.35(e) and 40.36(d) and license condition to revise its decommissioning cost estimate and to increase the amount of the decommissioning fund to cover the increased cost. Once a cost or increase in cost is foreseeable, LES must account for the cost and fund it.

Q.11. Is there any NRC guidance on the appropriate value of the contingency factor to be used for this purpose?

A.11. (TJ, JM, CD) Yes, NUREG-1757, NMSS Decommissioning Standard Review Plan, Appendix A, Section A.3.1.2.3, "Contingency Factor," LES Exhibit 82, states the following:

"[T]he cost estimate should apply a contingency factor of 25 percent to the sum of all estimated decommissioning costs. The 25 percent contingency factor provides reasonable assurance for *unforeseen* circumstances that could increase decommissioning costs, and should not be reduced or eliminated just because foreseeable costs are low."
(Italics in original)

Q.12. How did you determine whether the contingency factor used by LES was appropriate?

A.12. (TJ, JM, CD) First, I determined that the contingency factor met the requirements of NRC guidance in NUREG-1757. Second, I compared the contingency factor of 25 percent to contingency factors used in NUREG/CR-6477, Revised Analyses of Decommissioning Reference Non-Fuel-Cycle Facilities (July 1998) attached as Staff

Exhibit 38. NUREG/CR-6477 uses a contingency factor of 25 percent for a variety of facilities that are similar to the proposed LES facility. Third, I concluded that the decommissioning activities to be performed were relatively simple and straightforward, and therefore extremely unlikely to result in unforeseen costs so large that a 25 percent contingency would not be sufficient.

Q.13. Does this conclude your testimony?

A.13. (TJ, JM, CD) Yes.

TIMOTHY C. JOHNSON

Professional Qualifications

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

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

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

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

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

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

TIMOTHY C. JOHNSON

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

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

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

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

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

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

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

TIMOTHY C. JOHNSON

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

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

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

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

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

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

TIMOTHY C. JOHNSON

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am a member of the following professional societies:

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

Publications and Presentations

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

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

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

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

T.C. Johnson, H. Lowenberg, "Classification of TMI Wastes," Waste Management '82, Tucson, AZ, March 1982.

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

T.C. Johnson, P.H. Lohaus, G.W. Roles, "Implementation of 10 CFR 61 Part Waste Classification and Waste Form Requirements," Waste Management '83, Tucson, AZ, March 1983.

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

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

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

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T.C. Johnson, P.H. Lohaus, G.W. Roles, "Implementation of 10 CFR 61 Part Waste Classification and Waste Form Requirements," Electric Power Research Institute Radwaste Workshop, Washington, DC, July 1983.

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

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

T.C. Johnson, et al., "Economics of 10 CFR Part 61," Waste Management '84, Tucson, AZ, March 1984.

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

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

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

T.C. Johnson, et al., "Update on LLW Regulatory Guides and Topical Reports," Waste Management '87, Tucson, AZ, March 1987.

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

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

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

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

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

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

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

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

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

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

Jennifer Mayer
Senior Associate

ICF Consulting

EDUCATION

B.S., Chemical Engineering with Honors, Bucknell University, Lewisburg, Pennsylvania, 1992

EXPERIENCE OVERVIEW

Ms. Mayer is a chemical engineer with over thirteen years of experience in cost modeling and cost-benefit analyses. She has prepared several independent cost estimates for clean up for license termination, and reviewed a number of decommissioning funding plans. She recently prepared the cost benefit analysis for the Generic Environmental Impact Statement for NRC's clearance rule. She has also prepared cost models to evaluate the cost impacts of various proposed rulemakings including changes to EPA's LDR program, the addition of several industrial sectors to EPA's Toxic Release Inventory reporting system, and entombment of nuclear reactors as a decommissioning alternative.

PROJECT EXPERIENCE

Review of Decommissioning Cost Estimates/Decommissioning Funding Plans

Cost Estimate Review for Fuel Enrichment Facilities, U.S. NRC, 2004-Present.

Ms. Mayer has supported NRC in review of decommissioning cost estimate, decommissioning funding plan and the cost estimate in the GEIS for one or two proposed fuel enrichment facilities, and has reviewed the decommissioning cost estimate and decommissioning funding plans for a second facility. These reviews include evaluation for inclusion of required elements, determination if individual unit costs are reasonable, and appropriate adjustment to cost estimates to account for inflation and/or facility operational changes.

Decommissioning Cost Estimate/ Decommissioning Funding Plan Review, U.S. NRC, 2000-Present.

Ms. Mayer has supported NRC in review of over a dozen decommissioning cost estimates and decommissioning funding plans under 10 CFR Parts 30, 40, 70, and 72. These reviews included ensuring all necessary required elements were included, determining if whether individual unit costs and total costs were reasonable, and determining if appropriate adjustment to cost estimates to account for inflation and/or facility operational changes were included. For each review, Ms. Mayer prepared a memorandum listing deficiencies and potential deficiencies.

Fuel Cycle Facility Licensing Procedures Deposition Support, US NRC, 2004-Present.

Ms. Mayer attended the depositions of expert witnesses on the costs of decommissioning a fuel cycle facility as a technical expert, and provided feedback to NRC's legal counsel. Ms. Mayer also attended expert witness training for depositions and may be called to act as an expert witness.

Requests for Additional Information in Fuel Cycle Facility Licensing Procedures,
US NRC 2004-Present.

For the licensing procedures associated with the LES fuel cycle facility, Ms. Mayer has reviewed decommissioning cost estimates, presented potential deficiencies to NRC, and reviewed both NRC's draft Requests for Additional Information (RAIs) and the potential licensee's responses to those RAIs.

Review of PCB Commercial Storage Applications, U.S. EPA, 1998-Present.

Ms. Mayer is managing ICF Consulting's support in reviewing PCB commercial storage applications for EPA's OPPT, to ensure that closure plans meet the requirements of TSCA in order for facilities to receive operating approval from EPA. She has both conducted reviews herself and supervises a team of reviewers. Each review includes providing a summary of deficiencies and recommendations for additional information necessary for permit approval, as well as verifying the closure cost estimate to determine if the costs of carrying out all of the activities described in the closure plan are covered.

Other Cost Estimates

Independent Cost Estimate for Radioactive Contamination Cleanup, U.S. NRC, 2002.

For US NRC, Ms. Mayer reviewed existing characterization data for a contaminated site in eastern Oklahoma, and contributed to a summary characterization document. She also reviewed cost estimates provided by the facility, offered comment, and prepared an independent cost estimates for cleanup of the site under an unrestricted release scenario.

Independent Cost Estimate for Radioactive Contamination Cleanup, U.S. NRC, 2001.

For US NRC, Ms. Mayer reviewed existing characterization data and cost estimates for a contaminated site in central Pennsylvania, provided comment, and prepared an independent cost estimates for cleanup of the site under five different scenarios, including restricted release and unrestricted release. This cost estimate used comparisons of contaminant levels with derived concentration guidance levels to determine the extent of contamination that had to be removed for buildings, groundwater, soil, and vegetation. She participated in a site visit to better understand the conditions of almost 20 buildings and numerous areas of soil contamination.

Screening Level Analysis of Restricted Release Site Cleanups, U.S. NRC, 2001.

For NRC, Ms. Mayer conducted a screening level analysis to model the costs of remediating six sites to restricted release levels. She helped develop feasible release scenarios and applied generic cost assumptions to input data provided by NRC. This work was used as the basis for STP-04-003.

Support for Rulemaking Planning

Entombment, U.S. NRC, 2001-2002.

Ms. Mayer conducted a cost analysis of proposed changes to the Entombment scenario of nuclear reactor decommissioning. She calculated costs to model reactors decommissioning under decontamination, safe storage, and entombment scenarios to determine if entombment was an economically feasible alternative. For this modeling, she considered both the current regulatory requirements and the proposed regulatory requirements.

Cost Benefit Analysis for Controlling the Disposition of Solid Materials.

U.S. NRC, 2003-Present.

Ms. Mayer prepared the cost-benefit analysis for the Draft Generic Impact Statement for Controlling the Disposition of Solid Materials. Focusing on solid materials from light water reactors, she is modeling the costs and benefits of allowing this material to "clear" under each of four regulatory alternatives and 5 dose option levels. She is prepared the Regulatory Analysis based on this cost-benefit analysis. She has modeled the incremental values and impacts over a 50-year timeframe relative to the no action baseline by evaluating each of the 18 attributes that must be analyzed under NUREG BR/0814.

Regulatory Analysis for Fire Protection Manual Action Rule, 2004.

Ms Mayer prepared the draft Regulatory Analysis for changes to 10 CFR Part 50 dealing with operator manual actions. In this analysis, she examined the effect of the rule with and without an interim enforcement policy. Her analysis also considered the effect of some licensees not being in full compliance with existing regulations.

Regulatory Analysis of IAEA Safety Standards, U.S. NRC, 1999-2000.

Ms. Mayer evaluated the regulatory implications of NRC adoption of the IAEA ST-1 provisions pertaining to uranium hexafluoride (UF₆) in proposed revisions to 10 CFR Part 71. Specifically, she evaluated the difference between the international standard referenced by IAEA (ISO 7195) and the national standard referenced by existing regulations (ANSI N14.1), as well as other differences in regulatory requirements. She then estimated the amount of UF₆ shipped, and the cost of necessary changes in management, and the environmental costs and benefits.

Summary of Analysis of Public Comments

NRC Clearance Rule Comment Summary, 1999.

Ms Mayer assisted in summarizing comments received on the NRC Clearance rule. In particular, she summarized comments pertaining to restricted release of materials, as an alternative to unrestricted release.

Phase IV Land Disposal Restrictions, 1997.

Ms. Mayer helped manage ICF's work in summarizing over 600 comments on EPA's Phase IV LDR rule. For this effort, she helped develop the issue outline, provided specifications for the Lotus Notes system used in the comment summary process, and responded to technical questions from staff reading comment letters to best categorize comments. She also helped summarize the major issues raised by the commenters. Ms. Mayer helped prepare several technical background documents that were used by EPA to respond to commenters concerns as well as revising another technical background document to incorporate facility specific information provided in the public comment process.

Environmental Analysis

Environmental Assessment of IAEA Safety Standards, U.S. NRC, 1999-2000.

Ms. Mayer evaluated the environmental implications of NRC adoption of the IAEA ST-1 provisions pertaining to uranium hexafluoride (UF₆) in proposed revisions to 10 CFR Part 71. Specifically, she evaluated the difference between the international standard referenced by IAEA (ISO 7195) and the national standard referenced by existing regulations (ANSI N14.1), as well as other differences in regulatory requirements. She then estimated the amount of UF₆ shipped, and the cost of necessary changes in management, and the environmental costs and benefits.

Environmental Assessment of Geological and Seismological Characteristics for and Design of Dry Cask Independent Spent Fuel Storage Installations (10 CFR Part 72).

Ms. Mayer helped evaluate the environmental implications resulting from proposed changes to 10 CFR Part 72, including changes to the design earthquake and other design requirements for ISFSIs.

Selected Company Reports

Decommissioning Cost Estimate For Safety Light Corporation Bloomsburg, PA, 2001.

Decommissioning Cost Estimate For Fansteel Inc. Muskogee, OK, 2002.

Economic Analysis for Final Rule: Revisions to the Underground Injection Control Regulations for Class V Injection Wells, 1999.

Application of Phase IV Land Disposal Restrictions to Newly Identified Mineral Processing Wastes, Regulatory Impact Analysis, April 1998.

Regulatory Analysis of IAEA Safety Standards, 2000.

Regulatory Analysis for Controlling the Disposition of Solid Materials: Draft Report, 2005

Regulatory Analysis of Post-fire Operator Manual Actions Rule - 10 CFR Part 50 - Appendix R: Draft Report, 2004

Group II Cost Estimates And Financial Capability Assessment For Staff Response To SRM-SECY-00-180 Draft Report, 2002 (Basis of STP-04-003)

CRAIG M. DEAN

EDUCATION

1984-85	Graduate Study, Economics and Statistics, American University
1976-1979	J.D., Georgetown University Law Center
1964-1969	M.A., (Ph.D. less dissertation), Russian Studies, Columbia University
1960-1964	B.A., <u>cum laude</u> , History, Carleton College

EXPERIENCE

Mr. Dean joined ICF in January 1984, and is a Project Manager. He is an attorney and regulatory analyst, with an extensive background in financial assurance. His experience includes development and implementation of financial assurance requirements for the Environmental Protection Agency, the Nuclear Regulatory Commission, and several states. Since 1986, Mr. Dean has provided support to the NRC for the development of financial assurance regulations, program implementation, case work, training, and special projects involving financial assurance.

Financial Assurance Regulations of 10 CFR Parts 30, 40, 50, 70, and 72

Since 1986, Mr. Dean has been providing support to the NRC in analysis of financial assurance submissions, evaluation of financial assurance issues, development of guidance documents and delivery of training on financial assurance, licensing reviews, and enforcement. Projects have included the following:

- Review of Financial Assurance Submissions from NMSS Licensees.
Since promulgation of the NRC regulations on financial assurance for decommissioning of materials licensees in 1988, Mr. Dean has provided support to NRC in the review and evaluation of non-standard financial assurance submissions from licensees for costs of decommissioning licensed nuclear materials facilities. The submissions have included both decommissioning cost estimates and financial instruments. Mr. Dean has participated directly in the reviews, and has also supervised other ICF staff performing reviews and provided quality assurance.
- Financial Assurance Program Assessment.
Mr. Dean managed major components of a multi-year analysis in 1986-1987 of financial assurance requirements of the NRC for low-level radioactive waste, mixed low-level and RCRA waste, uranium mill tailings, and source, special nuclear, and byproduct licensees, including financial mechanisms, decommissioning cost estimates, reporting and recordkeeping requirements, bankruptcy problems, financial test issues, overall regulatory structure, and guidance. The assessment compared the NRC regulatory framework with financial assurance requirements of other federal agencies, particularly the EPA. Mr. Dean is currently managing a two-year contract to provide technical assistance to NMSS related to financial assurance for decommissioning and subsurface soil and groundwater monitoring of materials and non-power reactor facilities.

- Analysis of the Implications of Electric Utility Deregulation on Nuclear Reactor Decommissioning Financial Assurance.

Mr. Dean prepared a detailed study of the development of NRC policy on decommissioning financial assurance for nuclear power reactors to assess the implications of utility deregulation. He prepared a detailed chronological analysis of the development of NRC's policy concerning whether financial assurance should be required, the level of assurance (e.g., "reasonable assurance") required, the amounts of such assurance, the types of financial instruments to be allowed to provide assurance, the respective responsibilities of the NRC and other regulatory bodies, such as state PUCs and FERC, with respect to financial assurance, and related topics.

- Financial Assurance Training for NRC Regional and Headquarters Staff, and Agreement State Staff.

Mr. Dean prepared and presented training in July-August 1989 to four NRC Regions on financial assurance for decommissioning, including overview of financial mechanisms, review of cost estimates, implementation procedures, and data sources. He also presented training to NRC Headquarters staff from Office of Research, Office of Nuclear Materials Safety and Safeguards, Office of General Counsel, and Commission staff. The training was repeated in September 1992 to five NRC Regions and Headquarters staff, in August 1995 to three Regions and Headquarters staff, and in 1998 to three Regions (one by teleconference), Headquarters staff, and staff from three Agreement States.

- Financial Assurance Workshops for NRC Agreement States Staff.

Mr. Dean developed and presented a workshop on design and implementation of financial assurance for decommissioning to representatives of 28 States at the NRC annual meeting of Agreement States in October 1991. He also developed and presented a two-day training program in July 1993 sponsored by NRC's Agreement States Office for staff from 14 Agreement States. Training consisted of overview of financial assurance concepts and procedures for technical review of financial assurance submissions, including cost estimates and financial mechanisms, from nuclear materials licensees.

- Review of Decommissioning Cost Estimates and Financial Assurance Mechanisms for Proposed Fuel Enrichment Facilities.

Mr. Dean is currently managing reviews of cost estimates and financial mechanisms submitted by Louisiana Energy Services (LES) and U.S. Enrichment Company (USEC) in support of their license applications.

- Financial Assurance Compliance Support to NMSS.

