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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ATOMIC SAFETY AND LICENSING BOARD
(ASLB)

DOCKETED
USNRC

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December 21, 2005 (3:30pm)

CLOSED HEARING

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

In the Matter of:

LOUISIANA ENERGY SERVICES, L.P.

(National Enrichment Facility)

Docket Nos.
70-3103-ML
ASLBP No.
04-826-01-ML

Wednesday, October 26th, 2005

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

The above-entitled matter came on for hearing, pursuant to notice, at 9:00 a.m.

BEFORE:

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

APPEARANCES:

On Behalf of Louisiana Energy Services:

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On Behalf of the Nuclear Regulatory
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Also Present:

ATOMIC SAFETY LICENSING BOARD:

BETHANY ENGLE
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
PUBLIC CITIZEN
MELISSA KEMP
ARJUN MAKHIJANI
BRICE SMITH

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I-N-D-E-X

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I-N-D-E-X

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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 W-Withdrawn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
LES 98 Fisk email, 12-2-04	I-2452
LES 99 Fisk email, 3-23-05	I-2452
LES 100 Website excerpt (Transportation Logistics)	I-2452
LES 110 Fisk letter, 10-6-05	I-2453
LES 98-100, 110	A-2453
NIRS/PC 242 Fisk email with handwritten notations	I-2470
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LES 101 10CFR Part 61	I-2610
LES 102 Potter paper (Activity Concentrations Placed In WIPP)	I-2610
LES 103 Rafati letter, 2-3-05	I-2610
LES 104 Blevins memo, 4-6-05	I-2611
LES 105 MOA, 1-14-05	I-2611
LES 106 Handwritten notes, 12-30-02	I-2611
LES 107 RAI (NEF04-052), 12-10-04	I-2612
LES 108 DOE website excerpt	I-2612
LES 109 Section 4.13 of NEF ER	I-2612
LES 111 Federal Register Notice 2-27-87	I-2612
LES 112 NUREG 0945, FEIS 10CFR Part 61	I-2613
LES 113 DOE response to comments excerpt pg. 3-71	I-2613
LES 114 DOE response to comments excerpt pg. 3-142	I-2613
LES 116 ICRP publication excerpt (72)	I-2614
LES 101-109	A-2615
LES 111-114	A-2615
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NIRS/PC 170 Baird report	I-2715
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NIRS/PC 274 DEIS volume I (Part 61)	I-2733
NIRS/PC 275 DEIS Volume II (Part 61)	I-2733

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NIRS/PC 275	A-2741
NIRS/PC 86	A-2741
NIRS/PC 182 Etter letter	I-2758
NIRS/PC 182	A-2758
NIRS/PC 273 Oakridge Lab document	I-2718
NIRS/PC 257 Oakridge report June 2000	I-2725
NIRS/PC 273	A-2728
NIRS/PC 257	A-2728
NIRS/PC 276 Volume III D7 (DEIS Part 61)	I-2768
NIRS/PC 252 Johnson memo, 4-11-05	I-2790
NIRS/PC 252	A-2790

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P-R-O-C-E-E-D-I-N-G-S

9:05 a.m.

CHAIR BOLLWERK: Can we go on the record,
please?

Good morning, everyone. We are here this morning to begin hearing testimony on the question of the cost estimate for transportation of depleted uranium hexafluoride from the NEF.

Before we begin, I have at least one procedural matter I want to talk about, and I will see if the parties have anything else, as well.

There was a question, yesterday, raised about two exhibits, NIRS/PC number 96 and 98, which we identified, and then there was a question raised by LES about their admissibility.

In checking on those it appears that the citations that we were looking at, when we listed those, were actually to LES exhibits, rather than NIRS/PC exhibits, in terms of the footnotes that we were looking at in the testimony of Dr. Makhijani.

So at this point, in fact, it appears that we cannot find any place else that these two particular exhibits are referenced in the testimony of Mr. Makhijani.

But if we are wrong on that, and that is

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1 why we will hold it at this point. I will give
2 NIRS/PC an opportunity to check and see if any place,
3 within the testimony that we've missed those, in fact,
4 are listed, in terms of what Dr. Makhijani's testimony
5 is, any of the prefiled testimony that he has provided
6 us.

7 And we will just leave those pending, we
8 can deal with this, it doesn't have to be necessarily
9 today, but we need to deal with it before the end of
10 the hearing, obviously.

11 But, again, we believe that the confusion
12 here was caused by the fact that we, in the
13 transportation testimony, in footnotes, I believe it
14 was 7 and 9, there were some references to some LES
15 exhibits that had the same number, and we went through
16 and misread those, in fact.

17 So that is, I think, where the confusion
18 rose. But, again, certainly we will give you an
19 opportunity if we in fact did do it, if there are
20 other references to 96 and 98 in Dr. Makhijani's
21 testimony, then we will take the issue up again.

22 And I will leave that for you to raise
23 with us at some point before the end of the
24 proceeding.

25 I believe, in terms of the motion that was

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1 filed, and I believe you all got the email last night,
2 and it has been provided to the office of the
3 Secretary separately, I take it, in terms of having
4 been filed?

5 MR. CURTISS: Yes, sir.

6 CHAIR BOLLWERK: So we will take that up,
7 I guess, when we get to the disposal portion which may
8 be later this morning, or early this afternoon.

9 Let me see if there is any other
10 procedural matters that the parties have at this
11 point?

12 (No response.)

13 CHAIR BOLLWERK: If not, then I believe we
14 are ready to begin with the transportation testimony.

15 MR. CURTISS: We are prepared to call our
16 witness on that, Mr. Rod Krich.

17 CHAIR BOLLWERK: Okay.

18 Whereupon,

19 ROD KRICH
20 was recalled as a witness by counsel for the Applicant
21 and, having been previously duly sworn, assumed the
22 witness stand, was examined and testified as follows:

23 MR. SMITH: Good morning, Mr. Krich.

24 WITNESS KRICH: Good morning.

25 MR. SMITH: Do you have in front of you a

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1 document entitled the prefiled direct testimony of Rod
2 Krich on behalf of Louisiana Energy Services, L.P.,
3 regarding the adequacy of Applicant's cost estimate
4 for the transportation of depleted uranium from the
5 proposed National Enrichment Facility?

6 WITNESS KRICH: I do.

7 MR. SMITH: And was that testimony
8 prepared by you, or under your supervision?

9 WITNESS KRICH: It was.

10 MR. SMITH: And do you have any
11 corrections to that testimony, at this time?

12 WITNESS KRICH: No.

13 MR. SMITH: Is that document true and
14 correct to the best of your knowledge and belief?

15 WITNESS KRICH: Yes.

16 MR. SMITH: I would like to move that the
17 direct testimony be admitted into evidence.

18 CHAIR BOLLWERK: All right. Any
19 objections?

20 (No response.)

21 CHAIR BOLLWERK: All right, then, the
22 prefiled direct testimony of Rod Krich, on behalf of
23 LES, dealing with the adequacy of the Applicant's cost
24 estimate for transportation of depleted uranium from
25 the proposed National Enrichment Facility should be

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1 adopted into the record as if read.

2 (Whereupon, the direct prefiled testimony
3 of Rod Krich was bound into the record as if having
4 been read.)**

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September 16, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

**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**

I. WITNESS BACKGROUND

Q1. Please state your name, occupation, and by whom you are employed.

A1. My name is Rod M. Krich. I am Vice President of Licensing, Safety, and Nuclear Engineering for Louisiana Energy Services, L.P. ("LES"), the license applicant in this matter. I am presently "on loan" to LES from Exelon Nuclear, where I am Vice President, Licensing Projects, and lead Exelon Nuclear's licensing activities relative to future generation ventures. As an Exelon employee, I also have assisted in the Yucca Mountain Project licensing effort, and served as the lead on strategic licensing issues related to the development of a new approach to licensing advanced reactors, such as the Pebble Bed Modular Reactor.

Q2. Please describe your current responsibilities.

A2. I am responsible for leading the effort on behalf of LES to obtain a license from the U.S. Nuclear Regulatory Commission ("NRC"), and all necessary state and federal permits, to construct and operate the proposed National Enrichment Facility ("NEF"), a 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. 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. 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. The purpose of my expert testimony is to demonstrate that LES's cost estimate for the transportation of depleted uranium ("DU") (specifically, depleted UF₆ and U₃O₈) generated as a byproduct of NEF enrichment operations, for purposes of the ultimate disposal of that DU, has a reasonable basis and is adequately documented.

II. REGULATORY BACKGROUND – APPLICABLE NRC REQUIREMENTS

Q7. Please describe the NRC regulatory requirements, and any related NRC Guidance documents applicable to the transportation cost estimate for transporting DUF₆ and DU₃O₈ from the proposed NEF.

A7. The applicable NRC requirements and guidance, and the manner in which LES has sought to comply with those requirements and guidance, are described in the concurrently filed testimony of another LES witness panel. 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. As explained in that testimony, LES prepared a cost estimate that reflects its "Preferred Plausible Strategy" (or "Option 1") for dispositioning DU, which entails the deconversion, transportation, and disposal of NEF-generated DU by private sector entities within the U.S. See Section 4.13.3.1.3 of the NEF Environmental Report ("ER") (LES Exhibit 109). Using cost information obtained from third party commercial sources, LES estimated the total DU dispositioning cost to be \$4.68/kgU (\$4,680 per MT of uranium), in 2004 dollars. See LES Exhibit 83, at 10.3-3; LES Exhibit 84, Attach. 1 at 2. This figure includes: (1) \$2.69/kgU for deconversion of DUF₆ to DU₃O₈ (of which CaF₂ disposal accounts for \$0.02/kgU), (2) \$0.85/kgU for transportation of DUF₆ and DU₃O₈ (independent of distance), and (3) \$1.14/kgU

for disposal of DU_3O_8 in an engineered trench or near-surface low-level radioactive waste disposal facility. See LES Exhibit 84, Attach. 1 at 2. The transportation component of that estimate is the subject of this testimony.

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

Q8. Are you familiar with Contention NIRS/PC EC-5/TC-2 ("Decommissioning Costs")?

A8. Yes. As admitted and amended by the Atomic Safety and Licensing Board, Contention NIRS/PC EC-5/TC-2 states, in relevant part, that:

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.

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.

Q9. Do you agree with the intervenors' assertion in Contention NIRS/PC EC-5/TC-2 that LES's cost estimate for private sector dispositioning of DUF_6 from the NEF lacks "factual bases or documented support?"