Mr. Dean has managed or participated in support to NMSS and to NRC's Office of General Counsel in special enforcement situations involving the financial ability of materials licensees to carry out necessary decommissioning activities. Topics evaluated have included corporate ownership and piercing the corporate veil of a holding company involved in bankruptcy to determine if associated companies could be sources of financial assurance for decommissioning, evaluation of the financial condition of several firms in bankruptcy or reporting financial distress and assessments of their ability to pay financial assurance if needed, review of financial mechanisms either proposed or in use by licensees, and other topics.

- Financial Assurance Compliance Support to NRR.

Mr. Dean has provided support to NRR for the review of the terms and conditions of trust funds submitted by reactors, including a review in 2005 of proposed amendments to non-qualified decommissioning trust agreements for Turkey Point and St. Lucie nuclear plants. He has also reviewed tax issues pertaining to decommissioning trust funds established for nuclear power reactors, including evaluation of a private letter ruling addressing the tax liability of a licensee for reactor decommissioning financial assurance.

Analysis of Bankruptcy Issues Affecting Financial Assurance

- Evaluation of Vulnerability of Financial Assurance Mechanisms in Bankruptcy.

In support of the Environmental Protection Agency's evaluation of various financial mechanisms for use to provide financial assurance for closure and post-closure care of hazardous waste management facilities, Mr. Dean prepared a comprehensive analysis of the vulnerability of financial tests, letters of credit, trust funds, and surety bonds in reorganization and liquidation. In particular, he evaluated the effects of the automatic stay provision, legal decisions allowing environmental claims and/or administrative cost claims to avoid the automatic stay; the likelihood of government claims that are subject to the automatic stay to later be given preference over other claims; and the effects of the cram down provision on the likelihood of recovery if government claims are not given priority. He also evaluated the law pertaining to the bankruptcy or reorganization of parent and subsidiary corporations and the law of parent to subsidiary ("downstream"), subsidiary to parent ("upstream") and subsidiary to subsidiary ("cross-stream") corporate guarantees.

- Bankruptcy Analysis Support to NRC.

Mr. Dean has provided support to both NRR and NMSS staff for the analysis of bankruptcy issues. For NRR, he prepared an evaluation of nuclear power reactor ownership structures and their effects on NRC's reactor decommissioning financial assurance requirements that included an examination of the bankruptcy vulnerabilities of different forms of business organization, including corporations and partnerships as well as new forms of organization such as limited partnerships, limited liability partnerships (LLPs), limited liability limited partnerships (LLLPs), and limited liability companies (LLCs). For NMSS, he supervised the preparation of a summary of bankruptcy law as it was likely to affect NMSS financial assurance; identified sources of information on the likelihood that a firm that emerges from reorganization will reenter bankruptcy and the time periods in which their reentry is most likely to occur; and evaluated financial assurance submissions by the Fansteel corporation that involved bankruptcy issues.

Analysis of Business Organization Issues Affecting Financial Assurance

- Corporate Guarantees.

For the EPA, Mr. Dean researched the law on corporate guarantees and developed the terms and conditions of the corporate guarantee used in 40 CFR Parts 264 and 265 for financial assurance for closure and post-closure care of hazardous waste facilities. These corporate guarantee terms and conditions were subsequently adopted for financial assurance for underground storage tanks, and, by the NRC, for decommissioning financial assurance of facilities licensed by NMSS. For the EPA, Mr. Dean also reviewed the impacts of state insurance law on corporate guarantees for liability coverage.

- Evaluation of Power Reactor Ownership Structures.

For NRC/NRR, in response to a critical study released by the STAR Foundation of the increasing use of limited liability companies and multi-tiered holding companies to own nuclear power plants, Mr. Dean prepared a comprehensive working paper describing the basic attributes of corporations, partnerships (including limited liability partnerships and limited liability limited partnerships), and limited liability companies in terms of their organic statutes (Uniform Partnership Act, Uniform Limited Partnership Act, Uniform Limited Liability Company Act, etc.) as well as other governing law. The paper compared their key organizational attributes in terms of characteristics or actions most likely to affect financial assurance (e.g., limited liability, property ownership and distribution, and dissolution of the entity). The paper evaluated whether complex holding companies or other forms of organization that include limited liability subsidiaries pose a risk to the NRC of failing to provide reasonable financial assurance for decommissioning. The paper also reviewed the use of organizational terms in 10 CFR Part 50 and recommended changes to reflect the increased variety of business organizational structures in current use by reactor owners.

- Evaluation of Licensee's Use of Limited Liability Companies.

Mr. Dean prepared a detailed set of draft Requests for Additional Information submitted by the Office of Nuclear Reactor Regulation to Exelon Energy Corporation dealing with Exelon's use of numerous limited liability companies (LLCs) to hold trust funds for nuclear reactor decommissioning. Mr. Dean also participated in numerous teleconferences with Exelon staff, accountants, and attorneys, and NRC staff to receive Exelon's verbal explanations and determine if additional information was required. Mr. Dean then prepared a written analysis that formed the basis for a part of the Safety Evaluation Report on the licensee's proposed transactions, which involved license transfers and changes in control of the decommissioning trust funds.

Decommissioning Technology

- Evaluation of Institutional Controls for Decommissioning Facilities.
Mr. Dean has provided support to several federal agencies, including EPA and the Department of Energy, for the evaluation of potential institutional controls for decommissioning facilities. For the DOE, he managed a study of potential long-term controls for weapons-program sites contaminated with high-level radioactive materials and evaluated studies of institutional controls at particular DOE sites prepared by the Environmental Defense Fund. For EPA, he prepared analyses of such institutional controls as deed notices, covenants, easements, and similar restrictions for use at hazardous waste management facilities and brownfields sites.
- Review of Restricted Release Decommissioning Scenarios at Selected NRC Sites.
Mr. Dean prepared a comparison of restricted release scenarios, including site setting, constituents of concern, release criteria (DCGLs), sludges, structures, soils, groundwater, drummed wastes and solid wastes on site, disposal cell design, institutional controls and land use restrictions, offsite disposal alternatives, estimated costs, and expected duration of restrictions, for several sites, including Sequoyah Fuels, Shieldalloy Metallurgical Corporation, Molycorp, Inc., and Fansteel, Inc., as input to the remedial design for the SafetyLight site.
- Development of Independent Decommissioning Cost Estimate for NMSS Licensee Site.
Mr. Dean participated in the evaluation of decommissioning alternatives for the SafetyLight (SLC) site located in Bloomsburg, PA. In particular, he prepared the component of the revised cost estimate developed by ICF for the site that addressed institutional controls for the site, he participated in the review and evaluation of alternative scenarios for restricted and unrestricted release, and he reviewed the final report prepared by ICF.

Preparation of Draft NRC Rulemaking and Guidance Documents on Financial Assurance

- Rulemaking Support for Financial Assurance Requirements for NMSS Licensee Decommissioning.
Mr. Dean managed support to NMSS for the review of a petition for rulemaking by Westinghouse and General Electric requesting revised financial assurance requirements for large firms. The project involved quantification of the degree of assurance provided by all financial assurance mechanisms currently authorized by NRC and comparison to the degree of assurance provided by proposed financial test mechanism. (Cited as an example in NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook.") The project culminated in development of the financial test for financial assurance currently used by the NRC. Support for the rulemaking included development of draft text for the Federal Register notice, preparation of a Regulatory Analysis, OMB clearance document, and comment summary and analysis. Mr. Dean also managed a related project to address decommissioning by licensees that are not-for-profit entities, such as hospitals and universities, or that cannot qualify for the bond component of the financial test because they do not issue bonds. The report was published as NUREG/CR-6514, *Analysis of Potential Self-Guarantee Tests for Demonstrating Financial Assurance by Non-Profit Colleges, Universities, and Hospitals, and by Business Firms That Do Not Issue Bonds*, June 1997, and formed the basis for

rulemaking action by NMSS. Support for that rulemaking also included development of draft text for the Federal Register notice, preparation of a Regulatory Analysis, OMB clearance document, and comment summary and analysis.

- Rulemaking Support for Financial Assurance Requirements for Power Reactor Decommissioning.

Mr. Dean participated in a review of public comments on an NRC proposal to revise the financial assurance requirements for power reactors, proposed revisions to the trust fund requirements in 10 CFR Part 50, provided support for the preparation of a rule amending the requirements for nuclear power reactor decommissioning trust funds, and assisted NRC in a review of existing guidance.

- Financial Assurance Guidance.

Mr. Dean provided support for the development of guidance materials implementing NRC requirements for financial assurance for decommissioning of licensed facilities, including NUREG-1336, Rev. 1, *Standard Format and Content Guide for Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72*, July 1989 and NUREG-1337, Rev. 1, *Standard Review Plan for the Review of Financial Assurance Mechanisms for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72*, August 1989, Regulatory Guide 3.66, *Standard Format and Content Guide for Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72*, September 1998, and NUREG-1727, NMSS Decommissioning Standard Review Plan, September 2000.

Support for Financial Assurance Requirements of the Environmental Protection Agency

- Financial Assurance for Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDFs).

Between 1980 and 1983, while employed by the Government Research Corporation, Mr. Dean supported the development of financial assurance requirements by the Environmental Protection Agency under the Resource Conservation and Recovery Act (RCRA) for hazardous waste TSDFs. He participated in meetings with private attorneys and experts from the American Bankers Association and other trade organizations on trust funds, surety bonds, letters of credit and other financial instruments. He also participated in the development of a financial test for financial assurance. Mr. Dean also participated in the development of guidance on the preparation of decommissioning cost estimates for TSDFs.

- Financial Assurance for Underground Storage Tanks and Municipal Waste Disposal Facilities.

Beginning in 1984, at ICF, Mr. Dean provided support to the EPA for the development of financial assurance requirements for leaking underground storage tanks containing petroleum and for municipal landfills. He also worked on the development of standards for limiting lender liability for environmental cleanup costs at facilities containing underground storage tanks.

PROFESSIONAL AFFILIATIONS

Member of the Bar of the District of Columbia (Admitted to Practice, 1979)

SELECTED PUBLICATIONS/PRESENTATIONS

NUREG/CR-6514, *Analysis of Potential Self-Guarantee Tests for Demonstrating Financial Assurance by Non-Profit Colleges, Universities, and Hospitals, and by Business Firms That Do Not Issue Bonds* June 1997.

"Financial Assurance for Low-Level Radioactive Waste Disposal Facilities: Factors Affecting the Type, Levels, and Duration of Requirements," presented at WASTE MANAGEMENT '89, Tucson, Arizona March 1, 1989.

"EPA Regulations: Mixed Waste, RCRA and Low-Level Waste," presented at the seminar on Liability Coverage for Low-Level Radioactive Waste Disposal Facilities at the quarterly meeting of the Low-Level Radioactive Waste Forum, April 27-29, 1987.

"RCRA Reauthorization: What It Means For Your Company," speech presented at Hazardous Materials Expo '85, Chicago, Illinois, August 1985.

"Review of Financial Responsibility Regulations," paper presented at RCRA Financial Responsibility and Closure/Post-Closure Plans Seminar, sponsored by Government Institutes, Inc., Washington, D.C., June 1981.

"The Design of Hazardous Waste Management Financial Responsibility Programs," paper presented at Third National Conference on Hazardous Materials Management, Anaheim, California, March 1981.

Student Topics Editor, "The Tax Lawyer," Journal of the American Bar Association, Tax Section (published jointly with Georgetown University Law Center), 1978-1979.

1 MS. CLARK: With regard to the rebuttal
2 testimony, I would just like to point out that the
3 panel is slightly different. The panel on the
4 rebuttal testimony is only Timothy Johnson and Craig
5 Dean.

6 CHAIR BOLLWERK: All right.

7 MS. CLARK: So, Mr. Johnson and Mr. Dean,
8 do you have before you a document entitled NRC Staff
9 rebuttal testimony regarding contingency factor?

10 WITNESS DEAN: Yes.

11 WITNESS JOHNSON: Yes.

12 MS. CLARK: Did you prepare this testimony
13 for submission in this proceeding?

14 WITNESS DEAN: Yes.

15 WITNESS JOHNSON: yes.

16 MS. CLARK: Do you have any revisions or
17 corrections to make at this time?

18 WITNESS DEAN: No.

19 WITNESS JOHNSON: No.

20 MS. CLARK: Do you adopt your written
21 testimony as your sworn testimony in this proceeding?

22 WITNESS DEAN: Yes.

23 WITNESS JOHNSON: Yes.

24 MS. CLARK: And I would like to now move
25 to have this testimony admitted into the proceeding.

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1 CHAIR BOLLWERK: All right. Any
2 objections from the other parties?

3 (No verbal response.)

4 CHAIR BOLLWERK: No? There being none,
5 then the NRC Staff rebuttal testimony regarding
6 contingency factor of Mr. Johnson and Mr. Dean is
7 adopted into the record as if read.

8 (Whereupon, the prefiled rebuttal
9 testimony of Tim Johnson and Craig Dean was bound into
10 the record as if having been read.)**
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October 11, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

LOUISIANA ENERGY SERVICES, L.P.

(National Enrichment Facility)

)
)
)
)
)

Docket No. 70-3103

ASLBP No. 04-826-01-ML

NRC STAFF REBUTTAL TESTIMONY REGARDING CONTINGENCY FACTOR

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

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

A.1. (CD) Craig Dean. I am employed by ICF Consulting. I am providing this testimony under a technical assistance contract with the NRC.

Q.2. Have you previously submitted testimony in this proceeding?

A.2. (TJ, CD) Yes, we provided pre-filed direct testimony in this proceeding on September 15, 2005, on behalf of the NRC Staff. In that testimony, we described our individual responsibilities related to the NRC Staff's review of the application by Louisiana Energy Services, L.P. (LES) to construct and operate a uranium enrichment facility in Lea County, New Mexico, to known as the National Enrichment Facility (NEF). Statements of our professional qualifications were attached to that testimony.

Q.3. What was the purpose of your previous testimony?

A.3. (TJ, CD) The purpose of our joint pre-filed direct testimony was to provide the NRC Staff's views concerning the admitted contentions regarding the contingency factor used by LES in estimating the cost of decommissioning.

Q.4. What is the purpose of this testimony?

A.4. (TJ, CD) To provide our views on NIRS/PC's pre-filed testimony of Dr. Arjun Makhijani regarding the contingency factor used by LES for the decommissioning cost estimate.

Q.5. Have you read Dr. Makhijani's pre-filed direct testimony regarding the contingency factor? If so, what is your opinion of his testimony?

Q.5. (TJ, CD) Yes we have. We disagree with Dr. Makhijani's understanding of the role of the contingency factor and that of the periodic cost estimate adjustments required for decommissioning cost estimates. As Dr. Makhijani correctly notes, NUREG-1757 specifies that the 25 percent contingency factor provides reasonable assurance for *unforeseen* circumstances that could increase decommissioning costs. Factors which affect cost and are foreseeable are expected to be accounted for in the cost estimate. For this reason, LES has accounted for the size of the deconversion facility that will be necessary to handle the output of the proposed enrichment facility. As explained in the Staff's testimony regarding deconversion, LES provided documentation of how the scale of the deconversion facility was accounted for in the decommissioning cost estimate. Thus, the scaling factors cited by Dr. Makhijani, which are already known, are matters which should be addressed in relation to the current cost estimate provided by LES, not as a reason for applying a contingency factor.

In addition, we disagree with Dr. Makhijani's statement that the required, periodic cost estimate adjustments are only designed to address "minor modifications" in the cost. Indeed, it would undermine the very purpose of this requirement to restrict adjustments

only to minor cost adjustments if more significant adjustments are necessary. As NUREG-1757 clearly states with regard to these periodic adjustments in the cost estimates for decommissioning funding, "[a]djustments 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 Exhibit 82 at p. A-29 (emphasis added) Changes in facility conditions, operations, or expected decommissioning procedures could cause significant changes in decommissioning costs that would need to be accounted for in the periodic cost updates. For example, a licensee that had submitted a decommissioning cost estimate based on unrestricted release of the site but who later switched to restricted release conditions would need to make extensive revisions to the cost estimate.

We generally agree with Dr. Makhijani's testimony that factors such as future changes in the euro to dollar exchange rate and possible delays in licensing the deconversion site or disposal plant are adequately covered by the 25 percent contingency factor included in the LES cost estimate should they have any impact decommissioning costs.

Q.6. Does this conclude your testimony?

A.6. (TJ, CD) Yes.

1 MS. CLARK: At this time I would also like
2 to submit as an exhibit the final Environmental Impact
3 Statement for the proposed national enrichment
4 facility in Lea County, New Mexico.

5 CHAIR BOLLWERK: All right, this would be
6 Staff Exhibit 47? All right. Let's go ahead and mark
7 Staff Exhibit 47 for identification. It's the final
8 Environmental Impact Statement, which I believe was
9 dated June 15th, 2005. Have I got the right date?

10 MS. CLARK: I believe it may just be dated
11 June 2005.

12 CHAIR BOLLWERK: June 2005, all right.
13 (Whereupon, the above-
14 referenced to document was
15 marked as Staff Exhibit No. 47
16 for identification.)

17 CHAIR BOLLWERK: And then a motion has
18 been made, I believe, to have it admitted?

19 MS. CLARK: Yes.

20 CHAIR BOLLWERK: All right. Any
21 objections?

22 (No verbal response.)

23 CHAIR BOLLWERK: Hearing none, then the
24 Staff Exhibit 47, which is the final Environmental
25 Impact Statement for the NEF facility is admitted into

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1 evidence.

2 (The document referred to,
3 having been previously marked
4 for identification as Staff
5 exhibit No. 47 was received in
6 evidence.)

7 MS. CLARK: I have nothing further with
8 this panel. So they are prepared for cross
9 examination.

10 CHAIR BOLLWERK: All right. Let's see if
11 there's anything from LES for cross.

12 MR. CURTISS: No.

13 CHAIR BOLLWERK: All right, Mr. Lovejoy
14 then.

15 MR. LOVEJOY: I'll try to make it
16 reasonably brief.

17 EXAMINATION BY MR. LOVEJOY OF

18 TIMOTHY JOHNSON

19 JENNIFER MAYER

20 CRAIG DEAN

21 MR. LOVEJOY: In establishing allowances,
22 isn't that correct that you normally commence by
23 establishing costs on a line item basis?

24 WITNESS JOHNSON: I'm sorry, could you
25 repeat that?

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1 MR. LOVEJOY: You usually establish a
2 contingency allowance by starting with cost estimating
3 on a line item basis.

4 WITNESS JOHNSON: Normally it's applied to
5 the entire cost estimate.

6 MR. LOVEJOY: It's normal to start with
7 the total amount of the cost estimate?

8 WITNESS JOHNSON: Let me clarify that.
9 The guidance that we use is applicable to materials,
10 licensees. Their operations and decommissioning
11 activities are substantially simpler than what we
12 would expect from a nuclear power plant. And the
13 guidance applies to those materials facilities because
14 the decommissioning activities we expect to be
15 relatively simple.

16 And the contingency can be applied on the
17 entire estimate as opposed to a line by line basis.

18 MR. LOVEJOY: So is that what you did
19 here?

20 WITNESS JOHNSON: Yes.

21 MR. LOVEJOY: So you just took the total
22 number and applied 25 percent?

23 WITNESS JOHNSON: Yes, or LES did that and
24 that's what we reviewed and accepted.

25 MR. LOVEJOY: Okay. And in your review

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1 you just looked at the total number and whether it was
2 25 percent?

3 WITNESS JOHNSON: Yes.

4 MR. LOVEJOY: In your use of the
5 contingency factor, is it intended to account for
6 things like industrial accidents and mechanical
7 failures in carrying out the decommissioning
8 activities within the plans of the owner?

9 WITNESS DEAN: I think the guidance says
10 that the contingency factor is designed to account for
11 unforeseen circumstances. And to the extent that
12 those things that you describe are unforeseen, it
13 would cover them.

14 MR. LOVEJOY: Well, is there a line you
15 draw between things that are intended to be within the
16 scope of the contingency factor and those that are
17 outside?

18 WITNESS JOHNSON: Well if there are
19 foreseen costs we would expect that they would be
20 covered in the cost estimate. The contingency applies
21 again to things that are unforeseen.

22 MR. LOVEJOY: Okay. So if some heavy
23 equipment is used and it breaks and it's down for a
24 day, is that something that's covered by a contingency
25 allowance?

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1 WITNESS JOHNSON: Yes. That's its intent.

2 MR. LOVEJOY: That wasn't scheduled in, it
3 wasn't planned, it happened.

4 WITNESS JOHNSON: Yes.

5 MR. LOVEJOY: And you cover it by the
6 contingency allowance, okay. But if there is
7 inflation in the general economy would that be covered
8 by the contingency allowance or not?

9 WITNESS JOHNSON: No, the inflation is
10 covered separately through the periodic updates that
11 are required by regulation.

12 MR. LOVEJOY: And if there are regulatory
13 changes applicable to the activities being carried out
14 for decommissioning, those would be outside the
15 contingency factor, right?

16 WITNESS JOHNSON: Yes. The cost estimate
17 is based on the existing regulations.

18 MR. LOVEJOY: Okay. And so in expressing
19 a view on the sufficiency of a contingency factor
20 here, you are stating -- I recognize you are involved
21 in the cost estimates otherwise.

22 But testifying about the contingency
23 allowance you're testifying on the assumption that all
24 of the base cost estimate values are correct, right?

25 WITNESS JOHNSON: Well, that's one of the

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1 purposes of the review of the decommissioning funding
2 plan is to look at the base cost and to ensure that
3 there is an appropriate contingency factor that's
4 applied to it.

5 MR. LOVEJOY: Okay. But assessing the
6 contingency factor you're starting with the assumption
7 that the base costs are correctly calculated, right?

8 WITNESS JOHNSON: That's part of the
9 review, yes.

10 MR. LOVEJOY: And if there were some
11 determination down the line that near surface disposal
12 of depleted uranium was not going to be the path
13 followed, for whatever reason, then the base cost
14 estimate would change, correct?

15 WITNESS JOHNSON: That's possible, yes.

16 MR. LOVEJOY: And then there would have to
17 be a new judgment addressed as to the contingency
18 factor to apply to that, right?

19 WITNESS JOHNSON: Well, no. If we knew
20 that the disposal environment was going to change we
21 would request through the periodic updates that those
22 changes be reflected in the cost estimate, and again,
23 the contingency added as it applies under the
24 guidance.

25 MR. LOVEJOY: But for present purposes

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1 you're assuming that shallow land burial would work
2 for the depleted uranium, right?

3 WITNESS JOHNSON: Correct. That's the
4 basis of our reviews.

5 MR. LOVEJOY: And you're not calling it
6 reasonably foreseeable that any more expensive, say,
7 deep disposal method would be required.

8 WITNESS JOHNSON: No, we aren't.

9 MR. LOVEJOY: Okay. Well as the
10 regulators, isn't the decommissioning cost estimate
11 developed with the idea that it is the dollars that
12 would be available if necessary for a third party to
13 carry out the decommissioning activities?

14 WITNESS JOHNSON: Yes.

15 MR. LOVEJOY: And one of the circumstances
16 as we've discussed -- as I've discussed with Mr.
17 LaGuardia was that the licensee might be out of the
18 picture, so to speak, in bankruptcy or some other
19 situation.

20 WITNESS JOHNSON: The purpose of
21 decommissioning funding is to ensure that there is
22 money available to decommission the facility in the
23 event the licensee is unavailable to do that for
24 whatever reason. Bankruptcy might be a reason.

25 MR. LOVEJOY: And in a circumstance like

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1 that there's no periodic update process going on is
2 there?

3 WITNESS JOHNSON: Well, at that point in
4 time we would take what actions, assuming we start
5 with a bankruptcy, that would initiate a special
6 bankruptcy review on this facility.

7 And we would take whatever actions are
8 necessary, including the commencement of
9 decommissioning at that point in time. The Agency has
10 broad authority, and what we can do in the event of
11 these cases, and depending on the situation we could
12 issue orders.

13 We could initiate -- would could call in
14 the particular financial instrument. We could
15 initiate decommissioning. And there are probably
16 other things that could be done depending on the
17 specific circumstances.

18 MR. LOVEJOY: And if the financial
19 assurance was calculated on the basis of near surface
20 disposal, and you found that you needed to conduct
21 deep disposal, you might not have enough money, right?

22 WITNESS JOHNSON: The point is that if the
23 bankruptcy occurred, the financial updates would have,
24 hopefully, have dealt with those changes in the
25 situation prior to that.

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1 MR. LOVEJOY: And if those updates had not
2 dealt with that situation, you might not have enough
3 money, right?

4 WITNESS JOHNSON: Well, I don't think that
5 that practically is necessarily going to occur,
6 because if that kind of situation evolves we would
7 know it ahead of time, and would be able to take the
8 appropriate actions to get the cost estimate updated
9 to the appropriate levels.

10 MR. LOVEJOY: Have you even done back of
11 the envelope calculations of the activities involved
12 in carrying out deep disposal of the depleted uranium?

13 WITNESS JOHNSON: In terms of the cost
14 estimate?

15 MR. LOVEJOY: Yes.

16 WITNESS JOHNSON: I have not done those
17 calculations.

18 MR. LOVEJOY: Well, has anyone working on
19 this project done those calculations?

20 WITNESS JOHNSON: I'm not aware that they
21 have done those.

22 MR. LOVEJOY: Have you taken a look at the
23 calculations submitted by Dr. Makhijani, cost
24 estimates of deep disposal?

25 WITNESS JOHNSON: Yes, I have.

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1 MR. LOVEJOY: Have you given any
2 consideration to the possibility that you might need
3 to have financial assurance to do that kind of
4 activity?

5 WITNESS JOHNSON: No, we find it
6 reasonable that the basis for the cost estimate is
7 acceptable. And that is near surface disposal because
8 of the availability of the Envirocare facility.

9 MR. LOVEJOY: I see.

10 WITNESS JOHNSON: And again, that's what
11 the basis of our review was, and that's what the basis
12 of the cost estimate includes.

13 MR. LOVEJOY: If deep disposal is
14 necessary for the depleted uranium have you taken a
15 look at whether you think Dr. Makhijani's cost
16 estimates for that activity are reasonable?

17 WITNESS JOHNSON: I really don't know.

18 MR. LOVEJOY: That's all I have.

19 WITNESS JOHNSON: Okay.

20 CHAIR BOLLWERK: All right. Any, then,
21 questions from LES or from the Staff in terms of
22 redirect?

23 MS. CLARK: I have a few more questions.

24 CHAIR BOLLWERK: All right.
25

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1 EXAMINATION BY MS. CLARK OF

2 JENNIFER MAYER

3 TIMOTHY JOHNSON

4 JENNIFER MAYER

5 MS. CLARK: I'd like to begin with what we
6 heard about the need for a good base cost estimate.
7 Would you accept a base cost estimate for
8 decommissioning that you thought did not include all
9 foreseeable activities?

10 WITNESS JOHNSON: No, we wouldn't.

11 MS. CLARK: Would you accept one that you
12 felt did not include adequate costs to cover each of
13 those activities?

14 WITNESS JOHNSON: No, we wouldn't.

15 MS. CLARK: So notwithstanding the fact
16 that you know there's going to be a contingency
17 factor, would you still require that the base estimate
18 be conservative and sufficient to cover all
19 decommissioning activities?

20 WITNESS JOHNSON: Yes.

21 MS. CLARK: I'd like to talk a little bit
22 about the triennial updates. Mr. Lovejoy has spoken
23 about things that could have large consequences on
24 decommissioning cost estimate, and specifically a
25 change in the disposal options available.

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1 If such a change were to occur, would you
2 expect that the licensee would have to update their
3 decommissioning cost estimate to account for that
4 change?

5 WITNESS JOHNSON: Yes, we would.

6 JUDGE KELBER: Would that necessarily have
7 to wait for the three year period, or would that be
8 instant upon the change --

9 WITNESS JOHNSON: Well for this particular
10 facility the updates will be done a little bit
11 differently than what's under the regulation. The
12 first submittal that we get with the instrument will
13 be for a three year period and will include the waste
14 that would be generated during that first three year
15 period.

16 The subsequent estimates for
17 dispositioning of depleted uranium will be done
18 annually. So we would be able to account for changes
19 in disposition cost that might include disposal or
20 conversion or whatever on an annual basis.

21 And this is an item that will be put into
22 one of our license conditions, and is explained in
23 chapter 10 in the Safety Evaluation Report.

24 JUDGE KELBER: Thank you.

25 MS. CLARK: Does the Staff review the

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1 triennial updates?

2 WITNESS JOHNSON: Yes, it does.

3 MS. CLARK: Is it required that they be
4 approved by the Staff?

5 WITNESS JOHNSON: There is not a formal
6 approval required under regulation, but it is
7 something that we review. And if we find deficiencies
8 we will go back to the licensee to get those
9 corrected.

10 MS. CLARK: If you got a triennial update
11 and you believed that it did not account for changes
12 in the decommissioning cost estimate, would you take
13 action?

14 WITNESS JOHNSON: Yes, we would.

15 MS. CLARK: Would you require the licensee
16 to provide additional funding to cover the
17 adjustments?

18 WITNESS JOHNSON: The mechanism that we
19 could use -- well, we would try to get it done without
20 having to go to orders. But we do have the authority
21 to issue orders if it comes down to that.

22 MS. CLARK: Do you expect all cost
23 adjustments to be included in the triennial updates?

24 WITNESS JOHNSON: Well, if it -- if they
25 are foreseeable costs we would expect them to be

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1 identified and addressed in the updates.

2 MS. CLARK: Does it matter how large or
3 how small the cost changes are?

4 WITNESS JOHNSON: Correct. If it was a
5 change in the facility conditions or any of the base
6 assumptions that resulted in a large cost increase, we
7 would expect the licensee to account for that.

8 MS. CLARK: Okay.

9 WITNESS JOHNSON: Yes.

10 WITNESS DEAN: The term that I've heard
11 used with respect to the updates is that their purpose
12 is to true up the cost update, the cost estimate, so
13 that it's accurate as of the time that it's submitted.

14 MS. CLARK: So in approving that update
15 would you ignore cost changes that you knew existed
16 because, for example, they were large?

17 WITNESS JOHNSON: No, we would not.

18 MS. CLARK: Okay, thank you. I don't have
19 any further questions.

20 CHAIR BOLLWERK: Okay. Anything from
21 LES's point? I'm -- Mr. Lovejoy, anything further?

22 EXAMINATION BY MR. LOVEJOY OF

23 JENNIFER MAYER

24 TIMOTHY JOHNSON

25 CRAIG DEAN

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1 MR. LOVEJOY: Just a couple. Mr. Johnson,
2 do you keep track of LES's financial structure and
3 financial health?

4 WITNESS JOHNSON: I follow generally what
5 goes on by the uranium industry. I do look at annual
6 reports. I do have copies of annual reports from
7 Urenco.

8 LES, I don't believe, issues an annual
9 report. But when they get to that point where they do
10 issue one the NRC will follow that.

11 MR. LOVEJOY: So you don't have financial
12 statements from LES?

13 WITNESS JOHNSON: No, we do not.

14 MR. LOVEJOY: And if a triennial or a
15 regular update takes place -- well, has it ever
16 happened in your experience with the NRC that an
17 update has taken place and decommissioning financial
18 assurances had to be increased and the licensed party
19 has responded by saying that it doesn't have the
20 money?

21 WITNESS JOHNSON: There have been a number
22 of decommissioning cases where the current
23 decommissioning costs are under funded. But these
24 cases -- the contamination occurred prior to the
25 promulgation of the decommissioning financial

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1 assurance standards in 1988.

2 And we have programs underway addressing
3 those. But since the promulgation of the
4 decommissioning financial assurance, I'm not aware of
5 a case where a corporation has said that they cannot
6 meet the standards.

7 MR. LOVEJOY: LES is a partnership, right?

8 WITNESS JOHNSON: Yes, it is.

9 MR. LOVEJOY: I'm reminded of the instance
10 of Sequoyah Fuels, which may have involved some of the
11 members of this panel. Did an incident happen with
12 Sequoyah Fuels where the decommissioning financial
13 assurance requirement was not met?

14 MS. CLARK: I'm afraid that this line of
15 questioning is getting into what I believe is an
16 examination of whether our decommissioning funding
17 rules and requirements are sufficient.

18 And I don't think that's a matter before
19 this Board. The matter of whether we have sufficient
20 regulations in place to accommodate bankruptcies is
21 just simply not an issue here.