A9. No.

Q10. Please state the basis for your conclusion.

A10. Consistent with NUREG-1757 (see LES Exhibit 83), LES's cost estimate for DU dispositioning -- including the transportation component of that estimate -- is based on "documented and reasonable assumptions." Indeed, the NRC Staff has concluded that LES's cost estimate for decommissioning the NEF and dispositioning DU is "reasonable," and that the cost estimate fulfills the requirements of 10 C.F.R. § 30.35(e), 10 C.F.R. § 40.36(d), and 10 C.F.R. § 70.25(e) and the evaluation criteria in Section 4.1 of Volume 3 of NUREG-1757. See Staff Exhibit 37, at 10-12.

Q11. On what facts and assumptions did LES rely on in preparing its DU transportation cost estimate, and where are those facts and assumptions documented?

A11. As stated in the SER, LES's cost estimate for the transportation of DU is based on cost information provided by Transportation Logistics International ("TLI"), a company that specializes in the domestic and international transport of radioactive materials, including UF₆ and U₃O₈ in particular. Staff Exhibit 37, at 10-11 to 10-12. Specifically, on December 2, 2004, I received cost estimates for the transportation of depleted UF₆ and depleted uranium oxide via e-mail (as a follow-up to a prior phone conversation with TLI personnel) from Rod Fisk, Chief Executive Officer of TLI. See LES Exhibit 98. These estimates were provided in the form of two sets of cost ranges: (1) [REDACTED] for DUF₆, and (2) [REDACTED] for uranium oxide. These costs are for transporting by truck DUF₆ in 48X/48Y cylinders, and DU₃O₈ in 55-gallon drums, within a 20-foot ISO container, *i.e.*, standard industry methods for transporting such materials. See LES Exhibit 99. From this cost information, I estimated the average cost of transporting DU to be \$0.85 per kgU.

Q12. Please explain specifically how you arrived at the cost estimate of \$0.85 per kgU from the information supplied by TLI.

A12. I computed the average of the two lower-end cost values provided by TLI, *i.e.*, the [REDACTED] for DUF_6 and [REDACTED] for DU_3O_8 . I found this to be a reasonable approach in view of Mr. Fisk's characterization of the TLI-supplied cost figures as "very conservative." See LES Exhibit 98. To compute this average, I first adjusted the two figures, using appropriate conversion factors, to state both cost figures in common terms, *i.e.*, in dollars per kgU:

[REDACTED]

The average of these two values is \$0.85/kgU, the updated value included by LES in its revised license application. See Enclosure to Letter from R. Krich (LES) to Director of NMSS (NRC), "Subject: Clarifying Information Related to Depleted UF_6 Disposition Costs and Request for License Condition" (Mar. 29, 2005) (LES Exhibit 96).

Q13. The NRC Staff's SER states that the \$0.85/kgU transportation cost figure is "independent of distance." Please explain.

A13. The basis for this statement is contained in a March 23, 2005 e-mail from Rod Fisk of TLI to Rod Krich of LES. See LES Exhibit 99. Mr. Fisk explained therein that the "impact of additional mileage, which affects only time and fuel, amounts to fractions of a cent per kilogram/mile." In other words, costs associated with increases in distance traveled account for only a negligible portion of the overhead costs for transportation of radioactive materials. The latter costs, which constitute the bulk of the transportation cost estimate, include, among other things, material packaging, marking and labeling, communications, vehicle tracking, vehicle maintenance, driver training, security, loading and unloading of cargo, and insurance.

Q14. Please explain the basis for your conclusion (and that of the NRC Staff) that the \$0.85/kgU is a reasonable per unit cost estimate for the transportation of DU from the NEF.

A14. Simply put, the \$0.85/kgU cost figure is based on cost information provided specifically in response to my request from a third-party vendor, TLI. I have confidence in the reasonableness of the TLI cost information, insofar as TLI is the largest transporter of radioactive material, including uranium, in the country. TLI has an excellent reputation and an impeccable safety record. See LES Exhibit 100. In view of the expertise and experience of TLI in transporting nuclear materials, I concluded that it was reasonable to rely on the cost estimates provided by TLI for the transportation of DU, particularly given the company CEO's characterization of these estimates as "very conservative." See LES Exhibit 98.

Q15. Please summarize your conclusions regarding the assertions made in Contention NIRS/PC EC-5/TC-2.

A15. As the foregoing testimony demonstrates, LES's cost estimate for the transportation of DU from the NEF is based on "documented and reasonable assumptions," in accordance with NUREG-1757. See LES Exhibit 82. Recognizing that depleted uranium has been transported in the U. S. safely for decades, LES's cost estimate is based on cost information provided by a reputable and experienced third party vendor of the relevant transportation services. LES used the information obtained from that vendor in a reasonable and fully transparent manner.

Q16. Does this conclude your testimony?

A16. Yes.

RESUME

Rod M. Krich
6395 Twin Oaks Lane
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 I-Honorary Fraternity
American Association for the Advancement of Science

REFERENCES

Furnished upon request

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 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 HEXAFLUORIDE FROM THE PROPOSED NATIONAL ENRICHMENT FACILITY" in the captioned proceeding has been served on the following, on this 15th day of September 2005, for overnight delivery via Federal Express.

Office of the Secretary**
Attn: Rulemakings and Adjudications Staff
U.S. Nuclear Regulatory Commission
Mail Stop O-16C1
Washington, DC 20555-0001
(original + two copies)

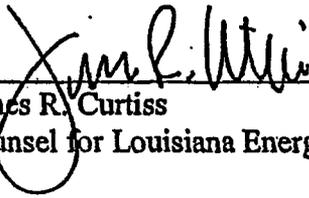
Office of the General Counsel**
Attn: Associate General Counsel for
Hearings, Enforcement and
Administration
Lisa B. Clark, Esq.**
Mail Stop O-15D21
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Paul B. Abramson**
Atomic Safety and Licensing Board Panel
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
G. Paul Bollwerk, III, Chair**
Atomic Safety and Licensing Board Panel
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Charles N. Kelber**
Atomic Safety and Licensing Board Panel
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Lindsay A. Lovejoy, Jr.**
618 Pasco de Peralta, Unit B
Santa Fe, NM 87501



James R. Curtiss
Counsel for Louisiana Energy Services, L.P.

1 MR. SMITH: And do you also have in front
2 of you a document entitled the prefilled rebuttal
3 testimony of Rod Krich on behalf of Louisiana Energy
4 Services, L.P., regarding the adequacy of the
5 Applicant's cost estimate for the transportation of
6 depleted uranium from the proposed National Enrichment
7 Facility?

8 WITNESS KRICH: Yes, that is a document
9 dated October 11th?

10 MR. SMITH: Correct.

11 WITNESS KRICH: Yes.

12 MR. SMITH: Was that testimony prepared by
13 you, or under your supervision?

14 WITNESS KRICH: Yes, it was.

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

17 WITNESS KRICH: No.

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

20 WITNESS KRICH: It is.

21 MR. SMITH: Then I would like to move that
22 the rebuttal testimony of Mr. Krich be admitted into
23 the record.

24 CHAIR BOLLWERK: Any objections?

25 (No response.)

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CHAIR BOLLWERK: Hearing none, then the prefiled rebuttal testimony of Rod Krich on behalf of LES regarding the Applicant's private sector cost estimate for transportation of depleted uranium is adopted into the record as if read.

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

October 11, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

**PREFILED REBUTTAL TESTIMONY OF ROD KRICH
ON BEHALF OF LOUISIANA ENERGY SERVICES, L.P.
REGARDING THE APPLICANT'S PRIVATE SECTOR COST
ESTIMATE FOR THE TRANSPORTATION OF DEPLETED URANIUM**

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 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" (Sept. 16, 2005) ("LES Transportation Direct Testimony").

Q2. What is the purpose of this rebuttal testimony?

A2. (RMK) The purpose of this rebuttal testimony is to respond to certain claims contained in the prefiled direct testimony of Arjun Makhijani regarding the transportation component of LES's cost estimate for depleted uranium ("DU") dispositioning, 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 LES's Transportation Cost Estimate" (Sept. 16, 2005) ("Makhijani Direct Testimony"). My 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, I demonstrate that, notwithstanding Dr. Makhijani's criticisms, LES's commercial transportation cost estimate has a reasonable basis and is adequately documented.

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

Q3. Please describe Dr. Makhijani's criticisms of LES's transportation cost estimate, as set forth in his prefiled direct testimony.

A3. Dr. Makhijani's criticisms are twofold. First, he contends that the "exchange of vague e-mails that contain only costs without detailed justification is insufficient to document the assumptions made, much less determine if they are unreasonable." Makhijani Direct Testimony, Answer 7 at 11. On this point, Dr. Makhijani adds that "the claim that the overhead costs

dominate the costs in transit contains no quantification beyond the statement that 'time and fuel amounts to fractions of a cent per kilogram/mile.'" Second, Dr. Makhijani contends that instead of averaging certain transportation cost values provided by TLI, LES should have added the values at issue to reflect the two different stages or "legs of the journey" involved in transporting DU: (1) the transport of DUF_6 from the NEF to the deconversion facility, and (2) the transport of DU_3O_8 from the deconversion facility to the disposal site. Makhijani Direct Testimony, Answer 7 at 11-12.

Q4. Do you agree with either one of those claims?

A4. No.

Q5. Please state the basis for your disagreement with Dr. Makhijani's first criticism.

A5. As described in my prefiled testimony, I discussed LES's DU transportation needs with TLI personnel, and received an immediate price quote from TLI, over the telephone in December 2004. See LES Transportation Direct Testimony, Answer 11 at 5. Shortly thereafter, I received a confirmatory e-mail from Rod Fisk, Chief Executive Officer of TLI, setting forth two specific cost ranges: (1) [REDACTED] for the movement of DUF_6 , and (2) [REDACTED] for the movement of DU_3O_8 . See LES Exhibit 98. In a subsequent e-mail, Mr. Fisk clarified that these costs are for transporting DUF_6 and DU_3O_8 by truck using standard industry methods, and that variations in transport distances have a "minimal effect" on overall costs. See LES Exhibit 99. Using the approach detailed in my prefiled direct testimony, I estimated LES's cost to transport DU from the NEF to be \$0.85 per kgU. See LES Transportation Direct Testimony, Answer 12 at 6.