22 MR. LOVEJOY: The regulations are the
23 regulations and they're given for purposes of this
24 proceeding. I'm inquiring as to the application of
25 the regulations in this specific case.

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1 JUDGE ABRAMSON: It seems to me what's
2 been challenged is the decommissioning costs and
3 what's been challenged is the contingency factor. I
4 have not heard and I don't recall that there was a
5 challenge and a contention to whether the
6 decommissioning funding mechanism was adequate.

7 MR. CURTISS: There was a challenge to
8 that raised by the Attorney General, but that was
9 rejected at the outset. And there hasn't been any
10 challenge to the financial assurance mechanism.

11 I think Staff's objection is the same one
12 we raise, which is there isn't an issue here that is
13 unique to LES, if there is an issue at all. I guess
14 the theory that bankruptcy occurs -- the regulations
15 change before or just after bankruptcy occurs, and
16 it's so highly implausible I'm not sure it's worth
17 pursuing it.

18 JUDGE ABRAMSON: What I don't see is the
19 connection between that and a challenge to either the
20 underlying cost estimates, which you've challenged and
21 we appreciate --

22 MR. CURTISS: Right.

23 JUDGE ABRAMSON: -- that there's that
24 question about whether -- what is the right cost to be
25 associated with deep -- with disposal, and for that

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1 matter with deconversion.

2 We understand those challenges. And we
3 understand that you're addressing the question of the
4 contingency. And to the extent that questions about
5 contingency go to what they are to cover, that's one
6 thing.

7 But I don't think that it's appropriate in
8 this hearing, because I don't think it's before us,
9 the question of the funding mechanics.

10 MR. LOVEJOY: All right. Well I can be
11 very brief, but in explanation I'm not questioning the
12 funding mechanics, but the witnesses have all said
13 that they can be one particular way about the
14 contingency level because there's always the periodic
15 update to fall back on.

16 And so since they've introduced that I'm
17 inquiring about that.

18 CHAIR BOLLWERK: Let me just say for
19 completeness of the record, given the answer that Mr.
20 Johnson already gave, I'd just like to hear the answer
21 to the Sequoyah Fuels question.

22 WITNESS JOHNSON: Yes, the Sequoyah Fuels
23 case is a case that is one of those that I referred to
24 as a case that has had a number of issues to it. It
25 was never able to comply with -- comply fully with the

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1 rulemaking when it first came into existence.

2 And there has been a substantial effort by
3 NRC Staff as well as Sequoyah Fuels and Converdyne to
4 reach an agreement that would ultimately provide
5 funding for the decommissioning of that facility.

6 CHAIR BOLLWERK: That's still an ongoing
7 matter with the Agency then, I take it.

8 WITNESS JOHNSON: That's an ongoing matter
9 within the Agency, yes.

10 CHAIR BOLLWERK: All right. Do you have
11 any further questions?

12 MR. LOVEJOY: No more questions, thank
13 you.

14 EXAMINATION BY MS. CLARK OF
15 TIMOTHY JOHNSON
16 JENNIFER MAYER
17 CRAIG DEAN

18 MS. CLARK: I think I need to clarify. I
19 can't recall the exact words Mr. Lovejoy just used,
20 but he said something to the effect that it's the
21 Staff position that cost contingency factor doesn't
22 matter because there's always the triennial update.

23 And I'd like to ask the Staff -- it's my
24 understanding that what we were discussing is the
25 difference in accounting for foreseeable costs and

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1 unforeseeable costs.

2 Do you think that the fact that there are
3 triennial updates mitigates the need for a contingency
4 factor in any way?

5 WITNESS JOHNSON: No, it doesn't.

6 CHAIR BOLLWERK: Any other questions?

7 (No verbal response.)

8 CHAIR BOLLWERK: All right. Any questions
9 from any of the Board members?

10 (No verbal response.)

11 CHAIR BOLLWERK: All right. Then moving
12 on, I thank you for your service to the Board. You've
13 been with us I guess over the last four days from one
14 time or another.

15 We appreciate very much the testimony
16 you've provided us. Thank you very much.

17 JUDGE ABRAMSON: Guess who's coming back.

18 (Pause.)

19 CHAIR BOLLWERK: All right. All set, Dr.
20 Makhijani? Okay. All right.

21 Whereupon,

22 ARJUN MAKHIJANI

23 was recalled as a witness by Counsel for NIRS/PC and,
24 having been previously duly sworn, assumed the witness
25 stand, was examined and testified as follows:

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1 CHAIR BOLLWERK: And let's turn to Mr.
2 Lovejoy then.

3 MR. LOVEJOY: Thank you, Your Honor.

4 Dr. Makhijani, do you have with you direct
5 testimony and rebuttal testimony in connection with
6 contingency issues?

7 WITNESS MAKHIJANI: Yes.

8 MR. LOVEJOY: Okay. First, as to the
9 direct testimony, what's the date on the direct
10 testimony?

11 WITNESS MAKHIJANI: October 18, 2005.

12 MR. LOVEJOY: And what's the date on the
13 rebuttal testimony?

14 WITNESS MAKHIJANI: October 21st, 2005.

15 MR. LOVEJOY: Very good. Would you --
16 let's take them together.

17 Are you content to offer the direct and
18 rebuttal testimony that you have in written form as
19 your sworn testimony before this Board?

20 WITNESS MAKHIJANI: Yes.

21 MR. LOVEJOY: We offer them for admission
22 into evidence.

23 CHAIR BOLLWERK: All right. Any
24 objections?

25 (No verbal response.)

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1 CHAIR BOLLWERK: All right. Then the
2 October 18th revised direct testimony of Dr. Makhijani
3 concerning contingency factor applicable to LES's cost
4 estimate, as well as the October 21st rebuttal
5 testimony of Dr. Makhijani on that issue are adopted
6 and placed into the record as if read.

7 (Whereupon, the direct and rebuttal
8 prefiled testimony of Arjun Makhijani was bound into
9 the record as if having been read.)**
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October 18, 2005

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

Docket No. 70-3103

Louisiana Energy Services, L.P.

ASLBP No. 04-826-01-ML

National Enrichment Facility

**REVISED 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 THE CONTINGENCY FACTOR APPLICABLE TO
LES'S COST ESTIMATE**

Q1. Please state your name, affiliation, and qualifications.

A1. My name is Dr. Arjun Makhijani. Among my credentials is a doctorate in Engineering from the Electrical Engineering Department of the University of California at Berkeley (1972, specialization: the application of plasma physics to controlled nuclear fusion). I am President of the Institute for Energy and Environmental Research (IEER), an organization, which, among its activities, assesses environmental damage from the operation of nuclear fuel facilities, and estimates

the compliance of those facilities with environmental regulations, mainly relating to radioactive materials and wastes and to radioactivity exposures. In addition, I am, in my personal capacity as part of a non-IEER team, currently one of the principal personnel who have been chosen by the U.S. government to carry out an audit of the radiation dose reconstruction program that is being done for nuclear weapons complex workers who have applied for compensation under the Energy Employees Occupational Illness Compensation Program Act.

I have authored and co-authored numerous studies, articles, and books examining nuclear-related issues, including emissions from nuclear weapons plants, nuclear fuel cycle related issues, nuclear weapons production and testing, and nuclear waste. Among other things, I was the principal author of the first ever independent source term reconstruction from a nuclear weapons plant (the Feed Materials Production Center), done in 1989.

Chapters that I have co-authored include "Dismantling the Bomb," and "Nuclear Waste Management and Environmental Remediation," in *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940*, Stephen I. Schwartz, editor, Brookings Institution Press, Washington, D.C., 1998. I am also a co-author of "The Production of Nuclear Weapons and Environmental Hazards," a chapter appearing in *Nuclear Wastelands: A Global Guide to Nuclear Weapons Production and its Health and Environmental Effects*, MIT Press, Cambridge, Massachusetts, 1995. I am principal editor of this book.

I have served on the Radiation Advisory Committee of the Science Advisory Board of the United States Environmental Protection Agency (EPA), and on the EPA's advisory subcommittee on Radiation Cleanup Standards of the National Advisory Committee on Environmental Policy and

Technology. From 1997 to 2002, I was part of an IEER team that monitored three independent audits of the compliance of the Los Alamos National Laboratory in New Mexico with radiation regulations under the Clean Air Act, specified in 40 CFR 61, Subpart H. The audits and the IEER monitoring of the audits were the result of a federal consent decree issued after the court found Los Alamos National Laboratory to be in violation of 40 CFR 61, Subpart H.

My current resume is attached to this testimony.

Q2. What is the purpose of your testimony today?

A2. I am testifying in support of three contentions, which were advanced in this proceeding by Nuclear Information and Resource Service and Public Citizen. The first contention, EC-3/TC-1 -- Depleted Uranium Hexafluoride Storage and Disposal, states as follows:

CONTENTION: Petitioners contend that Louisiana Energy Service, L.P., (LES) does not have a sound, reliable, or plausible strategy for private sector disposal of the large amounts of radioactive and hazardous Depleted Uranium Hexafluoride ("DUF6") waste that the operation of the plant would produce in that the statement that "discussions have recently been held with Cogema concerning a private conversion facility" (ER 4.13-8) is without substance.

The second contention, EC-5/TC-2 -- Decommissioning Costs, states as follows:

CONTENTION: Louisiana Energy Services, L.P., (LES) has presented estimates of the costs of decommissioning and funding plan as required by 42 U.S.C. 2243 and 10 C.F.R. 30.35, 40.36, and 70.25 to be included in a license application. See Safety Analysis Report 10.0 through 10.3; ER 4.13.1. Petitioners contest the sufficiency of such presentations as based on the lack of any relevant estimate of the cost of converting and disposing of depleted uranium, given it does not rely upon the three examples -- the 1993 CEC estimate, the LLNL report, and the UDS contract -- cited in its application.

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 USC 2243 and 10 CFR 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.

The third contention, EC-6/TC-3 -- Costs of Management and Disposal of Depleted UF₆, states as follows:

CONTENTION: Petitioners contend that the Louisiana Energy Services, L.P., (LES) application seriously underestimates the costs and the feasibility of managing and disposing of the Depleted Uranium Hexafluoride ("DUF6") produced in the planned enrichment facility in that:

(E) A problem arises with respect to disposal of CaF₂. It is not known whether the CaF₂ will be contaminated with uranium. Such contamination would prevent the resale of the CaF₂ and would require that such material be disposed of as low-level waste.

(G) LES's "preferred plausible strategy" for the disposition of depleted UF₆ is the possible sale to a "private sector conversion facility" followed by disposal of deconverted U₃O₈ in a "western U.S. exhausted underground uranium mine." (ER 4.13-8). Such a conversion strategy cannot be accepted as plausible given that no such conversion facility exists nor is it likely to be built to suit LES's timing and throughput requirements.

(I) The "engineered trench" method of waste disposal proposed by LES is not likely to be acceptable (ER 4.13-11, -19) if DUF₆ is not considered low level waste.

Q3. What materials have you reviewed in preparation for your testimony?

A3. Part of my preparation was working with and assigning tasks to Dr. Brice Smith, a senior scientist at IEER, and our librarian Lois Chalmers. I reviewed various parts of the LES license application, including the Environmental Report and the Safety Analysis Report, submitted by LES to the Commission in support of its application, that relate to the depleted uranium to be generated by the facility, the management of that material, and its deconversion and disposal. I also reviewed various documents prepared by LES and persons working for LES that shed light on LES's plans

for disposition of depleted uranium. I have also reviewed documents on uranium disposal options and uranium health effects including those from scientific journals as well as publications from national and international bodies such as the International Commission on Radiological Protection, the National Research Council of the National Academy of Sciences, the OECD Nuclear Energy Agency, the Royal Society, the International Atomic Energy Agency, and the World Health Organization.

In addition, I have reviewed the Draft and Final Environmental Impact Statement for the proposed National Enrichment Facility prepared by the Nuclear Regulatory Commission (NUREG-1790) (NIRS/PC Ex. 152, 191) as well as the Final Environmental Impact Statement for the proposed Claiborne Enrichment Facility (NUREG-1484) (NIRS/PC Ex. 58). I have revisited the history of 10 CFR 61.55 as well as other parts of 10 CFR 61. I have reviewed several related Department of Energy documents, such as the Environmental Impact Statements for the proposed Portsmouth and Paducah conversion plants (DOE/EIS-0359 and DOE/EIS-0360) (LES Ex. 16, 17) and the 1999 DOE Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride (DOE/EIS-0269) (LES Ex. 18). I have also reviewed some of the supporting documents for those studies such as the 1997 Lawrence Livermore National Laboratory Engineering and Cost Analyses. (NIRS/PC Ex. 55, 56).

I have studied these and related areas for many years, and so cannot make a full list of all the materials I have reviewed that may shed light on the questions before the Board. For a further listing of documents reviewed as part of my work in this case in collaboration with Dr. Smith, I refer you to the reference lists in the following reports:

Makhijani and Smith, *Costs and Risks of Management and Disposal of Depleted Uranium from the National Enrichment Facility Proposed to be Built in Lea County, New Mexico* by

LES, November 24, 2004. (NIRS/PC Ex. 190) (See particularly 3-19 concerning uranium health risks, 19-29 concerning regulatory aspects and generic analyses of near-surface disposal, 30-34 concerning deconversion and byproducts thereof, and 35-51 concerning factors affecting costs and cost estimates).

Makhijani and Smith, *Update to Costs and Risks of Management and Disposal of Depleted Uranium from the National Enrichment Facility Proposed to be Built in Lea County New Mexico* by LES by Arjun Makhijani, PhD. and Brice Smith, Ph.D. based on information obtained since November 2004, July 5, 2005. (NIRS/PC Ex. 224) (See particularly 1 (summary), 2-6 concerning the need to analyze specific disposal options, 7-8 concerning the difficulties of the Envirocare site, 8-22 concerning the difficulties of the WCS site, 22-24 concerning the probable need for geologic disposal).

Both of these reports have been filed in this proceeding on the indicated dates and are incorporated by reference here. These works form the primary technical basis for my conclusions as presented in this testimony. I asked Dr. Brice Smith to draft my testimony for me based on the above materials, my deposition testimony, and an outline we developed together. I reviewed, edited, and approved the text of this testimony while on travel.

Q4. What is your understanding of the requirements for a plausible strategy as it relates to the disposition of the depleted uranium hexafluoride that would be generated by the proposed National Enrichment Facility?

A4. In the Claiborne Enrichment Center case the Atomic Safety and Licensing Board ruled that

Thus, in assessing the plausible tails disposal strategy adopted by the Applicant as part of its decommissioning funding plan, we first must determine whether the funding plan contains a reasonable or credible plan to dispose of the DUF₆ tails generated at the CEC and then determine whether the Applicant's cost estimates for the components of the plan are reasonable.¹

In the current context, a reasonable and credible plan for the disposition of the depleted uranium hexafluoride that would be produced by the proposed NEF facility would have to address the

¹ ASLB CEC 1997 (NIRS/PC Ex. 205) p. 4 of 18.

deconversion of the DUF6 to a more stable chemical form, the safe disposal of the deconversion by-products (i.e. the neutralization of the hydrofluoric acid and the disposal of the resulting calcium fluoride), the processing of the DU into a suitable waste form, and the ultimate disposal of the depleted uranium in a manner that will meet all current regulatory requirements including the annual dose limits in 10 CFR 61 and the EPA maximum concentration limits for drinking water.

The proposed LES facility will generate as much as 133,000 metric tons of DU, and to date the disposal of such large quantities of depleted uranium has not occurred anywhere in the world.

An additional element that needs to be considered in the context of defining a plausible strategy is cost. While the Board has ruled that "the cost of implementing a particular strategy has no bearing upon whether any particular strategy is technically plausible," it has also acknowledged that LES itself noted that "the issues of 'plausible strategy' for waste disposal/dispositioning and decommissioning costs are closely related" and that "the reasonableness of the estimated costs of either the DOE plausible strategy or any potential private disposal strategy will be at issue in this proceeding."²

For an additional discussion on the nature and requirements of a plausible strategy I refer you to the Makhijani and Smith 2004 Report (NIRS/PC Ex. 191), specifically pages 44 to 47.

Q5. Moving to the proposal before the Commission, what do you understand LES proposes to do with the DUF6 from the NEF?

² ASLB June 30 2005 (NIRS/PC Ex. 206) p. 13-14.