I view the e-mail communications provided by Mr. Fisk as providing sufficient basis and documentation for my cost estimate, and certainly do not view them as "vague." As the Board

has recognized more than once in this proceeding, an applicant is entitled to rely on the statements or representations of third-party market participants. Price quotes from commercial vendors should be no exception. Moreover, the cost ranges provided by Mr. Fisk are sufficiently precise so as to allow computation of a reasonable per kgU cost estimate.

Mr. Fisk's March 23, 2005 e-mail also provides a sufficient qualitative explanation as to why "variation in the distance that material has to be moved has a minimal effect on the overall transportation costs" for DU. See LES Exhibit 99. In short, additional time and fuel costs account for a modest portion of a transporter's overall costs. This is consistent with statements contained in the 1997 Lawrence Livermore National Laboratory ("LLNL") cost analysis report, a document frequently cited by NIRS/PC in this proceeding. The report states:

The loading, shipping, and unloading costs represent less than one quarter of the transportation costs. Changing the shipping distance does not change the ranking of strategies by cost. Distance affects only the shipping component of transportation costs, which will vary linearly with the distance between facilities. Total transportation costs are therefore relatively insensitive to distances between facilities. There is significant flexibility, therefore, in choosing off-site locations for [de]conversion, manufacturing, storage, and disposal facilities. NIRS/PC Exhibit 56, at 92.

Given that NRC guidance requires only a "reasonably accurate" estimate or "best approximation" of expected costs, Mr. Fisk's price quote certainly suffices. A detailed quantitative assessment or justification, as suggested by Dr. Makhijani, is not necessary, particularly given Mr. Fisk's knowledge and expertise in the area of transporting radioactive materials and the attendant costs.

Q6. Please state the basis for your disagreement with Dr. Makhijani's second criticism.

A6. Dr. Makhijani's second criticism devolves from the dubious notion that since the transport of NEF-generated DU involves the movement of two different DU forms -- DUF_6 and

DU₃O₈ -- LES should effectively double its transportation cost estimate (by adding instead of averaging the cost values provided by TLI). See Makhijani Direct Testimony, Answer 7 at 11-12. Dr. Makhijani's argument is based on a clear misimpression of the cost information provided by Mr. Fisk. Based on my initial phone discussion with TLI personnel, and Mr. Fisk's later clarification that distance has a "minimal effect" on overall transportation costs, it was my understanding that the cost ranges provided by TLI were intended to allow me compute a consolidated or "cradle-to-grave" unit cost for the disposal of each kilogram of DU generated by NEF operations. In other words, LES's \$0.85 per kgU cost estimate encompasses the total cost of transporting each kilogram of DU to be generated by the NEF, both in its pre-deconversion DUF₆ form and in its post-deconversion DU₃O₈ form.

To eliminate any potential further confusion regarding this matter, I asked Mr. Fisk to confirm the validity of my interpretation and use of the TLI cost information. Mr. Fisk provided this confirmation to me in a letter dated October 10, 2005. See LES Exhibit 110. Accordingly, I conclude that using Dr. Makhijani's suggested approach of adding the cost values provided by TLI would basically result in an unnecessary doubling of LES's transportation cost estimate.

Q7. Does this conclude your testimony?

A7. 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 ON BEHALF OF LOUISIANA ENERGY SERVICES, L.P. REGARDING THE APPLICANT'S PRIVATE SECTOR COST ESTIMATE FOR THE TRANSPORTATION OF DEPLETED URANIUM" in the captioned proceeding has been served on the following, on this 11th day of October 2005, by Hand Delivery.

Office of the Secretary
Attn: Rulemakings and Adjudications Staff
U.S. Nuclear Regulatory Commission
Mail Stop O-16C1
Washington, DC 20555-0001
(original + two copies)

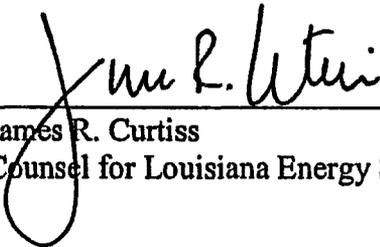
Office of the General Counsel
Attn: Associate General Counsel for
Hearings, Enforcement and
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Lisa B. Clark, Esq.
Mail Stop O-15D21
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Washington, DC 20555-0001

Administrative Judge
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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
G. Paul Bollwerk, III, Chair
Atomic Safety and Licensing Board Panel
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Charles N. Kelber
Atomic Safety and Licensing Board Panel
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Lindsay A. Lovejoy, Jr.
618 Pasco de Peralta, Unit B
Santa Fe, NM 87501


James R. Curtiss
Counsel for Louisiana Energy Services, L.P.

1 MR. SMITH: At this time I will be
2 identifying the LES exhibits associated with this
3 transportation testimony.

4 Those exhibits are, LES exhibit number 98,
5 and this is a proprietary email from Rod Fisk to Rod
6 Krich, dated December 2nd of 2004.

7 (Whereupon, the above-
8 referenced to document was
9 marked as LES Exhibit No. 98
10 for identification.)

11 MR. SMITH: LES exhibit number 99 is an
12 email from Rod Fisk to Rod Krich, dated March 23rd of
13 2005.

14 (Whereupon, the above-
15 referenced to document was
16 marked as LES Exhibit No. 99
17 for identification.)

18 MR. SMITH: LES exhibit number 100 is an
19 excerpt from the website of Transportation Logistics
20 International.

21 (Whereupon, the above-
22 referenced to document was
23 marked as LES Exhibit No. 100
24 for identification.)

25 MR. SMITH: And LES exhibit number 110 is

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1 a letter to Rod Krich, from Rod Fisk, dated October
2 6th, 2005. And that is a proprietary exhibit.

3 (Whereupon, the above-
4 referenced to document was
5 marked as LES Exhibit No. 110
6 for identification.)

7 CHAIR BOLLWERK: All right, then the
8 record should reflect that LES exhibit numbers 98, 99,
9 100, and 110, as described by counsel, are marked for
10 identification.

11 MR. SMITH: We would like to move to admit
12 these into evidence.

13 CHAIR BOLLWERK: All right. Any
14 objections?

15 (No response.)

16 CHAIR BOLLWERK: All right, hearing none
17 then LES exhibits 98, 99, 100, and 110, as described
18 by counsel are admitted into evidence.

19 (The document referred to,
20 having been previously marked
21 for identification as LES
22 exhibit Nos. 98-100 and 110
23 were admitted into evidence.)

24 MR. SMITH: I have nothing more for this
25 panel, and they are available for cross examination.

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1 CHAIR BOLLWERK: All right. Does the
2 Staff have anything for this particular witness?

3 MS. CLARK: We have no cross examination.

4 CHAIR BOLLWERK: All right. Then, Mr.
5 Lovejoy.

6 MR. LOVEJOY: Thank you, Your Honor.

7 EXAMINATION BY MR. LOVEJOY OF:

8 ROD KRICH

9 MR. LOVEJOY: Do you have those exhibits
10 nearby, Mr. Krich, 98. 99?

11 WITNESS KRICH: Yes, I do.

12 MR. LOVEJOY: Okay. So if the NEF goes
13 into operation, and is enriching uranium, and
14 generating depleted uranium, part of the operation of
15 the plant is going to be loading up the depleted
16 uranium, on the trucks, and transporting it to a
17 deconversion plant, and unloading it, is that right?

18 WITNESS KRICH: The activities that would
19 go on at the plant, under normal operations, would be
20 to fill product cylinders, and depleted uranium
21 byproduct cylinders. The product cylinders would be
22 shipped to the client's fuel fabricator, and the
23 depleted uranium cylinders would be stored,
24 temporarily, on the pad and then shipped to a
25 deconverter, or some other storage location.

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1 MR. LOVEJOY: So focusing on the process
2 of, broadly speaking, tails dispositioning, one of the
3 steps is to take the cylinders of depleted UF6, load
4 them on the trucks, transport them to a deconversion
5 plant and unload them. Is that not right?

6 WITNESS KRICH: I'm sorry, load the
7 cylinders onto the trucks?

8 MR. LOVEJOY: The DUF6 cylinders.

9 WITNESS KRICH: Yes.

10 MR. LOVEJOY: And transport them to a
11 deconversion plant, is that right?

12 WITNESS KRICH: Yes.

13 MR. LOVEJOY: And unload them, correct?

14 WITNESS KRICH: I would hope so.

15 MR. LOVEJOY: And do you have a cost
16 figure for that?

17 WITNESS KRICH: I have a cost figure for
18 the transporting the material through the entire
19 circuit. That is from transporting depleted uranium,
20 whether in the form of uranium hexafluoride, or in the
21 form of uranium oxide, from the facility, to a
22 deconverter, and from the deconverter to a disposal
23 site.

24 MR. LOVEJOY: Well, that was really not my
25 question.

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1 WITNESS KRICH: I know, but unfortunately
2 I don't have information in the form that you asked
3 about it. I'm telling you the form that I do have it
4 in.

5 In other words, Mr. Lovejoy, the cost
6 figures that I obtained are costs for making the
7 entire circuit.

8 MR. LOVEJOY: Are you sure that you don't
9 have a cost figure for transporting depleted UF6?

10 WITNESS KRICH: I have a cost figure for
11 transporting depleted UF6 from the National Enrichment
12 Facility, to the deconverter, and from the deconverter
13 to the disposal site.

14 MR. LOVEJOY: Can you tell me why you
15 would be transporting depleted UF6 from the
16 deconverter to the disposal site?

17 WITNESS KRICH: Well, that was the way
18 that the cost figures were provided to me. And that
19 was confirmed by the individual who provided the
20 figures to me.

21 In his letter, and I don't -- I'm trying
22 to find which exhibit it is.

23 MR. CURTISS: I believe it is exhibit 110.

24 WITNESS KRICH: One ten. So, Mr. Lovejoy,
25 if you look at the letter dated October 6th of this

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1 year, from Rod Fisk, who is the president and chief
2 executive officer of Transportation Logistics
3 International, which is to my understanding the
4 country's largest transporter of uranium, he re-
5 explains, because this is what he explained to me at
6 the time that he provided me with his cost estimates.

7 That the estimates he provided were for
8 the entire circuit, and that these figures are not to
9 be added, but to be averaged.

10 MR. LOVEJOY: And Mr. Fisk is where today?

11 WITNESS KRICH: I'm sorry?

12 MR. LOVEJOY: Where is Mr. Fisk now?

13 WITNESS KRICH: Well, I don't know, he may
14 be traveling. He may even, in fact, be in southern
15 France.

16 MR. LOVEJOY: We wish him well, wherever
17 he is.

18 But isn't it a fact that the email you
19 got, in answer to your enquiries, gave a figure for
20 transporting depleted UF6, a cost range, proprietary,
21 but the cost range is stated as [REDACTED] cents per KG.
22 Isn't that the information you got?

23 WITNESS KRICH: The information that I got
24 from Mr. Fisk, and you are referring to the email that
25 is exhibit 98?

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1 MR. LOVEJOY: Yes, it is in exhibit 98,
2 that is what I read.

3 WITNESS KRICH: Yes. That information
4 that was provided by Mr. Fisk was provided with the
5 understanding that that was the cost for moving the
6 material around the entire circuit.

7 MR. LOVEJOY: Is that what the email says?

8 WITNESS KRICH: No, that is what Mr. Fisk
9 says, as he described it to me on the phone, and then
10 reconfirmed, at my request, in this October 6th
11 letter.

12 MR. LOVEJOY: So this was oral
13 information, it was not documented?

14 WITNESS KRICH: I'm sorry?

15 MR. LOVEJOY: This was a telephone
16 conversation?

17 WITNESS KRICH: Yes, as documented in the
18 October 6th letter.

19 MR. LOVEJOY: But we all know you don't
20 move DUF6 around the whole circuit?

21 WITNESS KRICH: Well, you could, but that
22 was the basis for these cost estimates.

23 MR. LOVEJOY: The cost estimates also
24 include a cost figure for transporting depleted U308,
25 or rather oxides, don't they?

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1 WITNESS KRICH: Yes.

2 MR. LOVEJOY: And that is a range of [REDACTED]
3 [REDACTED] cents per KG as oxides, is that your understanding?

4 WITNESS KRICH: Well, it says what it
5 says.

6 MR. LOVEJOY: Yes, it does say what it
7 says, doesn't it, Mr. Krich?

8 WITNESS KRICH: Yes, it does, Mr. Lovejoy.
9 And so does the October 6th letter say what it says.
10 Which, if I could point you to the last paragraph, it
11 says: When we gave you the numbers we understood that
12 you wished to provide the NRC with a consolidated unit
13 cost for the movement of depleted uranium, originating
14 at the LES facility.

15 And that such a cost figure would be
16 obtained from the numbers we provided you. Thus it
17 would be appropriate, it would not be appropriate
18 excuse me, thus it would not be appropriate to add
19 these figures to come up with the cost of
20 transportation.

21 Now, this is from the individual who is
22 the president and CEO of the company that moves more
23 uranium in this country, than any other company, and
24 who provided me with the original figures.

25 I don't know how much clearer I can make

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1 it.

2 MR. LOVEJOY: So you, yourself, you are
3 not an expert in transportation costs?

4 WITNESS KRICH: No, I'm not.

5 MR. LOVEJOY: What you did in obtaining
6 transportation cost estimates, was to go to, as you
7 say, a well established company that has been doing
8 this for quite a while?

9 WITNESS KRICH: Yes.

10 MR. LOVEJOY: And you asked Mr. Fisk, with
11 TLI, to provide you with an estimate of how much it
12 would cost to transport a particular material, which
13 you described, from locations you described, to other
14 locations that you described, is that right?

15 WITNESS KRICH: What I discussed with Mr.
16 Fisk was that I needed some cost estimates, if he
17 could provide it, for moving depleted uranium either
18 in the form of UF₆, or in the oxide form, from our
19 site to a deconversion facility, and then on to a
20 disposal site.

21 And this is the -- and I asked him to give
22 me a cost, if they were mileage dependent, or not, to
23 give me the cost. And in response this is what he
24 provided.

25 MR. LOVEJOY: So you gave him the location

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1 of the proposed plant site in New Mexico, and you gave
2 him the location of Portsmouth, or Paducah, as
3 deconversion plant sites, is that right?

4 WITNESS KRICH: As a representative
5 deconversion site.

6 MR. LOVEJOY: And that would be the
7 shipment of the depleted uranium to go be deconverted?

8 WITNESS KRICH: What I asked Mr. Fisk to
9 provide was the cost of transportation of uranium
10 hexafluoride and the cost of transportation of uranium
11 oxide from the site, to a deconverter, and then on to
12 a disposal site.

13 MR. LOVEJOY: And you told him, also, did
14 you not that there would be transportation from
15 Portsmouth or Paducah, to a disposal site such as
16 Envirocare, or Hanford, or Barnwell, or Andrews
17 County, Texas; is that right?

18 WITNESS KRICH: I think I just testified
19 to that.

20 MR. LOVEJOY: And that was the DU308
21 shipment for disposal?

22 WITNESS KRICH: What I explained to Mr.
23 Fisk was I needed a cost estimate for moving depleted
24 uranium, either in the form of uranium hexafluoride,
25 or in the form of oxide, from us to a deconverter, and

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1 from a deconverter to a disposal site.

2 The figures that he provided me covered
3 the cost of moving this material through that circuit.
4 And that is documented, as I said, in his October 6th
5 letter.

6 MR. LOVEJOY: Do you have the NIRS/PC
7 exhibits nearby? I would like to ask you to look at
8 number 188.

9 It is a simple question, Mr. Krich, and
10 that is --

11 WITNESS KRICH: Could you tell me what 188
12 -- is it 188?

13 MR. LOVEJOY: It is 188, it is the April
14 8th transmittal to Staff. And it includes the
15 December 2 email from Mr. Fisk, does it not?

16 WITNESS KRICH: Let's see, attachment 2,
17 proprietary information related to depleted uranium
18 transportation costs.

19 MR. LOVEJOY: And that is the email from
20 Mr. Fisk?

21 WITNESS KRICH: Yes, the December 2nd
22 email from Rod Fisk to me.

23 MR. LOVEJOY: When you submitted this
24 material to the Staff did you explain to them that
25 although it might be a little confusing, Mr. Fisk

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1 really intended you to take the figure for shipping
2 UF6, and the figure for shipping U308, and strike an
3 average for transportation around the circuit?

4 WITNESS KRICH: I'm sorry, I don't
5 understand your question.

6 MR. LOVEJOY: I know it is a pretty
7 confusing area.

8 WITNESS KRICH: Not to me.

9 MR. LOVEJOY: All right. Let me try
10 again. When you submitted the email to the Staff did
11 you explain to them that although you did have a
12 figure for shipping depleted UF6, and you did have a
13 figure for shipping depleted U308, actually Mr. Fisk
14 never intended you to add the two figures, just
15 because you were shipping DUF6, and shipping U308, but
16 he intended you to strike an average for the cost for
17 shipping around the circuit, as you say?

18 WITNESS KRICH: Well, it was obvious to me
19 that what these figures represented was the total cost
20 for sending this material on whatever circuit you
21 wanted to send it.

22 So since it was obvious to me I didn't
23 make a special point of explaining it to the Staff.
24 It was very unambiguous, and unconfusing, non-
25 confused, as far as I was concerned.

1 MR. LOVEJOY: Now, as you understand it,
2 Mr. Fisk's estimates were independent of the length of
3 the transportation movement, is that correct?

4 WITNESS KRICH: As Mr. Fisk has explained,
5 in a subsequent email.

6 MR. LOVEJOY: And that is --

7 WITNESS KRICH: That is exhibit 99, in an
8 email from Mr. Fisk, who is the president and CEO of
9 Transportation and Logistics, to me, dated March 23rd,
10 2005.

11 He explains there that the figures that he
12 provided in his January 2nd email are independent of
13 distance. Of course we are talking about the
14 contiguous United States.

15 CHAIR BOLLWERK: For a procedural matter,
16 let's go ahead and mark exhibit 188 for identification
17 in the record. The letter dated April 8th, 2005

18 Hold on one second, maybe I'm -- I'm
19 working off of two lists here, so you may be right,
20 hold on. You are right, it is already in the record,
21 sorry.

22 MR. LOVEJOY: And, Mr. Fisk said in the
23 email, given the fact that overhead costs for
24 transportation of radioactive materials include
25 material packaging, marking and labeling,

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1 communication, vehicle tracking, vehicle maintenance,
2 driver training, security, loading and unloading of
3 cargo, insurance, etcetera, the impact of additional
4 mileage, which affects only time and fuel, amounts to
5 fractions of a cent per kilogram mile.

6 And he was advising you that the cost
7 estimates were independent of distance, is that right?

8 JUDGE ABRAMSON: Mr. Lovejoy, what is the
9 exhibit number for that one, please?

10 MR. LOVEJOY: That one is 99.

11 WITNESS KRICH: It is LES 99.

12 JUDGE ABRAMSON: Thank you.

13 MR. LOVEJOY: That was related to his
14 position that the estimates are independent of
15 distance, is that right?

16 WITNESS KRICH: Well, he says here that
17 after you take into account all these other factors,
18 packaging, marking, labeling, communications, vehicle
19 tracking, vehicle maintenance, driver training,
20 security loading and unloading of the cargo,
21 insurance, etcetera, that the impact of additional
22 mileage, which affects only time and fuel, amounts to
23 fractions of a cent per kilogram, per mile.

24 MR. LOVEJOY: So his cost estimate would
25 apply if the shipment goes for 2,000 miles, right?

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1 WITNESS KRICH: Well, his estimates apply
2 regardless of what the distance is that you have to
3 travel within the contiguous United States.

4 MR. LOVEJOY: And his cost estimate would
5 apply if the distance traveled is ten miles?

6 WITNESS KRICH: I guess I'm not sure I
7 understand the question. His cost figures apply
8 regardless of the distance that the material is
9 transported, of course, within the contiguous United
10 States.

11 MR. LOVEJOY: And for each shipment you
12 have to load it, you have to mark it, you have to
13 track the vehicle, you have to do all these overhead
14 items, right?

15 WITNESS KRICH: When you are transporting
16 the material you have to go through the steps, you
17 don't re-insure them every time, I'm sure. But you
18 have to go through the steps of loading and unloading,
19 those types of things.

20 MR. LOVEJOY: I'm sorry, Your Honor, did
21 you have a question?

22 JUDGE ABRAMSON: Well, I think we
23 understand your point here, and I was just going to
24 ask if you can get on with it a little bit. We
25 understand that you are questioning whether this

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1 should have been separate or not, and we understand
2 that we have the clarifying letter, a recent
3 clarifying letter from the party that made the bid.