A5. The LES FEIS contains the following description of the two options proposed for the management of the DUF6 that would be generated by the proposed NEF:

Two options are proposed for disposition of DUF6. The first option would be to ship the material to a private conversion facility prior to disposal (Option 1). An alternative available under the provisions of the United States Enrichment Corporation (USEC) Privatization Act of 1996 would be to ship the material to a DOE conversion facility, either at Portsmouth, Ohio, or at Paducah, Kentucky, for temporary storage and eventual processing by the DOE conversion facility prior to disposal by DOE (Option 2).³

In addition, LES has publicly stated that

For many reasons, including the large volume of byproduct already in storage in the US, *the DOE deconversion facilities are not LES's path of choice for byproduct deconversion.* LES has continually supported the development of a commercial, private deconversion facility. In fact, the company will seek to develop long-term supply contracts with potential deconversion operators in order to assist in their financing and licensing efforts to build such a facility.⁴

LES and the NRC Staff have also stated that it is their position that the depleted uranium from the deconversion facility would be considered Class A low-level radioactive waste under 10 CFR 61.55 and that the preferred option is the deconversion of the DUF₆ to DU₃O₈ followed by its disposal in a shallow land disposal facility. While no shallow-land burial site has been specifically identified by LES as the final destination for the DU₃O₈ that would be generated, the NRC FEIS considers only the Hanford and Envirocare sites as potential options. The option of disposal at the proposed Waste Control Specialists facility in Andrews County, Texas, which is currently seeking a license, was explicitly removed from consideration by the NRC as follows:

Due to the need for separate regulatory actions prior to disposal at WCS [Waste Control Specialists], it is assumed that the depleted U₃O₈ generated from the adjacent or offsite private conversion process would be disposed at another disposal site licensed to accept this material.⁵

³ NEF FEIS 2005 (NIRS/PC Ex. 191) p. 2-28.

⁴ LES NEF UF6 info sheet (NIRS/PC Ex. 134) p. 3 (emphasis added).

⁵ NEF FEIS 2005 (NIRS/PC Ex. 191) p. 2-33.

The FEIS focuses heavily on the choice of Envirocare and, in fact, draws no conclusions whatsoever about the environmental impacts of disposal at Hanford. The option of disposing of the depleted uranium in an abandoned mine previously put forth by LES in this case was withdrawn as a basis upon which they would rely for their plausible strategy.

Finally, LES has stated that it will consider only the neutralization of the hydrofluoric acid generated during deconversion to form calcium fluoride (CaF_2). They have also proposed that the CaF_2 would be disposed of in the Lea County landfill as industrial waste.⁶

Q6. In light of your understanding of the requirements of a plausible strategy, what is your conclusion regarding the plausibility of the Cogema option for deconverting the DUF_6 that would be generated by the proposed NEF?

A6. Based on Cogema's experience operating a similar deconversion plant in France (i.e. the Pierrelatte plant) to that which would be required to handle the material from the proposed LES facility, reliance on Cogema for the deconversion option would be considered technologically plausible once a siting process for the deconversion facility is specified by the NRC and provided that the final deconversion form chosen is U_3O_8 and not UO_2 .

Q7. What is your conclusion regarding the need to consider a contingency allowance with respect to a deconversion facility based on Cogema's experience with the Pierrelatte plant?

⁶ Krich 2005 (NIRS/PC Ex. 187) Attachment 1.

A7. I will discuss issues relating to the general contingency factor of at least 25 percent required by the NRC for unforeseen circumstances. With respect to a deconversion option based on Cogema's experience, the Pierrelatte plant upon which our cost estimate is based has a throughput that is more than two and a half times larger than the throughput of a deconversion plant that would be built to handle the DUF6 from the proposed NEF facility. The LLNL analysis estimated that the unit cost of a deconversion facility producing either DUO_3O_8 or DUO_2 would increase by about 73 percent if the throughput of the facility was reduced by 50 percent.⁷

Thus, the scaling uncertainties are significant enough to argue for the continued inclusion of at least a 25 percent contingency factor despite the fact that the 5.50 euro per kg U (\$7.10 per kg U in 2004 dollars) estimate is based on an operating plant with real-world practical experience.

Q8. What is your conclusion on the reasonableness of LES's reliance on cost information from either the Envirocare or WCS sites?

A8. In their June 30, 2005 ruling, the Board stated that

To be sure, the choice regarding a "plausible strategy," and the concomitant need to provide a reasonable explanation of the costs of that choice as they relate to its financial qualifications/decommissioning funding responsibilities, rests with LES in the first instance.⁸

In addition, the NRC stated in its guidelines for determining decommissioning costs that

The purpose of the review of the cost estimate is to ensure that the licensee or responsible party has developed a cost estimate for decommissioning the facility based on documented

⁷ Makhijani and Smith 2004 (NIRS/PC Ex. 190) p. 37 and LLNL 1997 CA (NIRS/PC Ex. 56) p. 99-100.

⁸ ASLB June 30 2005 (NIRS/PC Ex. 206) p. 14 (emphasis added).

and reasonable assumptions and that the estimated cost is sufficient to allow an independent third party to assume responsibility for decommissioning the facility if the licensee or responsible party is unable to complete the decommissioning.⁹

The current LES cost estimates rely on the lowest price quoted to them in a Memorandum of Agreement (MOA) between LES and WCS. This MOA states the parties' intention to consider discussions that could lead to a contract for WCS to accept two years worth of depleted uranium from a private deconversion facility amounting to a total of 16,800 metric tons of DU_3O_8 or 14,250 tons of DU. This quantity is less than 11 percent of the 133,000 metric tons of DU that the proposed NEF facility would be expected to generate over its operational lifetime.¹⁰ The MOA also states that the proposed WCS would be sufficiently large to contain the full amount if it was eventually disposed of at the proposed WCS site. Currently, however, WCS has no license to dispose of radioactive waste and, therefore, these discussion are contingent upon the WCS assumption that it will receive a license from the Texas Commission on Environmental Quality.

In the final EIS for the NEF, the NRC staff notes the following the actions that would be necessary before it would be possible to dispose of the depleted uranium from the NEF facility at the proposed Waste Control Specialists site in Andrews County, Texas:

Before the depleted uranium generated by the proposed NEF could be disposed at the proposed WCS Compact Facility, a series of legal procedures and approval processes would have to be successfully addressed. These procedures and processes include:

1. Approval by the State of Texas of WCS's application, including authorization by the State for the WCS Compact Facility to accept for disposal depleted uranium oxides of the type and quantities expected to be generated as a result of the proposed NEF's operations;
2. Approval by the Rocky Mountain Compact (in which the proposed NEF would be located) for the export of the depleted uranium oxides from the Compact; and
3. Approval by the Texas Compact for the import and disposal of the depleted uranium oxides generated as a result of the proposed NEF's operations.¹¹

⁹ NUREG 1757, Vol. 3 (NIRS/PC Ex. 249) p. 4-9 (emphasis added).

¹⁰ MOA 2005 (LES Ex. 105) p. 2 to 3.

¹¹ NEF FEIS 2005 (NIRS/PC Ex. 191) p. 2-32 to 2-33.

They go on to specifically recognize that “[a] separate licensing process could be required to obtain approval from the State of Texas” for the disposal of DU even if the general low-level waste application is eventually granted.¹² In light of these considerations, the NRC staff concluded that

Due to the need for separate regulatory actions prior to disposal at WCS, it is assumed that the depleted U_3O_8 generated from the adjacent or offsite private conversion process would be disposed at another disposal site licensed to accept this material.¹³

WCS is not in a position to set its prices for disposal. Those prices would have to be set by the Texas Compact Commission. Thus, a vague cost estimate from WCS that can be changed at any time, that contains no basis for how it might be changed, when it might be changed, or whether there are any upper limits to the cost cannot be considered to be reasonable or credible estimate in this case. In light of this conclusion it is interesting to note that the January 2005 memorandum of agreement explicitly states that

LES and WCS acknowledge and agree that neither party accepts *any responsibility* for nor make[s] any representation or warranty, express or implied, with respect to the information provided to the other party in accordance with this MOA.¹⁴

This type of agreement should not form the basis for estimating the cost of a plausible disposal strategy, and should not be accepted by the NRC. Relying on this memorandum of agreement for a cost estimate before WCS has been granted a license is more wishful thinking than a plausible strategy.

LES also notes in support of its cost estimate a single page letter from the Executive Vice President of Envirocare that states that the cost stated in the LES license application were “a conservative estimate of what it would currently cost at standard depleted U_3O_8 density to dispose of such

¹² NEF FEIS 2005 (NIRS/PC Ex. 191) p. I-83 (in the electronic version of the FEIS this quote appears on page I-82)

¹³ NEF FEIS 2005 (NIRS/PC Ex. 191) p. 2-33.

¹⁴ MOA 2005 (LES Ex. 105) p. 4 (emphasis added).

material at Envirocare's Utah facility."¹⁵ At the time the Envirocare letter was written, the disposal costs reported by LES in its license application were between \$1.47 and \$2.17 per kilogram of uranium compared to the current LES estimate of \$1.14 per kilogram of uranium.¹⁶ As with the case of WCS, a vague unsupported statement with no supporting discussion of the analysis underlying the conclusion cannot be considered sufficient to document the assumptions made, much less determine if they are reasonable. In addition, the letter from Envirocare also noted that their review was not an offer to dispose of the material at this cost and that the DU would still have to be meet "Envirocare's licenses, permits, and operational requirements."¹⁷

Q9. What is your understanding of the role of the NRC required contingency factor in general and its applicability to the estimates of DU dispositioning in this case in specific?

A9. In the *Consolidated NMSS Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness* the NRC noted that

The purpose of the review of the cost estimate is to ensure that the licensee or responsible party has developed a cost estimate for decommissioning the facility based on documented and reasonable assumptions and that the estimated cost is sufficient to allow an independent third party to assume responsibility for decommissioning the facility if the licensee or responsible party is unable to complete the decommissioning.¹⁸

They went on to state that "[a]t minimum, all cost estimates for unrestricted or restricted release must" apply "a contingency factor of *at least* 25 percent to the sum of all estimated costs."¹⁹ The reason NRC requires this provision is stated clearly:

¹⁵ Krich 2005 (NIRS/PC Ex. 187) Attachment 2.

¹⁶ LES SAR 2004 (NIRS/PC Ex. 222) Table 10.3-1.

¹⁷ Krich 2005 (NIRS/PC Ex. 187) Attachment 2.

¹⁸ NUREG 1757, Vol. 3 (NIRS/PC Ex. 249) p. 4-9.

¹⁹ NUREG 1757, Vol. 3 (NIRS/PC Ex. 249) p. 4-9 to 4-10 (emphasis added).

Because of the uncertainty in contamination levels, waste disposal costs, and other costs associated with decommissioning, the cost estimate should apply a contingency factor of 25 percent to the sum of all estimated decommissioning costs. The 25 percent contingency factor provides reasonable assurance for *unforeseen* circumstances that could increase decommissioning costs, and should not be reduced or eliminated simply because foreseeable costs are low.²⁰

Typical examples of unforeseen circumstances would include things like industrial accidents and other unexpected delays in construction or shutdowns during operation.

This guidance clearly demands two things of cost estimates; first, that the baseline estimate should be based on "documented and reasonable assumptions" and second, that the contingency allowance relate to "unforeseen circumstances." Therefore, we have retained the NRC contingency factor of 25 percent despite that fact that we have quantified some of the anticipated uncertainties in the economic analysis presented in the November 2004 report. This is because the NRC guidance explicitly and emphatically states that the contingency factor of at least 25 percent provision relates to "unforeseen circumstances."

Q10. What is your understanding of the role of the triennial cost adjustments and how they relate to the contingency factor required by the NRC?

A10. The triennial cost adjustments are meant to allow minor modifications of the decommissioning cost estimates to reflect changes such as adjusting for changing inflation rates. It is not meant to provide a mechanism for major adjustments to the cost to reflect significant departures from the decommissioning plan set forth at the time the license is granted. A particularly relevant precedent in this case is the Atomic Safety and Licensing Board's rulings in the Claiborne Enrichment Center

²⁰ NUREG-1757, Vol. 3, Appendix A (LES Ex. 82), p. A-29 (emphasis in the original).

case in 1997 with respect to the cost of neutralizing the HF and disposing of the resulting calcium fluoride as discussed above. In its ruling the Board concluded that

Here, the largest component of the Applicant's estimate for tails disposal is that for the conversion of DUF6 to U3O8. As we have found, however, the Applicant's estimate has not properly accounted for neutralizing the byproduct HF as part of its estimate. *This additional cost is substantial and it is not the type of expense, like an increase for inflation or the development of a new technology (see 50 Fed.Reg. 5600, 5604 (1985)), that merely should be added sometime in the future after one of the Applicant's periodic decommissioning funding reviews that the Applicant is committed to performing at least once every 5 years.* (App.Exh. 1(e), at 7-1.) Rather, the neutralization of the byproduct HF produced as part of the conversion of DUF6 to U3O8 is clearly an essential element of the conversion cost (and hence the tails disposal cost) that reasonably can be estimated at this time.²¹

It went on to specify that the corporate structure of the LES partnership makes it particularly important that the initial cost estimate be reasonable:

In other words, LES must be totally self-reliant in paying for tails disposal. As we detailed in LBP-96-25, 44 NRC at 378-80, LES is a newly formed entity created to build and operate the CEC. It is structured as a limited partnership and LES has no significant independent assets. Id. at 398-99. Similarly, none of the LES general or limited partners are corporations of worth. Id. Further, under the LES Partnership Agreement, as well as general principles of corporate and partnership law, the corporate parents and other affiliates of the LES general and limited partners have no liability for the obligations of the partnership. Id. at 402 n. 30. *In these circumstances, we cannot conclude that the Applicant's tails disposal estimate need only be a rough approximation that can be adjusted in the future upon periodic reviews by the Applicant. Rather, for the LES tails disposal estimate to be a reasonable one, it must include the substantial cost of neutralizing the HF from the conversion of DUF6 to U3O8.*²²

In the present LES case, the applicants have once again failed to include an adequate cost estimate for the neutralization of the HF and disposal of the resulting CaF2 as low-level waste. In addition, neither the NRC nor LES has offered any analysis whatsoever for the impacts of shallow land disposal of the depleted uranium upon which their disposal costs are based. Once the NEF facility is licensed and operating, the recognition that shallow land burial is very unlikely to be acceptable based on the dose limits in 10 CFR 61 and/or the EPA National Primary Drinking Water standard, the cost for disposal will escalate dramatically, as I have testified. The difference for LES is, in

²¹ ASLB CEC 1997 (NIRS/PC Ex. 205) p. 11 of 18 (emphasis added).

²² ASLB CEC 1997 (NIRS/PC Ex. 205) p. 12 of 18 (emphasis added).

effect, the difference between a viable business and a non-viable one. Our November 2004 report showed that, under the assumption of repository disposal, the cost that would have to be charged per separative work unit to recover the funds necessary to pay for DU dispositioning would range from \$50 to \$110 per SWU. Such a large charge would be very unlikely to be recoverable from customers given that the commercial cost of enrichment services are expected to remain in the range of \$100 to \$120 per SWU over the coming decades.²³

If after three or six years of operation LES shuts down due to increased decommissioning costs, the DU already generated would be much more expensive to deal with through the private option. This is because the cost of locating, characterizing, licensing, and constructing a repository for depleted uranium will be very capital intensive and, therefore, the unit costs for small quantities would be much higher than for large quantities. Given the large difference in estimated disposal costs even assuming the full depleted uranium inventory is generated (\$1.14 per kg U from LES for shallow land burial compared to \$5.40 and \$8.00 per kilogram of uranium for disposal in a WIPP like repository) it is critical to determine the reasonableness of their cost estimate before a license is granted in this case. This is particularly important given that my analysis, which is currently the only analysis of the impacts of shallow land burial on the table in this case, has shown that it is very unlikely that depleted uranium can be disposed of in a shallow land burial facility in accordance with the existing regulatory dose limits.

²³ Makhijani and Smith 2004 (NIRS/PC Ex. 190) p. 49-51.