4 And if there is something, some other
5 point you would like to make, let's please make it and
6 move on.

7 MR. LOVEJOY: Okay.

8 JUDGE ABRAMSON: That is all.

9 MR. LOVEJOY: So, Mr. Krich, you yourself
10 don't know how much of the costs go into, say, loading
11 and unloading?

12 WITNESS KRICH: A large fraction of the
13 cost, according to Mr. Fisk.

14 MR. LOVEJOY: You --

15 WITNESS KRICH: Let me finish my answer,
16 please. As I said, as you asked me, and as I have
17 testified to, I'm not a transportation expert. And
18 so, therefore, I don't know the breakdown of
19 transportation costs.

20 But in discussions with Mr. Fisk he
21 explained on numerous occasions that the loading and
22 unloading, and other activities associated with
23 preparing the shipment constitute, really, the
24 largest, or a large fraction of the overall costs.

25 MR. LOVEJOY: But you don't have any

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1 number breakout for what goes into loading and
2 unloading, what goes into packaging, what goes into
3 marking, or communications, or any of the other
4 elements that he has listed?

5 WITNESS KRICH: I thought I just
6 explained, as I testified a few minutes ago, I'm not
7 a transportation expert, and so I don't know the
8 details. What I do know is that, as Mr. Fisk has
9 explained to me, those activities constitute a large
10 fraction of the overall cost.

11 MR. LOVEJOY: Can you tell what it would
12 cost to transport oxide alone?

13 WITNESS KRICH: Oxide, what oxide?

14 MR. LOVEJOY: We are talking about
15 depleted U308 although Mr. Fisk was not exactly clear
16 on that, he just --

17 WITNESS KRICH: Well, he was clear on
18 that. If you look at the January, or December 2nd
19 email, it says: I have discussed the numbers that Mark
20 gave you recently for the movement of depleted UF6,
21 and depleted oxide. So I think that is pretty clear.

22 MR. LOVEJOY: So what --

23 WITNESS KRICH: And your question is?

24 MR. LOVEJOY: What is the cost for
25 transporting oxide?

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1 WITNESS KRICH: To transport depleted
2 uranium oxide is going to, according to Mr. Fisk,
3 would run between ■ cents and ■ cents per kilogram.

4 MR. LOVEJOY: And that is --

5 JUDGE KELBER: Excuse me, is this per
6 kilogram of uranium?

7 WITNESS KRICH: Per kilogram of uranium
8 oxide.

9 JUDGE KELBER: Of uranium oxide?

10 WITNESS KRICH: Oxide, yes.

11 JUDGE KELBER: Okay.

12 MR. LOVEJOY: And you have the figure for
13 UF6, also, on the same document?

14 WITNESS KRICH: Yes, I do. And that is
15 per kilogram of UF6.

16 MR. LOVEJOY: Okay. Do you have NIRS/PC
17 exhibit 242, which is another copy of this same email,
18 with some handwritten notations? Do you have number
19 242?

20 Number 242 is an email from Rod Fisk, to
21 Rod Krich, dated December 2, 2004, with some
22 handwritten notations in it.

23 CHAIR BOLLWERK: And this one has not been
24 yet identified, I don't believe. Let's go ahead and
25 marks NIRS/PC exhibit 242 for identification.

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1 (Whereupon, the above-
2 referenced to document was
3 marked as NIRS/PC Exhibit No.
4 242 for identification.)

5 WITNESS KRICH: Yes.

6 MR. LOVEJOY: Does this exhibit number 242
7 consist of the email we have been discussing, together
8 with your handwritten notations?

9 WITNESS KRICH: That is what it appears to
10 be, yes.

11 MR. LOVEJOY: We offer this document in
12 evidence.

13 CHAIR BOLLWERK: Any objections?

14 (No response.)

15 CHAIR BOLLWERK: Hearing none exhibit
16 NIRS/PC 242 is admitted into evidence.

17 (The document referred to,
18 having been previously marked
19 for identification as NIRS/PC
20 Exhibit no. 242 was admitted in
21 evidence.)

22 MR. LOVEJOY: Can you tell, from the
23 document, the equivalent money values for shipping, or
24 calculated, rather, in terms of kilograms uranium, as
25 for UF6 transportation, and oxide transportation?

1 WITNESS KRICH: Well, these notes were
2 made a long time ago, so I can't -- I can't vouch for
3 exactly what I was thinking when I made these notes.
4 But I would have to convert the [REDACTED] cents per kilogram
5 depleted UF6 to whatever that is, and depleted
6 uranium, and then convert the [REDACTED] cents per kilogram
7 depleted uranium oxide to the cost per uranium, per
8 kilogram uranium.

9 MR. LOVEJOY: And those -- do you happen
10 to have the NIRS/PC exhibits right there? I could ask
11 you to take a look at exhibit 187.

12 WITNESS KRICH: That was the one book I
13 just put away.

14 JUDGE ABRAMSON: Before we go to that, Mr.
15 Krich, let me just ask you a quick question about --
16 these are, as far as you know, these are your own
17 scribblings on here?

18 WITNESS KRICH: Yes, I'm pretty sure.

19 JUDGE ABRAMSON: And if I look at the
20 scribblings, at the bottom of the page, it looks to me
21 like you were computing averages of the two low end
22 numbers, and an average of the middle number. Is that
23 what I see?

24 You added the [REDACTED] and [REDACTED], you got an
25 average, you added the [REDACTED] and [REDACTED] and got an average,

1 you added them and divided --

2 WITNESS KRICH: Yes.

3 JUDGE ABRAMSON: -- by two to get an
4 average. Is that what it looks like to you?

5 WITNESS KRICH: That is what it looks
6 like, yes. I was doodling with various ways of doing
7 this. And then, of course, realizing that you can't,
8 you had to put them on a common basis if you want to
9 put them together, because they are on different
10 basis.

11 JUDGE ABRAMSON: But these notes, to me,
12 indicate you were computing an average, an overall
13 average --

14 WITNESS KRICH: Averages.

15 JUDGE ABRAMSON: -- at least doodling on
16 an overall average. Mr. Lovejoy, does that seem like
17 a reasonable understanding of what these doodlings are
18 about, or do you have some other view of them?

19 MR. LOVEJOY: I had some thoughts about
20 them, but I wasn't sure, so I didn't want to try to
21 make a case about them.

22 JUDGE ABRAMSON: Okay.

23 MR. LOVEJOY: Mr. Krich, do you have
24 number 242, rather, 187?

25 WITNESS KRICH: I was going to say, you

1 are going to make me get another book.

2 MR. LOVEJOY: I'm sorry.

3 WITNESS KRICH: Exhibit 187.

4 MR. LOVEJOY: There is a page, a few pages
5 in, headed clarifying information related to depleted
6 UF6 disposition costs.

7 I'm just going to ask you to look at the
8 conversion factors there and tell me whether those are
9 the conversion factors you would use to put cost
10 figures for shipping DU308, and DUF6 into a common
11 terms?

12 WITNESS KRICH: Well, this letter is from
13 me to the NRC, so I certainly wouldn't send the NRC
14 incorrect information.

15 MR. LOVEJOY: So you see the conversion
16 factors?

17 WITNESS KRICH: I do.

18 MR. LOVEJOY: So those are the ones you
19 would use to convert to shipment costs per KGU, is
20 that right?

21 WITNESS KRICH: I think these are the ones
22 that anybody would have used to make that conversion.

23 MR. LOVEJOY: To your knowledge --

24 CHAIR BOLLWERK: Let's go ahead and mark
25 exhibit 187 as described by counsel for

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1 identification.

2 (Whereupon, the above-
3 referenced to document was
4 marked as NIRS/PC Exhibit No.
5 187 for identification.)

6 CHAIR BOLLWERK: I don't believe it was.

7 MR. LOVEJOY: Okay, thank you.

8 CHAIR BOLLWERK: No, at least on my
9 records, anyway.

10 MR. LOVEJOY: Well, we offer the exhibit
11 in evidence.

12 CHAIR BOLLWERK: All right, it has been
13 marked for identification. Any objections to its
14 admission?

15 (No response.)

16 CHAIR BOLLWERK: No objections, then
17 exhibit 187, as identified by counsel, is admitted
18 into evidence.

19 (The document referred to,
20 having been previously marked
21 for identification as NIRS/PC
22 Exhibit No. 187 was admitted in
23 evidence.)

24 MR. LOVEJOY: To your knowledge, Mr.
25 Krich, is depleted uranium hexafluoride ever shipped

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1 in the same shipment with DU308?

2 WITNESS KRICH: I'm sorry?

3 MR. LOVEJOY: In common practice is DU308
4 ever shipped in the same shipment, along with DUF6?

5 WITNESS KRICH: I really don't know, it
6 could be. I don't see that there is any reason not
7 to, but I don't know for a fact.

8 MR. LOVEJOY: Have you ever known that to
9 happen, in your experience?

10 WITNESS KRICH: I just explained that I'm
11 not familiar with transportation, so I don't know.

12 MR. LOVEJOY: For addressing the plans
13 that LES has for the National Enrichment Facility, do
14 you plan to be shipping depleted uranium hexafluoride
15 in the same shipments with depleted U308?

16 WITNESS KRICH: I don't know. I mean,
17 that could always be a possibility.

18 MR. LOVEJOY: You really don't --

19 WITNESS KRICH: That we certainly didn't
20 preclude that from happening, in any of the
21 information in the application.

22 MR. LOVEJOY: Well, what would you do with
23 the --

24 WITNESS KRICH: I don't know, Mr. Lovejoy,
25 there may be situations that call for that. But that

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1 may be an efficiency that can be gained by using a
2 truck to ship multiple, various material.

3 MR. LOVEJOY: You don't know where you
4 would want to be shipping both DUF6 and DU308 at once,
5 do you?

6 WITNESS KRICH: I don't know. I might be
7 able to think of some situations like that.

8 MR. LOVEJOY: That would be very unusual,
9 wouldn't it?

10 WITNESS KRICH: No, not necessarily.

11 MR. LOVEJOY: I'm done.

12 MR. CURTISS: And I can be fairly quick so
13 that we can move on here.

14 CHAIR BOLLWERK: All right.

15 EXAMINATION BY MR. CURTISS OF

16 ROD KRICH

17 MR. CURTISS: Mr. Krich, why did you
18 choose to enquire of TLI regarding the transportation
19 costs?

20 CHAIR BOLLWERK: Well, I didn't see, let
21 me just ask the Staff if anything?

22 MS. CLARK: No.

23 CHAIR BOLLWERK: I didn't think so.

24 MR. CURTISS: Excuse me.

25 Why did you choose to enquire of TLI

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1 regarding your transportation cost estimate?

2 WITNESS KRICH: We, in order to get an
3 idea of costs for transportation we looked at who were
4 the largest shippers, who would know the best what
5 figures to use, and Transportation Logistics is the
6 country's largest shipper and, in fact, may be the
7 world's largest shipper of uranium, as well as other
8 radioactive material.

9 But, Mr. Curtiss, I would like to address
10 Mr. Lovejoy's incredulity. Certainly there is a
11 scenario where uranium oxide and UF6 could be shipped
12 to places like the Nevada Test Site.

13 So such a shipment is certainly feasible,
14 or possible.

15 MR. CURTISS: The question was raised
16 about whether the transportation of these materials is
17 largely distant independent. And let me refer you to
18 an exhibit that NIRS/PC introduced on this subject, if
19 I could, exhibit number 56.

20 WITNESS KRICH: Our exhibit number 56?

21 MR. CURTISS: No, it is a NIRS/PC exhibit
22 56.

23 WITNESS KRICH: It is the one that we have
24 to divide by two?

25 MR. CURTISS: It is the Lawrence Livermore

1 May 1997 report. Do you have that exhibit before you
2 there?

3 WITNESS KRICH: Exhibit 56, yes.

4 CHAIR BOLLWERK: It appears, this is,
5 again, the one that appears after exhibit number 134
6 in the sequence.

7 WITNESS KRICH: Yes, I have it.

8 MR. CURTISS: Would you turn to page 92 of
9 that exhibit, the number is at the bottom of the page.

10 WITNESS KRICH: Page 92.

11 MR. CURTISS: Do you see a section there,
12 section 6.1.2 effective transportation distances?

13 WITNESS KRICH: Yes, I do.

14 MR. CURTISS: Would you read that second
15 paragraph out loud, please, loading and shipping, and
16 so forth?

17 WITNESS KRICH: Sure. The loading,
18 shipping, and unloading costs represent less than one
19 quarter of the transportation costs. Changing the
20 shipping distance does not change the ranking by
21 strategies, of strategies by cost.

22 Distance affects only the shipping
23 component of transportation costs, which will vary
24 linearly with the distance between facilities. Total
25 transportation costs are, therefore, relative

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1 insensitive to the distances between facilities.

2 MR. CURTISS: And is this discussion of
3 transportation distances, and their impact on cost
4 estimates in this NIRS/PC exhibit, consistent with the
5 understanding that you had from TLI when you initially
6 received their estimate?

7 WITNESS KRICH: This pretty well, is close
8 to what Mr. Fisk explained to me, yes.

9 MR. CURTISS: So there is no inconsistency
10 between the NIRS/PC exhibit and its description here,
11 and what you understand from TLI?

12 WITNESS KRICH: From Mr. Fisk, that is
13 correct.

14 MR. CURTISS: Could I ask you, following
15 up on this question, do you believe the Staff was
16 aware that the transportation costs were independent
17 of distance?

18 WITNESS KRICH: Say that again?

19 CHAIR BOLLWERK: That the transportation
20 cost estimates were independent of distance, do you
21 think they were aware of that?

22 WITNESS KRICH: The Staff?

23 MR. CURTISS: Yes.

24 WITNESS KRICH: Yes, I explained it to
25 them verbally. We had a phone call before I submitted

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1 this letter, and explained to them the costs. And I
2 told them at that time that the cost was independent
3 of distance.

4 MR. CURTISS: Could you pull Staff exhibit
5 37, please?

6 JUDGE KELBER: Counselor, before we go on
7 to that --

8 MR. CURTISS: Yes, sir.

9 JUDGE KELBER: Mr. Krich, could you just
10 back up for a minute to the statement that you read
11 about loading, and unloading? I think it was the
12 previous question.

13 WITNESS KRICH: From the --

14 JUDGE KELBER: From the LL -- thank you,
15 I have it here, that is all right.

16 WITNESS KRICH: Okay.

17 JUDGE KELBER: Please go on, I'm sorry.

18 MR. CURTISS: Do you have Staff exhibit 37
19 before you?

20 WITNESS KRICH: I do.

21 MR. CURTISS: Would you turn to page 10-12
22 of that exhibit?

23 WITNESS KRICH: Yes, I have it.

24 MR. CURTISS: You have it there?

25 WITNESS KRICH: Yes.

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1 MR. CURTISS: And first full paragraph at
2 the top, it begins, the transportation and disposal
3 costs, so forth, and so on. The second sentence,
4 would you read that sentence, please? Transportation
5 costs were based --

6 WITNESS KRICH: That actually starts on
7 10-11.

8 MR. CURTISS: I think it actually starts
9 on -- what I have is the top of page 10-12, the
10 transportation cost, disposal costs were based on --

11 WITNESS KRICH: Right.

12 MR. CURTISS: -- the sentence that starts,
13 transportation costs were based on, do you see that
14 sentence?

15 WITNESS KRICH: Yes.

16 MR. CURTISS: Would you read that?

17 WITNESS KRICH: Transportation costs were
18 based on an estimate from Transportation Logistics
19 International. This transportation estimate premises
20 85 cents per kilogram U, was independent of distance.

21 MR. CURTISS: And, on that basis, do you
22 believe the Staff understood that the transportation
23 cost was independent of distance?

24 WITNESS KRICH: Very clearly so, yes.

25 MR. CURTISS: There was, I think, a

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1 significant confusion in the questions that were being
2 asked, as to how you calculated this average. And, as
3 you pointed out, exhibit 110 is a letter that confirms
4 that the approach that you understood, from the
5 initial cost estimate was, in fact, appropriate.

6 Could you turn to your direct testimony,
7 please?

8 WITNESS KRICH: I have it.

9 MR. CURTISS: Do you have it there?

10 WITNESS KRICH: Yes.

11 MR. CURTISS: Would you turn to page 5 of
12 that testimony, beginning with question and answer 11.
13 Do you have that there?

14 WITNESS KRICH: Yes, I do.

15 MR. CURTISS: If you could just review
16 question and answer 11 and question and answer 12,
17 does that constitute your sworn testimony in this
18 proceeding about how you calculated the cost estimate
19 for transportation?

20 (Witness reviews document.)

21 WITNESS KRICH: Yes, this constitutes is
22 my testimony.

23 MR. CURTISS: And in particular does the
24 answer 12 discussion, including the specific values
25 that were used for conversion, about which there was

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1 some apparent confusion in the early line of
2 questioning, does this testimony fully explain how you
3 arrived at the numbers?

4 WITNESS KRICH: Yes, very clearly.

5 MR. CURTISS: And then not only was it
6 consistent with your earlier discussions, but does
7 exhibit 110, the letter from Rod Fisk, confirm that it
8 would not be appropriate to add these numbers in the
9 manner that was suggested in the question but, in
10 fact, the manner in which you arrived at those
11 estimates, as reflected here, is exactly what he
12 confirmed was an appropriate approach?

13 WITNESS KRICH: That is correct. I, in
14 calling Mr. Fisk to ask him if he could provide his
15 conclusion, in writing, I explained to him what had
16 been proposed by NIRS/PC. He said that was
17 ridiculous, given what he had provided.

18 MR. CURTISS: I have no further questions.

19 JUDGE ABRAMSON: I have a clarifying
20 question, Mr. Krich.

21 It seems to me that what underlies
22 NIRS/PC's question here is whether or not the costs of
23 unloading the DUF6, at the deconverter, and then
24 reloading the DU outside the deconverter, and I assume
25 in the same, or in different packages, but they need

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1 to be labeled differently, need to be --

2 WITNESS KRICH: Yes.

3 JUDGE ABRAMSON: -- handled differently,
4 whether or not that is part of this cost or not.

5 And did you have any discussions with Mr.
6 Fisk about those aspects of it? I mean, he --

7 WITNESS KRICH: Yes, Judge.

8 JUDGE ABRAMSON: So he understood that
9 when he was giving you numbers -- I can see the source
10 of NIRS/PC's confusion, because it looked like you
11 were getting a number to transport the DU, and then a
12 separate number to transport the DUF6.

13 WITNESS KRICH: Right.

14 JUDGE ABRAMSON: So it is a little, it
15 could clearly have led to this conclusion, that is why
16 I like to explore this particular question with you.

17 And so maybe just take a minute and tell
18 me how that discussion went, so I understand what he
19 was doing.

20 WITNESS KRICH: When I originally called
21 Mr. Fisk we actually talked to a Mark Lambert, and
22 that is who is referred to in the email. And Mark
23 provided us some estimates over the phone.

24 And then, subsequently, I talked to Mr.
25 Fisk and he provided us the email. But in all of

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1 those discussions we were clear about what we were
2 looking for, in terms of the cost estimate, because I
3 wanted to make sure, one of the things I was concerned
4 with was that we would get a cost estimate for
5 depleted uranium hexafluoride, and therefore it might
6 not be applicable to uranium oxide.

7 And so we discussed this at length to make
8 sure that we got estimates for both. He understood
9 that there would be transport loading, unloading,
10 reloading. And if you look at his subsequent email
11 about distance being not a factor, he talks about the
12 ISO container, that the depleted uranium oxide would
13 be put into, you know, the 55 gallon drums that are
14 then loaded into an ISO container, loaded on the
15 truck, and then taken to the disposal site.

16 So he understood, clearly, and explained
17 that he would give me a total circuit cost, basically,
18 for carrying depleted oxide, or carrying depleted
19 uranium hexafluoride.

20 JUDGE ABRAMSON: So it goes from, it goes
21 from the NEF to the deconverter in the cylinders we
22 were talking about yesterday? Those cylinders then go
23 back to NEF, or anyway, they are not involved in the
24 transportation from thereon.

25 And at the deconverter it gets loaded into

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1 these drums, and into the ISO container, and that is
2 why that discussion is in the email?

3 WITNESS KRICH: Yes, sir.

4 JUDGE ABRAMSON: Okay. That answers my
5 question.

6 WITNESS KRICH: He was clear, I guess this
7 shows that he was clear about what is involved here,
8 the loading and unloading, when he gave me the cost
9 estimate.

10 JUDGE ABRAMSON: I understand, thank you.
11 Mr. Lovejoy, do you want to follow this up, at all?
12 Since I'm trying to understand the issue I thought you
13 were raising?