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Education:

Ph.D. University of California, Berkeley, 1972, from the Department of Electrical Engineering. Area of specialization: plasma physics as applied to controlled nuclear fusion. Dissertation topic: multiple mirror confinement of plasmas.
M.S. (Electrical Engineering) Washington State University, Pullman, Washington, 1967. Thesis topic: electromagnetic wave propagation in the ionosphere.
Bachelor of Engineering (Electrical), University of Bombay, Bombay, India, 1965.

Current Employment:

1987-present: President and Senior Engineer, Institute for Energy and Environmental Research, Takoma Park, Maryland. (part-time in 1987).
February 3, 2004-present, Associate, SC&A, Inc., one of the principal investigators in the audit of the reconstruction of worker radiation doses under the Energy Employees Occupational Illness Compensation Program Act under contract to the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

Other Long-term Employment

1984-88: Associate Professor, Capitol College, Laurel, Maryland (part-time in 1988).
1983-84: Assistant Professor, Capitol College, Laurel, Maryland.
1977-79: Visiting Professor, National Institute of Bank Management, Bombay, India. Principal responsibility: evaluation of the Institute's extensive pilot rural development program.
1975-87: Independent consultant (see page 2 for details)
1972-74: Project Specialist, Ford Foundation Energy Policy Project. Responsibilities included research and writing on the technical and economic aspects of energy conservation and supply in the U.S.; analysis of Third World rural energy problems; preparation of requests for proposals; evaluation of proposals; and the management of grants made by the Project to other institutions.
1969-70: Assistant Electrical Engineer, Kaiser Engineers, Oakland California. Responsibilities included the design and checking of the electrical aspects of mineral industries such as cement plants, and plants for processing mineral ores such as lead and uranium ores. Pioneered the use of the desk-top computer at Kaiser Engineers for performing electrical design calculations.

Professional Societies:

Institute of Electrical and Electronics Engineers and its Power Engineering Society
American Physical Society
Health Physics Society
American Association for the Advancement of Science

Awards:

The John Bartlow Martin Award for Public Interest Magazine Journalism of the Medill School of Journalism, Northwestern University, 1989, with Robert Alvarez.

Consulting Experience, 1975-1987

Consultant on a wide variety of issues relating to technical and economic analyses of alternative energy sources; electric utility rates and investment planning; energy conservation; analysis of energy use in agriculture; US energy policy; energy policy for the Third World; evaluations of portions of the nuclear fuel cycle.

Partial list of institutions to which I was a consultant in the 1975-87 period:

Tennessee Valley Authority
Lower Colorado River Authority
Federation of Rocky Mountain States
Environmental Policy Institute
Lawrence Berkeley Laboratory
Food and Agriculture Organization of the United Nations
International Labour Office of the United Nations
United Nations Environment Programme
United Nations Center on Transnational Corporations
The Ford Foundation
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United Nations Development Programme

Languages: English, French, Hindi, Sindhi, and Marathi.

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Makhijani, A., Peter Bickel, Aiyu Chen, and Brice Smith, *Cash Crop on the Wind Farm: A New Mexico Case Study of the Cost, Price, and Value of Wind-Generated Electricity*, Institute for Energy and Environmental Research, Takoma Park, Maryland, April 2004.

Makhijani, A., Lois Chalmers, and Brice Smith, *Uranium Enrichment: Just Plain Facts to Fuel an Informed Debate on Nuclear Proliferation and Nuclear Power*, Institute for Energy and Environmental Research, Takoma Park, Maryland, October 15, 2004.

Makhijani, A., and Brice Smith, *Costs and Risks of Management and Disposal of Depleted Uranium from the National Enrichment Facility Proposed to be Built in Lea County New Mexico by LES*, Institute for Energy and Environmental Research, Takoma Park, Maryland, November 24, 2004.

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(Authored by A. Makhijani and Brice Smith.)

Institute for Energy and Environmental Research, *Iodine-131 Releases from the July 1959 Accident at the Atomics International Sodium Reactor Experiment*, IEER, Takoma Park, Maryland, January 13, 2005.
(Authored by A. Makhijani and Brice Smith.)

Makhijani, A., and Brice Smith. *Update to Costs and Risks of Management and Disposal of Depleted Uranium from the National Enrichment Facility Proposed to be Built in Lea County New Mexico by LES*. Institute for Energy and Environmental Research, Takoma Park, Maryland, July 5, 2005.

CERTIFICATE OF SERVICE

Pursuant to 10 CFR § 2.305 the undersigned attorney of record certifies that on October 18, 2005, the foregoing Revised 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 the Contingency Factor Applicable to LES's Cost Estimate was served by expedited delivery upon the following:

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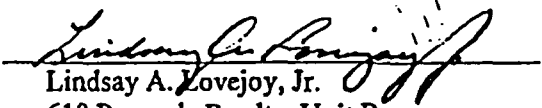
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October 21, 2005

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

Docket No. 70-3103

Louisiana Energy Services, L.P.

ASLBP No. 04-826-01-ML

National Enrichment Facility

**REVISED 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 THE CONTINGENCY FACTOR APPLICABLE TO
LES'S COST ESTIMATE**

Q1. Please state your name and what testimony you will be discussing today?

A1. My name is Dr. Arjun Makhijani and I have previously submitted direct testimony in this proceeding. I will be offering rebuttal to the pre-filed direct testimony of Rod M. Krich and Thomas LaGuardia presented on behalf of Louisiana Energy Services, L.P. dated September 16, 2005, and the pre-filed direct testimony of Timothy C. Johnson, Jennifer Mayer, and Craig Dean presented on behalf of the NRC Staff dated September 15, 2005. The testimony of Rod Krich,

Timothy Johnson, Jennifer Mayer, and Craig Dean was offered with respect to issues of the contingency allowance relied upon by LES as they relate to Nuclear Information and Research Service and Public Citizen Contention EC-5/TC-2.

Q2. With respect to the NRC guidance on the appropriate size of the contingency factor for use what opinions were offered by the opposing experts in their direct testimony that you plan to discuss?

A2. The testimony of interest from Rod Krich and Thomas LaGuardia was as follows:

A13. (RMK, TSL) ... In a related guidance document that is intended to facilitate compliance with the foregoing regulations, the NRC Staff has directed materials license applicants to apply a 25 percent contingency factor to their overall decommissioning cost estimate.¹

A22. (RMK, TSL) The 25 percent contingency factor that LES has applied to its overall cost estimate for DU dispositioning is more than adequate.... Accordingly, LES's compliance with NUREG-1757 provides clear evidence that LES has applied an appropriate contingency factor to its estimated facility decommissioning and DU disposition costs. In addition, extensive historical experience in decommissioning nuclear power plants has shown that 25 percent is an appropriate contingency for those more complex types of facilities.²

The testimony of interest from Timothy Johnson, Jennifer Mayer, and Craig Dean was as follows:

Q.12. How did you determine whether the contingency factor used by LES was appropriate?

A.12. (TJ, JM, CD) First, I determined that the contingency factor met the requirements of NRC guidance in NUREG-1757. Second, I compared the contingency factor of 25 percent to contingency factors used in NUREG/CR-6477, Revised Analyses of Decommissioning Reference Non-Fuel-Cycle Facilities (July 1998) attached as Staff Exhibit 38. NUREG/CR-6477 uses a contingency factor of 25 percent for a variety of facilities that are similar to the proposed LES facility. Third, I concluded that the decommissioning activities to be

¹ LES Contingency 2005 p. 5.

² LES Contingency 2005 p. 12-13.

performed were relatively simple and straightforward, and therefore extremely unlikely to result in unforeseen costs so large that a 25 percent contingency would not be sufficient.³

Q3. What opinions have you formed regarding the conclusions presented in the above testimony?

A3. In the *Consolidated NMSS Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness* the NRC states that “[a]t minimum, all cost estimates for unrestricted or restricted release must” include the application of “a contingency factor of *at least* 25 percent to the sum of all estimated costs.”⁴ Thus, a 25 percent contingency factor is considered by the NRC to be a minimum regulatory requirement and not a maximum.

In addition, there has not been what I would classify as “extensive historical experience” at decommissioning commercial nuclear power plants as claimed by Rod Krich and Thomas LaGuardia. To date, only five nuclear power plants have completed the DECON decommissioning alternative. Of these five plants only two had a rated power greater than 250 MW-thermal. These two plants were the Fort St. Vrain gas-cooled reactor (842 MWt), which achieved a lifetime capacity factor of just 14.5 percent and had a forced outage rate of nearly 61 percent, and the Shoreham boiling-water reactor (2436 MWt) which was shutdown just 68 days after receiving its operating license. The DECON process is currently listed as “in progress” at just five other nuclear power plants (which had a rated power between 23.5 MWt and 3411 MWt).⁵

³ NRC Staff Contingency 2005 p. 4-5.

⁴ NUREG 1757, Vol. 3 (NIRS/PC Ex. 249) p. 4-9 to 4-10 (emphasis added).

⁵ NRC 2005b (NIRS/PC Ex. 264) p. 111-112.

Q4. With respect to the complexity of DU dispositioning what opinions were offered by the opposing experts in their direct testimony that you plan to discuss?

A4. The testimony of interest from Thomas LaGuardia was as follows:

A17. (TSL) In short, my experience tells me that because 25 percent is an adequate cost contingency for the complex decommissioning of a power plant, it is, *a fortiori*, an adequate cost contingency for the comparatively simpler decommissioning and DU dispositioning activities required for the NEF.⁶

A18. (TSL) ... With respect to the dispositioning of DU from the NEF, there are fundamentally three activities or operations to consider: transportation, deconversion, and disposal of DU. *All three of these activities, in my expert opinion, have relatively low levels of uncertainty.*⁷

Q19. Please state the basis for your opinion that the three DU dispositioning activities identified above have relatively low levels of uncertainty.

A19. (TSL) ... As set forth in the testimony of other LES witnesses, the deconversion of depleted UF₆ to U₃O₈ is based on a well-understood chemical process that been [sic] successfully deployed on a commercial scale in Europe for over two decades. Moreover, LES's estimate of the potential costs associated with such a deconversion operation in the U.S. is based principally on specific cost information obtained from Urenco and COGEMA (the pertinent vendor of deconversion services). These facts do not suggest significant potential for large unforeseen cost increases within the scope of anticipated deconversion activities.

Finally, LES's DU disposal cost estimate reflects disposal of DU in an engineered trench, a procedure which I consider to be fairly predictable in terms of both logistics and cost.... I can say with confidence that low-level radioactive waste disposal costs have stabilized considerably over the past several years, and more recent cost increases have largely coincided with the inflation rate. At Envirocare, for example, disposal costs typically average about \$25 per cubic foot, though they are subject to negotiation. In some instances they may be less than \$25 per cubic foot; in other situations they may be [sic] exceed that amount (mainly when smaller quantities of waste are involved). Under any scenario, the proprietary disposal cost estimate (stated in dollars per cubic foot) that LES obtained from a [sic] Waste Control Specialists, LLC, and which underlies LES's \$1.14/kgU cost figure, is certainly conservative for the type (bulk DU₃O₈) and volume of DU₃O₈ to be disposed of by LES.⁸

⁶ LES Contingency 2005 p. 7.

⁷ LES Contingency 2005 p. 8-9 (emphasis added).

⁸ LES Contingency 2005 p. 9-10.

A21. (TSL) A contingency factor is meant to account for the differences between the base cost and unforeseen costs. The base cost estimate defines the project scope and accounts for the known and reasonably anticipated costs of decommissioning. A contingency factor, by contrast, is intended to account for any unforeseen costs within the defined project scope, i.e., events that may occur in the field during implementation of the work, and which are not accounted for in the base cost estimate. In the case of DU dispositioning, the "defined project scope" includes the transportation of DU to and from a deconversion facility, the deconversion of DUF_6 to DU_3O_8 , and the near-surface disposal of DU_3O_8 at a licensed low-level radioactive waste disposal facility.⁹

The testimony of interest from Timothy Johnson, Jennifer Mayer, and Craig Dean was as follows:

Q.8. What about costs that can be foreseen but are not known for certain?

A.8. (TJ, JM, CD) Those costs are expected to be included and accounted for in the decommissioning cost estimate. The Staff recognizes that some costs cannot be predicted with certainty but nevertheless can be expected. In these cases, applicants such as LES must account for them in their cost estimate, using the best available documentation.¹⁰

Q.12. How did you determine whether the contingency factor used by LES was appropriate?

A.12. (TJ, JM, CD) First, I determined that the contingency factor met the requirements of NRC guidance in NUREG-1757. Second, I compared the contingency factor of 25 percent to contingency factors used in NUREG/CR-6477, Revised Analyses of Decommissioning Reference Non-Fuel Cycle Facilities (July 1998) attached as Staff Exhibit 38. NUREG/CR-6477 uses a contingency factor of 25 percent for a variety of facilities that are similar to the proposed LES facility. *Third, I concluded that the decommissioning activities to be performed were relatively simple and straightforward, and therefore extremely unlikely to result in unforeseen costs so large that a 25 percent contingency would not be sufficient.*¹¹

Q5. With respect to the deconversion of DUF_6 , what conclusions have you drawn regarding the suitability of the 25 percent contingency factor applied by LES?

A5. The deconversion of the depleted uranium hexafluoride (DUF_6) to uranium oxide (DU_3O_8) has been carried out at the Pierrelatte Plant in France for more than 20 years. To make use of this

⁹ LES Contingency 2005 p.12 (emphasis in the original).

¹⁰ NRC Staff Contingency 2005 p. 3.

¹¹ NRC Staff Contingency 2005 p. 4-5 (emphasis added).

deconversion service, in 2004 Urenco was paying 3.2 euros per kilogram of uranium excluding transportation, storage, and other costs. Using the exchange rate proposed by LES (\$1.291 per euro) this would amount to cost of \$4.13 per kilogram of depleted uranium. Instead of relying on this baseline cost estimate, which is based on experience at a real-world operating facility, LES has proposed to rely primarily on a paper study for the cost of a plant that has yet to be built or even have its design finalized. The cost derived by LES (\$2.69 per kilogram of uranium) is 35 percent less than that which would be expected based on Urenco's contract with Cogema for deconversion at the operating Pierrelatte Plant. Significantly, the paper study that LES is relying upon itself represents the cost estimates as being "based on preliminary design information and therefore are +/- 30% confidence."¹² The modifications made by LES to the Urenco cost estimates to account for scaling the plant to double the throughput, for modifications to "Americanize" the plant, and for adding funds to cover decontamination and decommissioning, would not be expected to decrease the level uncertainty inherent in the final cost estimate. Therefore it is not correct to conclude, as was done by both the NRC Staff witnesses and the LES witness Mr. LaGuardia, that a 25 percent contingency added to the current baseline estimate would be adequate to cover the additional costs that could be encountered in deconverting the depleted uranium hexafluoride from the proposed NEF. As I testified in my direct testimony and as testified to by Mr. LaGuardia, the NRC requirement of a contingency of at least 25 percent, relates to unforeseen costs such as industrial accidents and equipment malfunction which may occur in any industrial undertaking. The fact that (1) the business study relied upon by LES itself states that the cost estimates are based on "on preliminary design information" and that they therefore have a "+/- 30% confidence," (2) the fact that the current LES cost estimate (\$2.69 per kg U) is 35 percent less than historical experience would suggest based on operational experience at the Pierrelatte Plant (\$4.13 per kg U), (3) the fact

¹² LES Business Study (LES Ex. 91) p. 8/15.

that the proposed scale of the LES deconversion facility (10,350 MT DUF6 per year) is roughly half of the throughput of the Pierrelatte Plant, and (4) the fact that the Portsmouth deconversion plant was already 12 to 14 months behind schedule as of July 2005 due to difficulties encountered in finalizing the design, all undermine the above claims by Thomas LaGuardia, Timothy Johnson, Jennifer Mayer, and Craig Dean that the existing contingency factor applied by LES is sufficient. Indeed, the existing evidence indicates that even the foreseeable costs may not be adequately covered by the 25 percent which NUREG 1757 requires to be used for unforeseen costs.

Q6. With respect to the disposal of depleted uranium oxide, what conclusions have you drawn regarding the suitability of the 25 percent contingency factor applied by LES?

A6. Contrary to the claims by NRC Staff and LES witnesses that the disposal of the depleted uranium oxide will be a relatively simple matter, the National Research Council of the National Academy of Sciences reached the exact opposite conclusion. Specifically, the NRC concluded that

If disposal [of depleted uranium oxide] is necessary, it is not likely to be simple. The alpha activity of DU is 200 to 300 nanocuries per gram. Geological disposal is required for transuranic waste with alpha activity above 100 nanocuries per gram. If uranium were a transuranic element, it would require disposal in the Waste Isolation Pilot Plant (WIPP) based on its radioactivity. The chemical toxicity of this very large amount of material would certainly become a problem as well.¹³

The disposal of depleted uranium on the scale that would be generated by the proposed NEF is unprecedented and carries a significant degree of uncertainty. Despite the claim by Mr. LaGuardia, the "defined project scope" is not "the near-surface disposal of DU_3O_8 at a licensed low-level radioactive waste disposal facility," but is instead the safe disposal of depleted uranium in accordance with all appropriate rules and regulations. It is very unlikely that the depleted uranium

¹³ NAS/NRC 2003 (NIRS/PC Ex. 151) p. 64 (emphasis added).

from the proposed NEF could be disposed of by shallow-land burial in such a way that it would meet the performance criteria set forth in 10 CFR 61 Subpart C, even in a dry climate.

The lack of any environmental impact analysis for shallow land burial of depleted uranium presented in either the Draft or Final Environmental Impact Statements for the proposed NEF as well as the lack of any such environmental impact analysis presented in the pre-filed testimony of any witness for the NRC Staff or LES makes these conclusions [of Thomas LaGuardia, Timothy Johnson, Jennifer Mayer, and Craig Dean that the disposal of depleted uranium is likely to be a relatively simple undertaking with few unknowns] even more shaky. Indeed they are untenable as part of the basis for estimating an adequate contingency factor that should be part of a plausible strategy

Q7. Given that Rod Krich (the LES witness) explicitly introduced the issues of the DOE cost estimate in his pre-filed direct testimony on deconversion, did any NRC Staff or LES witness testify as to the adequacy of a 25 percent contingency factor for the DOE cost estimate?

A7. No. There was no testimony presented as to the appropriate contingency factor that should be applied to the presently available DOE estimate provided by LMI. This was a notable omission from the LES and NRC Staff testimony.

Q8. What is your conclusion regarding an appropriate contingency factor that should be applied to the DOE cost estimate testified to by Rod Krich?

A8. The LES estimate for the DOE option rests on a study conducted by LMI for the Department of Energy to examine the costs of using the proposed Paducah or Portsmouth deconversion facilities to handle the depleted uranium from LES.¹⁴ This study is not a firm offer from the DOE to accept the depleted uranium at this price, but is, instead, a business study that presents a variety of scenarios based on the information available to the contractor as of December 2004.

LES has suggested that the triennial adjustments can be used to take any additional contingencies beyond 25 percent into account. However, as I have testified the triennial adjustments are not meant for large unforeseen contingencies dealing with disposal method or poor performance of the participating parties.

Q9. In light of what you have testified to, what is your conclusion for the overall cost of deconversion, transportation, and disposal for the DUF6 that would be produced by the proposed NEF facility?

A9. I have concluded that, if DU is treated in a manner that respects the risks it poses, the likely cost of dispositioning the depleted uranium hexafluoride from the proposed NEF facility would fall between \$18 per kilogram of uranium and \$24 per kilogram of uranium after taking into account the Board-imposed subtractions from the estimates in our November 2004 and July 2005 report.

¹⁴ LMI 2004 (LES Ex. 86).

In the table below, which is restricted to cost elements allowed by the October 4, 2005 directive of the Board, the "IEER WIPP Disposal Scenario 1" includes a low-end cost estimate for DU disposal based on experience at WIPP and an estimated calcium fluoride dispositioning cost based on the Lawrence Livermore National Laboratory analysis while the "IEER WIPP Disposal Scenario 2" includes a medium WIPP cost estimate and an estimated calcium fluoride cost based on a report from the National Research Council of the U.S. National Academy of Sciences.

Cost element*	IEER WIPP Disposal Scenario 1	IEER WIPP Disposal Scenario 2
Deconversion to U ₃ O ₈ , Transportation, and Storage**	\$7.10	\$7.10
Disposal	\$5.40	\$8.00
CaF ₂ (Neutralization and Disposition)	\$2.00	\$4.00
Contingency - NRC- minimum required (25 percent)	\$3.63	\$4.78
Total Cost per kg U	\$18.13	\$23.88

* This table is based on Table 9 of the November 2004 report and includes only those cost elements allowed by the October 4, 2005 directive of the Board.¹⁵

** The cost of deconversion, transportation, and storage were taken from the actual contractual arrangement between Urenco and Cogema in which depleted uranium hexafluoride has changed hands and has been deconverted to DU₃O₈ at the operating Pierrelatte Plant. The contract price of 5.50 euros per kilogram was converted to 2004 dollars by using the exchange rate currently employed by LES (\$1.291 per euro).

Our costs are significantly larger than the \$5.85 per kilogram of uranium currently proposed by LES (\$4.68 per kilogram of uranium plus a 25 percent contingency factor).

Q10. Does this conclude your testimony for today?

A10. Yes.

¹⁵ Makhijani and Smith 2004 (NIRS/PC Ex. 190) p. 51.

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CERTIFICATE OF SERVICE

Pursuant to 10 CFR § 2.305 the undersigned attorney of record certifies that on October 21, 2005, the foregoing Revised 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 the Contingency Factor Applicable to LES's Cost Estimate was served by expedited delivery upon the following:

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1 MR. LOVEJOY: And I'm looking -- and I
2 believe --

3 CHAIR BOLLWERK: I think you have one
4 more --

5 MR. LOVEJOY: Two sixty-four.

6 CHAIR BOLLWERK: Yes.

7 MR. LOVEJOY: NIRS/PC Exhibit 264 is U.S.
8 Nuclear Regulatory Commission Information Digest,
9 2005-06 addition extract. We wish this exhibit to be
10 identified and also admitted.

11 CHAIR BOLLWERK: All right. Then NIRS/PC
12 Exhibit 264 as identified by Counsel is marked for
13 identification.

14 (Whereupon, the above-
15 referenced to document was
16 marked as NIRS/PC Exhibit No.
17 264 for identification.)

18 CHAIR BOLLWERK: Any objections to it's
19 admission?

20 (No verbal response.)

21 CHAIR BOLLWERK: There being none, NIRS/PC
22 Exhibit 264 is admitted into evidence.

23

24

25

1 (The document referred to,
2 having been previously marked
3 for identification as NIRS/PC
4 Exhibit No. 264 was admitted in
5 evidence.)

6 CHAIR BOLLWERK: Any other --

7 MR. LOVEJOY: That's all I have on direct.

8 CHAIR BOLLWERK: All right. Then let me
9 turn first to LES, I suppose.

10 MR. CURTISS: We have no questions of this
11 witness.

12 CHAIR BOLLWERK: No questions. Does the
13 Staff have any questions?

14 MS. CLARK: We have no questions.

15 CHAIR BOLLWERK: No questions? I guess
16 that doesn't leave any room for redirect then, so I
17 think we're --

18 JUDGE ABRAMSON: And I have no questions.

19 CHAIR BOLLWERK: From the Board members?

20 JUDGE KELBER: I have none.

21 CHAIR BOLLWERK: Well, I'm not sure if you
22 got off easily or you had something you wanted to say,
23 but I --

24 WITNESS MAKHIJANI: I do have something I
25 want to say --

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1 JUDGE ABRAMSON: Too bad.

2 WITNESS MAKHIJANI: -- if I might. I
3 might not.

4 CHAIR BOLLWERK: If it's something you
5 want to say complimentary about Judge Abramson we'll
6 certainly listen to that.

7 WITNESS MAKHIJANI: No, no. I would like
8 to say for the record I've enjoyed this.

9 CHAIR BOLLWERK: All right, Dr. Makhijani,
10 then we thank you for your service to the Board in
11 providing your direct and rebuttal testimony.

12 WITNESS MAKHIJANI: Thank you, Mr.
13 Chairman.

14 CHAIR BOLLWERK: All right. At this point
15 I believe that concludes the testimony that we had
16 with respect to the four issues, as well as the matter
17 remanded by the Commission in terms of the
18 environmental issue.

19 A couple things we need to take up
20 procedurally. The first one is the question of -- we
21 have a schedule which we previously have established.
22 I believe we have post findings of fact and
23 conclusions of law due on the 30th of November, reply
24 findings on the 23rd of December, and then from that
25 we move toward the Board partial initial decision.

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1 Let me raise question with the Staff and
2 with NIRS/PC about the issue that's remaining on the
3 environmental side about the EC disposal matter. And
4 I understand the Staff was thinking of filing for
5 summary disposition.

6 MS. CLARK: We are considering it. We
7 haven't determined that for certain. I would also
8 like the opportunity, I don't know if we will need it,
9 to file written testimony on this issue in the event
10 that we may want to rely on other Staff experts.

11 CHAIR BOLLWERK: Well, I mean summary
12 disposition, again, we give you the opportunity to put
13 in affidavits which --

14 MS. CLARK: Right.

15 CHAIR BOLLWERK: -- are of the same ilk
16 although obviously not subject to cross examination.
17 That's the point of summary disposition. I don't know
18 --

19 MS. CLARK: I would expect out summary
20 disposition could be based on the testimony that was
21 elicited here. And then in the event that that was
22 not successful we may want to submit additional
23 testimony.

24 CHAIR BOLLWERK: Right. If disposition
25 does not work then obviously we'd have to go to live

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1 testimony.

2 JUDGE ABRAMSON: I'd like to encourage the
3 Staff to communicate with NIRS/PC and the Applicant
4 prior to submission of such a motion, and see if you
5 can't get the factual underpinnings of the analyses in
6 question straightened out between the three
7 organizations so everybody understands what's been
8 done before you try to waste everybody's time with a
9 motion that may not go anywhere.

10 CHAIR BOLLWERK: Do you want to say
11 something, Mr. Lovejoy?

12 MR. LOVEJOY: Well, simply this. I don't
13 conceive of the facts here as so hard to put your
14 finger on, frankly. As far as I know, back last
15 November we got to the bottom of the well and it was
16 dry.

17 And I'm not sure what else there is to
18 find out. And we ought to be able to submit it on
19 some kind of written presentation to the Board.

20 CHAIR BOLLWERK: All right. Well again,
21 I mean there's noting that says that -- I mean you can
22 file for summary disposition. The Staff can file for
23 summary disposition.

24 That would be the written presentation.
25 What -- my concern at this point is to try to set a

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1 date for that and not simply leave it open. And I
2 guess my question to both parties is if both or either
3 of you want to file for summary disposition, when
4 would you want to do so?

5 MR. LOVEJOY: My problem is I'm not sure
6 whether there's more coming from them.

7 MS. CLARK: Well there won't be any
8 additional testimony before we file for summary
9 disposition. That would be based on the testimony
10 that was elicited today.

11 CHAIR BOLLWERK: And then the question
12 would be would you -- you may or may not add
13 additional affidavits of your own. I don't know, so
14 --

15 MR. LOVEJOY: We would probably need to
16 present some evidence essentially saying that the
17 calculations can't be reproduced from the information
18 available.

19 CHAIR BOLLWERK: Right. Again I'll go
20 back to my initial question. How long?

21 MR. LOVEJOY: Well is the thought that we
22 would then incorporate this into the findings of fact
23 and reply findings?

24 CHAIR BOLLWERK: Well, I mean it's
25 actually a separate motion in once sense. The concern

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1 I have is that I don't want it to linger because if we
2 decide that summary disposition isn't appropriate then
3 we need to deal with it.

4 And if we wait until the findings of fact
5 and conclusions of law, that's -- I mean that maybe
6 that -- it's possibly the same date but it's not much
7 past that at all.

8 It would either have to be simultaneous
9 with that, or maybe if you're comfortable with that
10 maybe you can file it a week or so ahead of time.

11 MS. CLARK: I would propose perhaps
12 November 7th for summary disposition.

13 CHAIR BOLLWERK: If you -- that's
14 certainly acceptable to the Board.

15 JUDGE ABRAMSON: That's a week, sure.

16 CHAIR BOLLWERK: If you think you can --

17 MR. LOVEJOY: There's going to be a
18 problem with that particular date. Perhaps we,
19 Counsel, can confer and --

20 CHAIR BOLLWERK: That's fine, yes.

21 MR. LOVEJOY: -- with the idea that you're
22 going to have the material in time to incorporate in
23 the decision on the findings of fact and conclusions
24 of law, hopefully before the findings come in.

25 CHAIR BOLLWERK: That would be very good.

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1 Somewhere around the -- the Staff can do it around the
2 7th, somewhere within that date. We can work within
3 a week or so, hopefully.

4 And it may well be we want to, again, rule
5 on that more quickly because if it turns out summary
6 disposition isn't appropriate you all may want to
7 prepare testimony and do some other things.

8 So that's my concern. I hear what you're
9 saying. You think this is -- but I don't know.
10 That's my problem.

11 MR. LOVEJOY: Okay.

12 CHAIR BOLLWERK: Okay, all right. So
13 let's say within -- think about sometime within seven
14 to ten days of the date that the Staff suggested, if
15 that's possible.

16 JUDGE ABRAMSON: So somewhere between the
17 7th and the 17th or something? You know, I mean you
18 all work up your date.

19 CHAIR BOLLWERK: All right. The other
20 thing I wanted to mention briefly, the question of
21 redaction of, at a minimum, the transcript here. We
22 heard some financial information but I didn't hear a
23 tremendous amount, or maybe I wasn't listening
24 carefully enough.

25 It would be, I think, useful, in a

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1 minimum, when we come down with an initial decision
2 there would be a direction to do some redaction, or to
3 think to raise that issue. If there's a way that LES
4 could begin that process sooner rather than later I
5 would certainly -- the Board would appreciate that, I
6 think.

7 There may not be much to redact is what
8 I'm saying.

9 MR. CURTISS: In this last session.

10 CHAIR BOLLWERK: Well over the last four
11 days that we've looked at.

12 MR. CURTISS: We have the transcripts and
13 will try to complete that process --

14 CHAIR BOLLWERK: All right.

15 MR. CURTISS: -- within a week to ten
16 days, I think.

17 CHAIR BOLLWERK: All right. And that may
18 be something that you would need to exchange with the
19 other parties. If there's a problem with it we'll
20 bring it to Board and we'll deal with it.

21 JUDGE ABRAMSON: But it's largely their
22 material that's at issue right?

23 CHAIR BOLLWERK: Correct.

24 JUDGE ABRAMSON: It's largely your
25 material at issue, so it's not a question of dealing

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1 with safeguards that the Staff has to determine. This
2 is your baby.

3 MR. CURTISS: So we'll try to coordinate
4 and work within the time frame a week to ten days.

5 CHAIR BOLLWERK: All right. And then in
6 terms of the evidentiary material, I think that may be
7 slightly more difficult. But I don't really know what
8 Mr. Lovejoy's going to want to put on -- how much of
9 this you want on the record is -- right now we could
10 leave the whole record closed if there weren't a
11 motion, for instance, to put things out.

12 So to some degree it's a question of what
13 you want to see on the record in terms of the redacted
14 material. If the transcript is sufficient for your
15 purposes, if you think the evidentiary material ought
16 to be -- it's something you need to talk with Mr.
17 Curtiss about and see where that goes as well.

18 MR. LOVEJOY: may I make an inquiry about
19 -- if you're finished. I'm not sure you are, sorry.

20 CHAIR BOLLWERK: I'm finished on the
21 question of redaction unless you want to say something
22 about that.

23 MR. LOVEJOY: No, no. Please go ahead.
24 I'll speak after you finish.

25 CHAIR BOLLWERK: In part, this normally

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1 depends on motion from the party that wants the
2 material out publicly. So maybe you can talk with Mr.
3 Curtiss and express to him, you know -- and again, the
4 private fuel storage case might give you some sense of
5 where we went with that one.

6 I'll be frank with you. In that case we
7 did not -- we told the parties we did not want to go
8 to the detail of redacting the particular pleadings.
9 It didn't strike us as useful to the -- the public's
10 interest here is to see what testimony was put into
11 the record, what evidence was put into the record.

12 And we think -- and obviously our initial
13 decision, when we came out with that, would be put
14 into the record as well, so -- all right. Okay.

15 MR. LOVEJOY: Well, simply this. In our
16 exhibits we designated various deposition extracts and
17 deposition exhibits.