14 EXAMINATION BY MR. LOVEJOY OF

15 ROD KRICH

16 MR. LOVEJOY: Mr. Krich, the fact remains
17 that there are two separate shipments for each
18 kilogram of uranium coming out of the NEF, is that
19 right?

20 There is a shipment of the uranium in UF6,
21 and there is a shipment of uranium in U308?

22 WITNESS KRICH: Not coming from the NEF,
23 as you just said, but a shipment of UF6 from the
24 National Enrichment Facility and then a shipment of
25 uranium oxide from the deconverter to the disposal

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1 facility.

2 But as, I mean, I think as we've said a
3 number of times, the person who provided the estimate
4 explained how those figures should be used.

5 CHAIR BOLLWERK: All right, any further
6 questions by anyone? Staff, Mr. Curtiss, anything
7 further?

8 MR. CURTISS: No, sir.

9 CHAIR BOLLWERK: Mr. Lovejoy, anything
10 further?

11 MR. LOVEJOY: No, thank you.

12 CHAIR BOLLWERK: Mr. Krich, then thank you
13 for your testimony on this particular issue. I will
14 be seeing you again in this proceeding.

15 Then let's go ahead and, I believe, next
16 we have the Staff panel, the Staff witness.
17 Whereupon,

18 JENNIFER MAYER

19 CRAIG DEAN

20 TIMOTHY JOHNSON

21 were called as witnesses by counsel for the Staff and,
22 having been previously duly sworn, assumed the witness
23 stand, were examined and testified as follows:

24 MS. CLARK: Do you have, before you, a
25 document entitled NRC Staff testimony on the LES

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1 transportation cost portion of the decommissioning
2 cost estimate?

3 WITNESS MAYER: Yes.

4 WITNESS DEAN: Yes.

5 WITNESS JOHNSON: Yes.

6 MS. CLARK: Did you prepare this document
7 for submission in this proceeding?

8 WITNESS MAYER: Yes.

9 WITNESS DEAN: Yes.

10 WITNESS JOHNSON: Yes, we did.

11 MS. CLARK: At this time do you have any
12 corrections, or revisions, for that document?

13 WITNESS MAYER: No.

14 WITNESS DEAN: No.

15 WITNESS JOHNSON: No.

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

18 WITNESS DEAN: Yes.

19 WITNESS MAYER: Yes.

20 WITNESS JOHNSON: Yes.

21 MS. CLARK: At this point I would like to
22 move to have this direct testimony admitted into the
23 evidence in this proceeding.

24 CHAIR BOLLWERK: Are there any objections?

25 (No response.)

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CHAIR BOLLWERK: No? Hearing none, then the NRC Staff testimony on LES transportation cost portion of the decommissioning cost estimate is adopted into the record as read.

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

September 15, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

NRC STAFF TESTIMONY ON THE LES TRANSPORTATION
COST PORTION OF THE DECOMMISSIONING COST ESTIMATE

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 of 2002, when LES initiated discussions with NRC for the project. A statement of my professional qualifications is attached hereto.

A.1. (JM) Jennifer Mayer. I am employed as a consultant by ICF Consulting. I am providing this testimony under a technical assistance contract with the NRC.

A statement of my professional qualifications is attached hereto.

A.1. (CD) Craig Dean. I am employed by ICF Consulting. I am providing this testimony under a technical assistance contract with the NRC. A statement of my professional qualifications is attached hereto.

→ PROPRIETARY INFORMATION →

Q.2. Please describe your current job responsibilities in connection with the NRC Staff's review of the application by LES to construct and operate a uranium enrichment facility in Lea County, New Mexico, to be known as the National Enrichment 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 cost of transportation for the purpose of estimated 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; and (4) the lack of any relevant estimate of the cost of converting and disposing of depleted uranium, given it does no 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 2242 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.

Q.5. Has LES provided a basis for its estimate of transportation of the DU for conversion and disposal (\$0.85/kgU)?

A.5. (TJ, JM, CD) Yes. The transportation cost includes the cost of both shipping the DUF₆ from the NEF to the conversion facility and then transporting the U₃O₈ from the conversion facility to the disposal site. The cost was based on an estimate from a transportation company, Transportation Logistics International (TLI). TLI provided two

ranges of estimates - one for DUF₆ and one for oxides, and represented the quote as being very conservative. LES Exhibit 98; LES Exhibit 99. Of these, LES used the average of the lower range estimate for each material, after converting the cost to \$/kgU.

Q.6. In your opinion, does the information described provide a reasonable basis for estimating the cost of transportation?

A.6. (TJ, JM, CD) Yes, because the cost information relied on by LES was provided by an independent third party vendor we considered it to be reliable. The use of the lower end of range of cost was deemed acceptable because of the conservative nature of the quotation.

Q.7. Does this conclude your testimony?

A.7. (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.

TIMOTHY C. JOHNSON

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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.

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 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: Do you also have before you a
2 document entitled NRC Staff rebuttal testimony
3 regarding transportation?

4 WITNESS MAYER: Yes.

5 WITNESS JOHNSON: Yes.

6 WITNESS DEAN: Yes.

7 MS. CLARK: Did you prepare this testimony
8 for submission in this proceeding?

9 WITNESS DEAN: Yes.

10 WITNESS JOHNSON: Yes.

11 WITNESS MAYER: Yes.

12 MS. CLARK: At this time do you have any
13 corrections or revisions you would like to make to
14 this testimony?

15 WITNESS DEAN: No.

16 WITNESS MAYER: No.

17 WITNESS JOHNSON: No.

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

20 WITNESS DEAN: Yes.

21 WITNESS MAYER: Yes.

22 WITNESS JOHNSON: Yes.

23 MS. CLARK: At this time I would like to
24 move to have this testimony admitted into the record
25 of this proceeding.

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CHAIR BOLLWERK: Any objections?

(No response.)

CHAIR BOLLWERK: Hearing none, then the NRC Staff rebuttal testimony regarding transportation will be adopted into the record as if read.

(Whereupon, the prefiled rebuttal testimony of Craig Dean, Timothy Johnson and Jennifer Mayer was bound into the record as if having been read.) **

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.	)	Docket No. 70-3103
)	
(National Enrichment Facility)	)	ASLBP No. 04-826-01-ML

NRC STAFF REBUTTAL TESTIMONY REGARDING TRANSPORTATION

- 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. (JM) Jennifer Mayer. I am employed as a consultant by ICF Consulting. I am providing this testimony under a technical assistance contract with the NRC.
- 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, JM, 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, JM, CD) The purpose of our joint direct testimony is to provide the NRC Staff's views concerning the admitted contentions regarding the cost of transportation as it relates to LES's decommissioning cost estimate.

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

A.4. (TJ, JM, CD) To provide our views on NIRS/PC's pre-filed testimony of Dr. Arjun Makhijani regarding transportation.

Q.5. Have you read the direct pre-filed testimony of Dr. Makhijani regarding transportation? If so, please state your opinion of the testimony.

A.5. (TJ, JM, CD) Yes we have. First, we disagree with Dr. Makhijani's assertion that the cost estimate for transportation was insufficiently documented. LES provided documentation from the Chief Financial Officer of a transportation vendor, TLI, Inc., citing specific cost numbers for transport of depleted UF_6 and for uranium oxides. In addition, he explained that these costs were conservative and were independent of distance because the primary cost components were overhead expenses. LES Exhibits 98, 99. In our opinion, these estimates provided sufficient documentation to support LES's cost estimate because they were provided by an independent third party vendor.

Q.6. What is your opinion of Dr. Makhijani's assertion that the LES underestimated the transportation cost by averaging the costs provided for UF_6 and uranium oxides instead of adding them?

A.6. (TJ, JM, CD) For the purpose of decommissioning, the tails produced at the enrichment facility must first be transported as UF_6 to a deconversion facility where they are converted to a uranium oxide, U_3O_8 . Thereafter, the U_3O_8 must be transported to a disposal site. Both of these transportation segments are necessary for final disposition of the tails. The transportation costs associated with disposition of the tails must include

the costs of both of these transportation segments. LES obtained an estimate from a transportation which contained two costs - one for the transport of UF_6 and another for the cost of transport of U_3O_8 . LES Exhibits 98, 99. It is our understanding and belief that the cost estimates provided by TLI and relied upon by LES included both segments of the transportation necessary for disposal - from the proposed enrichment facility to the deconversion facility and from the deconversion facility to the ultimate disposal site - for each type of material being transported. Therefore, we concluded that it was appropriate for LES to use the average of the two costs. Dr. Makhijani, on the other hand, assumes that the cost information for each type of material - UF_6 and uranium oxide - only refers to one leg of the journey.

Q.7. What is your opinion of Dr. Makhijani's assertion that LES should have derived its cost estimate for transportation by adding the costs for transport of UF_6 and U_3O_8 ?

A.7. (TJ, JM, CD) As discussed above, this would not be appropriate because we believe that the cost estimates already provided include both segments of the transportation necessary to dispose of depleted uranium. However, even if one accepted Dr. Makhijani's assumption that the cost estimates reflect only one segment of the journey, adding the two costs together would likely result in an overly conservative cost estimate because not all costs would be incurred twice. TLI has stated that the overhead costs involved included the following: Material packaging, marking and labeling, communications, vehicle tracking, vehicle maintenance, driver training, security, loading and unloading of cargo and insurance. LES Exhibit 99. While some cost elements may be incurred independently for each segment of the trip; i.e, loading and unloading, other elements such as driver training, vehicle maintenance and tracking, and insurance should not be counted twice as these costs would be shared between both segments of the trip. The same trucks used to deliver the UF_6 to the

deconversion facility would be able to take the U_3O_8 produced by the deconversion facility to the disposal site.

Q. Does this conclude your testimony?

A. (TJ, JM, CD) Yes.

1 MS. CLARK: We do not have any exhibits
2 with regard to this testimony, so at this time the
3 Panel is ready for cross examination.

4 CHAIR BOLLWERK: All right. Let me see if
5 Mr. Curtiss has any questions for the Panel?

6 MR. CURTISS: No, sir.

7 CHAIR BOLLWERK: All right. Then, Mr.
8 Lovejoy?

9 MR. LOVEJOY: Thank you.

10 EXAMINATION BY MR. LOVEJOY OF

11 JENNIFER MAYER

12 CRAIG DEAN

13 TIMOTHY JOHNSON

14 MR. LOVEJOY: Do you have the LES exhibits
15 nearby? I would like to ask you to look at number 98.
16 Do you have that exhibit?