18 CHAIR BOLLWERK: Yes.

19 MR. LOVEJOY: And we had meant to offer
20 those as evidence on the matters before the panel.
21 And I'm not quite sure that there's been a ruling on
22 those. And if there's been a ruling --

23 CHAIR BOLLWERK: Okay. I think -- I
24 thought there had been, but let me make it clear. The
25 -- those matters, those exhibits which we have marked

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1 in evidence as part of this proceeding are in
2 evidence.

3 There were a number of items that were
4 cited in the testimony or even -- I'm sorry, that were
5 not. There were a number of items that were not cited
6 in the testimony, let me be clear on this, that were
7 simply proffered as exhibits.

8 I think the direction the Board gave is if
9 it was tied to the testimony in some way where it was
10 cited, then we had no problem, assuming there weren't
11 objections on the relevance.

12 Having said that, if there wasn't some
13 citation to the evidence, the evidentiary, the
14 documented material, in the testimony that was given
15 then we were not going to admit it.

16 Having said that, the documents are in the
17 record in terms of the record of the proceeding. If
18 you have a problem with that, obviously you can go to
19 the Commission and suggest that it -- but the
20 evidentiary material is the material that we have
21 talked about, marked as evidence, and used in this
22 proceeding.

23 MR. LOVEJOY: And when you're speaking of
24 the testimony, you're speaking of Dr. Makhijani's
25 testimony?

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1 CHAIR BOLLWERK: Yes. There were a number
2 of things cited in that testimony -- or I should say
3 in one point he actually tried to bring in a number of
4 items that were actually in some of the underlying
5 documents.

6 I think what the Board tried to make clear
7 was if you wanted to bring those particular exhibits
8 in by putting them into the testimony as support for
9 different portions we had no problem with that.

10 But simply trying to incorporate masses of
11 documents by reference was not appropriate. And
12 that's what -- our position on this. So what, for
13 instance, the exhibits 190 and 224 are in the record.

14 Having said that, all the supplementary
15 material, if it wasn't cited in this testimony, is not
16 part of the record. Some of it is, some of it isn't.

17 There were some documents that were used
18 on cross and for other purposes that came in. And I
19 think if you need a list of everything I think we kept
20 a fairly careful one.

21 Hopefully you have the same things as
22 well, so -- and again, if there's a problem with that,
23 obviously the Commission would be the folks to speak
24 with.

25 All right. Any other administrative

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1 matters that we need to deal with in terms of the
2 contested proceeding, as we'll call it? On behalf of
3 the Board in terms of the -- I'd like to thank all of
4 you for your presentations, the effort that you've put
5 into them.

6 You've clearly thought this through very
7 carefully in terms of the positions you have and the
8 concerns you've expressed to the Board. We try to be
9 up front with you about what our concerns were as
10 well, the things that we wanted to hear about.

11 I think we've put together a good record
12 here in terms of what needs to be discussed.
13 Obviously there were some things that we did not
14 accept, and again, the Commission is the place to talk
15 with them about that.

16 And you know where they live. You've
17 already been there and you've had some success,
18 actually. So -- and that's part of the process. So,
19 you know, that's the way it works.

20 So again, we very much appreciate the
21 efforts that all of you put into it. And the next
22 stop for us will be the partial initial decision on
23 these issues, as well as the summary disposition
24 matter and whatever comes from that.

25 Anything else the other two Board members

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1 want to say about that?

2 (No verbal response.)

3 CHAIR BOLLWERK: At this point we're going
4 to talk with LES and the Staff briefly about the
5 mandatory hearing. But if you want to stay and hear
6 that, I think in terms of the mandatory hearing we are
7 moving toward a January date, I believe, to have a
8 sort of a pre-hearing conference on that to talk about
9 it in some length.

10 Having said that I should first say we
11 very much appreciate the efforts that you'll all put
12 in to giving the Board the documentary material we've
13 asked for.

14 Judge Abramson and Judge Kelber spent
15 quite a bit of time already going through it. And
16 they had some matters that they wanted to bring to
17 your attention now that they've identified and thought
18 would be appropriate to be -- give you some feedback.

19 We don't want to, obviously, dump this all
20 on you at the end so we thought we'd take that
21 opportunity right now. But again, I know you've
22 hauled in many boxes and they are being read.

23 It's not like you're just producing paper
24 and it's going in a corner someplace. Well it is
25 going in a corner, but it's coming out of the boxes

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1 and being read, so --

2 MR. CURTISS: And will this be -- excuse
3 me. Will this be part of the transcript so that we
4 can review this --

5 CHAIR BOLLWERK: Yes.

6 MR. CURTISS: -- as well?

7 CHAIR BOLLWERK: Yes, we'll just leave it
8 in the transcript.

9 MR. CURTISS: Thank you.

10 CHAIR BOLLWERK: I mean the mandatory
11 hearing is a part of the public record as well.
12 There's no reason not to have it in the transcript, so
13 -- all right. Who wants to go first?

14 JUDGE ABRAMSON: Well, let me start.
15 Notwithstanding the fact that Mr. Lovejoy has sort of
16 addressed this a little bit, and I told him it wasn't
17 part of the contested portion of the hearing, it's
18 something that we're very interested in, and this
19 relates to how the financial assurances mechanism will
20 deal with the possibility that there will be an
21 outstanding bond for X dollars and suddenly there'll
22 be an increase in the cost of one of the major
23 elements, and the possibility that the licensee might
24 say gee we're just not going to bear that cost we're
25 going home.

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1 And so I'd like to have you all address
2 that. How -- what are you going to do about that?
3 And I, as I said to you earlier in the proceeding, I
4 applaud the Applicant for taking the approach that
5 they're going to put up a bond instead of fund this
6 with periodic payments as the utilities used to do.

7 I think it's a very heads up way to do
8 things. And it makes life much easier for the public
9 to feel that their health and safety are protected.
10 I can't imagine what this would look like if it were
11 30 year periodic payments.

12 So it's great to have a bond in the full
13 amount. But what I'm concerned about, and what we've
14 talked about as a group here is this exact possibility
15 that Mr. Lovejoy belatedly raised here, but we would
16 like to address it in a mandatory hearing.

17 CHAIR BOLLWERK: All right. Judge Kelber?

18 JUDGE KELBER: My problems revolve around
19 the Safety Evaluation Report, which quite frankly
20 raised in my mind more questions than I expected. I
21 was able, by going to the Safety Analysis Report and
22 Integrated Safety Analysis that to resolve quite a few
23 of them.

24 There are some that are left over. The
25 first is respect to criticality safety accompanying

1 significant water vapor intrusion. I would like to
2 see a quantitative analysis of the probability of such
3 an event. I realize that there is discussion of the
4 light gas handling system, the action of the cold
5 trap, and so on.

6 It is difficult for me to see how the
7 probability assigned to that event is reached. A
8 fault-tree diagram would be extremely helpful. And
9 I'm willing to bet since this is a problem with very
10 significant economic effects as well as safety effects
11 that there are people who have thought deeply about
12 this.

13 I would also like to see a discussion of
14 the, in the case of significant water vapor intrusion,
15 a discussion of the interaction of hot hydrofluoric
16 acid with the aluminum fluoride layer on the aluminum
17 tubes.

18 Will the aluminum fluoride in the presence
19 of the water vapor transform to aluminum oxide plus
20 hydrogen fluoride? And will any resulting aluminum
21 oxide flake off or will it continue to adhere as a
22 different type of passivating layer?

23 I could probably test this by dipping one
24 of my wife's emeralds in hydrofluoric acid, but I
25 doubt that I would live to tell the tale. I might

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1 point out that alumina, that is to say aluminum oxide,
2 is a principal ingredient of boxite.

3 As we all know refining aluminum from
4 boxite is not an easy process. I'd also appreciate a
5 discussion of the interaction of the hydrogen fluoride
6 with the various seals that are present.

7 Are they attacked and degraded or are they
8 some form of -- I hate to say Teflon, but some
9 fluorinated compound that is impervious to attack?
10 Then I'd like to know if any of the optimum
11 criticality estimates referred to in the Safety
12 Analysis Report are at low, that's to say ten to one
13 or less hydrogen to uranium ratios.

14 Now I expect that those will be in the
15 supplemented validation verification report related to
16 MONK8. Staff has requested such a report. I believe
17 it is to be delivered by the end of the year.

18 It would be helpful if somebody supplied
19 me with a copy of that, and perhaps put a tab in where
20 you discuss the optimum ratio. The reason for that is
21 that the -- as you point out, as LES points out in the
22 Safety Analysis Report, the bias in the MONK8 results
23 very significantly at low level H to U ratios, and
24 includes a negative as well as a positive bias case,
25 so that the Staff reliance on a small but positive

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1 bias, may not be adequate in those -- in that case.

2 Let me turn now to the reflected
3 unmoderated volumes. I did appreciate the discussion
4 of how you estimated the criticality or sub-
5 criticality margin, I should say, in the case of the
6 cylinders.

7 I think that was very well done. It's the
8 way I would have done it. However, I would appreciate
9 if you would show how the MONK8 code with the Jef 2.2
10 cross-sections was validated and verified for use with
11 unmoderated cores.

12 The cylinders in particular, as well as
13 various piping, aluminum tubes, and so on, if they do
14 not have water vapor, are essentially unmoderated
15 cores.

16 I realize that fluorine produces some
17 moderation, but at the sizes that are indicated here,
18 it's trivial. I do know that in the catalog of
19 criticality experiments there are experiments which
20 pertain to such problems.

21 And if you don't like those I would expect
22 that you might analyze any of the cases in table 7-24
23 of ANL 5800. That wasn't my chapter. My chapter was
24 4.

25 JUDGE ABRAMSON: What year, Charlie? Oh,

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1 I'm sorry.

2 JUDGE KELBER: Fifty-eight hundred was in
3 1958. In discussing the criticality of unmoderate
4 volumes I would expect to hear a description of the
5 treatment of the inherent randomness of the unresolved
6 cross-sections for these cases.

7 I might say Staff employs, from time to
8 time, Oakridge personnel as contractors. And Staff
9 occasionally uses the scale code itself to treat
10 questions of this sort.

11 And I know that the scale code has a
12 number of options for treating the unresolved cross-
13 sections. And I don't know what is in MONK8. Turning
14 now to fire safety I have just one question.

15 And that is if there is a fire in an
16 electrical cabinet, how is the retained heat
17 dissipated? I realize that the reports indicate that
18 there is a very small amount of equipment in any such
19 cabinet.

20 But we have had cases with power reactors
21 where there has been a fire in an electrical cabinet.
22 It's been extinguished by an inert gas. Then the
23 cabinet is opened and because the heat has not yet
24 been dissipated the equipment reignites.

25 We don't want that to happen. There are

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1 various steps that can be taken. I have no doubt that
2 they can be taken here. I would just like to hear
3 how. And that concludes my list.

4 CHAIR BOLLWERK: All right. Let me stop
5 and see if there is, at this point, any questions
6 about what either Judge Abramson or Judge Kelber
7 mentioned.

8 You may want to look at the transcript
9 first before you do that. And in fact, I probably
10 will have the two of them look at it and make sure
11 that it reads the way it should, because there were
12 some words in there that I'm sure I can't spell.

13 So we'll go ahead, if you don't mind doing
14 that.

15 JUDGE KELBER: Sorry for that.

16 CHAIR BOLLWERK: No, that's my problem,
17 not yours.

18 JUDGE KELBER: I do have a typed copy
19 here.

20 CHAIR BOLLWERK: That's -- maybe you can
21 give a copy of that to the Court Reporter. It might
22 be useful to him. That's -- maybe able to get some of
23 the words.

24 MR. CURTISS: I am advised by Rod Krich
25 that he thinks the questions have been clearly

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1 articulated.

2 CHAIR BOLLWERK: All right, good.

3 MR. CURTISS: So we'll confirm that with
4 the transcript. If there are questions we'll get back
5 to you, but he thinks --

6 CHAIR BOLLWERK: All right. Very good.
7 Let's see if the Staff has any questions at this
8 point. Maybe we can clarify something, but -- do you
9 want to mention about the --

10 JUDGE ABRAMSON: I think we mentioned
11 something in our last order, and you may want to go
12 take a look at this, but I think we mentioned
13 something in our last order that we were interested in
14 hearing from the Staff as to where they did not follow
15 the SRP, or where they had to adapt the SPR.

16 And this is in a mandatory hearing, and
17 where you felt the Applicant did or did not follow reg
18 guides or where reg guides had to be adapted, because
19 it seems to me that's kind of where we have to go.

20 MS. CLARK: Oh, that was submitted with
21 our executive summary.

22 CHAIR BOLLWERK: Okay, that's fine then.
23 It's already taken care of. All right. Anything then
24 from either of the Board members with respect to the
25 contested matter or the uncontested, the mandatory

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1 hearing?

2 All right, just -- again, a scheduling
3 matter. I think we're looking at this point still for
4 holding any hearing on the mandatory portion of the
5 proceeding in the March 6th to 8th time frame in the
6 Hobbs area.

7 And we've also, I think, indicated that we
8 would anticipate holding some limited appearance
9 sessions in Hobbs at that point as well. So I think
10 we've done some in Eunice.

11 And we would then -- there is a larger
12 population in Hobbs. I'm not sure if folks up there
13 are interested or the individuals from Eunice want to
14 come up again.

15 But that will certainly be something we'll
16 be doing. Probably try to hold maybe at least one
17 evening session and maybe one during the daytime.
18 We'll have to see what scheduling looks like.

19 JUDGE ABRAMSON: Yes. And as we move
20 forward between now and March, you can expect to hear
21 from us occasionally with a follow-up, heads ups on
22 the mandatory hearing, maybe some requests for some
23 things in writing as we start wading through the
24 materials.

25 MR. CURTISS: My recollection is we have

1 a conference call, or are going to have, on January
2 17th or mid January if I have my dates right.

3 CHAIR BOLLWERK: Right. Approximately
4 then, yes.

5 MR. CURTISS: What would the topic of that
6 be? Or would it be to follow up on additional
7 questions, or --

8 CHAIR BOLLWERK: I think just to touch
9 base if we have additional items like this, or if
10 there's something that the parties have come up with
11 that they -- proposals of some kind they want to
12 present to the Board in terms of how we would deal
13 with a mandatory hearing, we'd be glad to entertain
14 them there.

15 Although if at some point before then you
16 think in terms of timings it's better to bring them to
17 our attention sooner rather than wait until that we'll
18 certainly be glad to entertain anything you have at
19 that point.

20 Again, we want to do -- we're trying to do
21 as thorough a job as we're capable of here. I'm sort
22 of looking to these two in terms of the mandatory
23 hearing.

24 Although I'll be looking at other aspects
25 of it as well. So you can tell already that they've

1 taken a very serious approach to this. This is
2 something we do.

3 We haven't done one of these in a long
4 time, but we're trying to do the right thing
5 basically, in a very serious way. So all right, at
6 this point again, we've expressed, and I'll say it
7 again, our appreciation to all of the parties for
8 efforts in this proceeding.

9 To all the witnesses that appeared before
10 us we, again, appreciate the time and effort you take
11 in coming here to Washington, those of you that have.
12 We will be out in the Hobbs area again in the March
13 time frame.

14 And if you're from that area and you're
15 around and you want to come see us we certainly would
16 encourage you to do so because that's part of the
17 process.

18 And see something sort of unique, it's
19 something the Agency hasn't done in about 20 years or
20 more in terms of a mandatory hearing. So we invite
21 you at that point to come and see us.

22 At this point, if neither the Board
23 members or the parties have anything further, I will
24 mention that we will leave the record open for a
25 period, probably actually to the time the summary

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1 disposition motion is filed incase there's anything
2 further we need to do.

3 But you should be looking at the
4 transcripts and the evidentiary materials to make sure
5 we've gotten everything in the way that needs to be
6 done.

7 And having said all that, I thank Ms.
8 Engel for her assistance in the hearing, as well as
9 our Court Reporter, and our staff here at the
10 Licensing Board Panel that's done a terrific job
11 keeping everything straight. We stand adjourned.
12 Thank you.

13 (Whereupon, at 4:40 p.m., the above-
14 entitled matter was concluded.)
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in the matter of:

Name of Proceeding: Louisiana Energy Service, LP

Open Session

Docket Number: 70-3103-ML

ASLBP No. 04-826-01-ML

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