17 WITNESS MAYER: Yes, we do.

18 MR. LOVEJOY: Is this the source of the
19 transportation cost estimate?

20 WITNESS DEAN: To the best of my
21 knowledge.

22 WITNESS MAYER: Along with the other email
23 clarifying that it was valid regardless of distance,
24 and explaining what the components were, yes.

25 WITNESS JOHNSON: And we also had some

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1 responses to request for additional information.

2 MR. LOVEJOY: Okay. What was -- were
3 those the ones that came in March 29th?

4 WITNESS JOHNSON: Well, one --

5 MR. LOVEJOY: Take a look at --

6 WITNESS JOHNSON: -- them was December
7 10th, 2004, another one was January 7th, 2005, and
8 also March 29th, 2005. These all had questions and
9 responses that were related to the transportation
10 costs, and March 3rd as well.

11 MR. LOVEJOY: So what are the assumptions
12 underlying the transportation cost estimates, shown on
13 exhibit 98?

14 WITNESS MAYER: I believe those are
15 described in exhibit 99.

16 MR. LOVEJOY: And they are? Do you have
17 number 99?

18 WITNESS MAYER: Yes.

19 MR. LOVEJOY: What are the assumptions
20 underlying the estimate?

21 WITNESS MAYER: Here I would just like to
22 clarify. Are you asking what are the assumptions of
23 whom? Do you mean the person who prepared, who gave
24 the cost estimate? Because I don't think our panel
25 can speak to the knowledge of someone else.

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1 MR. LOVEJOY: What are the assumptions
2 underlying the person's -- what are the assumptions
3 made in giving the estimates that you referred to?

4 MS. CLARK: If you know, or to the extent
5 you know.

6 MR. LOVEJOY: If you know.

7 JUDGE ABRAMSON: What is your
8 understanding of the assumptions that underlie those
9 estimates?

10 CHAIR BOLLWERK: Is that a fair statement
11 of the question?

12 MR. LOVEJOY: That is a good question.

13 CHAIR BOLLWERK: All right.

14 WITNESS MAYER: First that the price is
15 quoted in exhibit 98 represent the various materials
16 listed, as Mr. Krich clarified for the entire circuit
17 that the material could be shipped through.

18 That, as exhibit 99 points out, that the
19 shipment of the UF6 would happen in 48 Y cylinders,
20 and that the shipment of U308 would occur in drums
21 placed in an ISO container.

22 That the cost estimates represented in
23 exhibit 98 are independent of distance traveled, and
24 that they include the overhead costs listed in the
25 second paragraph of exhibit 99, which I can read if it

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1 would be helpful.

2 MR. LOVEJOY: You are referring to the
3 overhead costs listed in the second paragraph, in
4 number 99, is that right?

5 WITNESS MAYER: That is correct.

6 MR. LOVEJOY: And you said that -- and I'm
7 not sure that I got every word, but you said something
8 like that the costs apply to the whole circuit, is
9 that right?

10 WITNESS MAYER: That is correct.

11 MR. LOVEJOY: Can you point out where it
12 is stated, in these written documents, that that is
13 the assumption?

14 WITNESS MAYER: It is not stated in either
15 exhibit 98 or 99. That was described to us in a
16 telephone call with Mr. Krich, and later documented in
17 the letter that is now exhibit 110 of LES exhibit 110.

18 MR. LOVEJOY: So it is something Mr. Krich
19 told you, followed up by the letter that he gave you?

20 WITNESS MAYER: Yes. When we got the
21 exhibit 98, it was not immediately obvious how he had
22 translated those to the 85 cent, and we asked him to
23 walk us through that calculation, and in that
24 conversation he described that the costs represented
25 both legs of the journey.

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1 JUDGE ABRAMSON: When I look at that
2 calculation it seems evident that Mr. Krich took the
3 low end number of both of the estimates provided to
4 him?

5 WITNESS MAYER: That is correct.

6 JUDGE ABRAMSON: And you were comfortable
7 with that as an estimate?

8 WITNESS MAYER: Yes, we were.

9 JUDGE ABRAMSON: And why?

10 WITNESS MAYER: Because it was a fairly
11 conservative estimate to begin with, based on our
12 experience.

13 WITNESS JOHNSON: It is also conservative
14 with respect to the DOE transportation cost estimate,
15 which looks at the same shipping routes, and their
16 estimate was ■ cents per KGU, while this estimate was
17 85 cents per KGU.

18 WITNESS MAYER: Yes, actually the DOE
19 estimate, when they went through the reconciling
20 process, there was a second part. But it still came
21 out to ■ cents per KGU, if I remember correctly.

22 JUDGE ABRAMSON: Why do you think the DOE
23 estimate was so much lower than this estimate? Would
24 you have any explanation for it, or --

25 WITNESS MAYER: I believe the DOE estimate

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1 assumed rail shipment for at least one of the two
2 components.

3 JUDGE ABRAMSON: I see.

4 JUDGE KELBER: And, excuse me, the DOE
5 estimate is also for a complete circuit?

6 WITNESS JOHNSON: Yes.

7 JUDGE KELBER: Cradle to grave, so to
8 speak?

9 WITNESS JOHNSON: You are right, it
10 included shipment of the UF6 from Lea County, New
11 Mexico, to Paducah, or Portsmouth and the shipment of
12 the waste from the deconversion facilities to
13 Envirocare.

14 JUDGE KELBER: Okay, thank you.

15 MR. LOVEJOY: Now, you do understand, I
16 think everyone understands, that in the tails
17 dispositioning process there is a shipment of each KG
18 of depleted uranium, from the National Enrichment
19 Facility, to a deconversion site, where it is unloaded
20 and deconverted, correct?

21 WITNESS MAYER: That is correct.

22 WITNESS JOHNSON: Yes.

23 MR. LOVEJOY: And then there is a separate
24 shipment from the deconversion plant to a disposal
25 site, which has to separately be loaded up,

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1 transported, and then unloaded, correct?

2 WITNESS MAYER: That is correct.

3 MR. LOVEJOY: And actually they have to
4 send back the empty trucks, too, don't they?

5 WITNESS MAYER: We have no information on
6 what they are going to do with the trucks once they've
7 unloaded the material.

8 MR. LOVEJOY: Do you know what kind of
9 trucks are used?

10 WITNESS MAYER: I do not.

11 MR. LOVEJOY: Do you know if different
12 trucks are used?

13 WITNESS JOHNSON: Generally the shipments
14 of the hexafluoride cylinders are made in flat bed
15 trucks. The drums of waste could be either flat bed,
16 or a standard van type vehicle.

17 MR. LOVEJOY: The depleted U308, once
18 deconverted, you are assuming is in 55 gallon drums?

19 WITNESS JOHNSON: Yes, that was what the
20 assumption was, that is in the Transportation
21 Logistics estimate.

22 MR. LOVEJOY: Did you know that Mr. Krich
23 had given the source of the dollar estimates
24 information about shipping from the enrichment plant
25 in New Mexico, to deconversion plant locations in

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1 Paducah and Portsmouth, did you know that he had done
2 that?

3 WITNESS JOHNSON: The locations of the
4 shipment aren't identified, but because the shipments
5 are done independent of distance, it wouldn't matter
6 where the location was.

7 MR. LOVEJOY: So these estimates apply to
8 each movement of a kilogram, or a quantity of depleted
9 uranium, is that right?

10 WITNESS JOHNSON: That is the way we
11 understand the estimate.

12 JUDGE ABRAMSON: I'm sorry, the estimates
13 are for the in movement, that is the question, and
14 let's not get tricked up by language here.

15 The question is, is the estimate a price
16 for both legs, or is it a separate price for each leg?

17 WITNESS MAYER: Each of the prices listed
18 in exhibit 98 are for both legs. But there was
19 further clarification. We asked whether distance
20 mattered. That is did it matter if they were assuming
21 that the material --

22 JUDGE ABRAMSON: I understand that. But
23 what I want to make sure the record is clear on, is
24 that your answer is either, it is a price for one leg,
25 or it is a price for both legs.

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1 WITNESS MAYER: It is a price for both
2 legs.

3 MR. LOVEJOY: And it doesn't say that in
4 email, right?

5 WITNESS MAYER: In --

6 MR. LOVEJOY: In Mr. Fisk's email. You've
7 got that later from Mr. Krich?

8 WITNESS MAYER: That is correct.

9 WITNESS JOHNSON: But in our assumptions,
10 when we saw the estimate, we assumed that it was a
11 package price for all the transportation that would
12 have to occur.

13 And, again, that was confirmed later on by
14 Rod Fisk, in a letter to Rod Krich.

15 MR. LOVEJOY: So that was your --

16 JUDGE KELBER: Excuse me, at the risk of
17 stopping the merry go round, we have gone over this a
18 number of times, and I think you said in connection
19 with the DOE estimate, it also was a complete circuit?

20 WITNESS MAYER: That is correct.

21 JUDGE KELBER: That seems to be the
22 practice in discussing these shipments. I don't
23 understand the need to belabor this point. I
24 understand how confusing it can be, in the way it was
25 originally stated. But it seems to be the practice.

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1 WITNESS JOHNSON: Yes, we agree with that.

2 MR. LOVEJOY: Did Mr. Fisk prepare the DOE
3 estimates?

4 WITNESS MAYER: No, he did not. Or
5 actually we don't know whether he provided any input.
6 But the DOE estimate was provided by DOE.

7 MR. LOVEJOY: And it was mainly rail
8 transportation, right?

9 WITNESS MAYER: It included rail
10 transportation. I don't know if it was solely rail
11 transportation.

12 MR. LOVEJOY: Let me just ask you about a
13 couple of things in your testimony. In your rebuttal
14 testimony, answer number 6, you state that you are
15 assuming "that the cost estimates provided by TLI and
16 relied on by LES included both segments of the
17 transportation necessary for disposal from the
18 proposed enrichment facility to the deconversion
19 facility, and from the deconversion facility to the
20 ultimate disposal site for each type of material."

21 Well, if that is so, and the material you
22 ship from the enrichment plant to the deconversion
23 site is UF6, and the material you shipped from the
24 deconversion plant to a disposal site is in U308, why
25 don't you count the cost of shipping the DUF6

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1 separately from the DU308, and add them?

2 WITNESS MAYER: That would be inconsistent
3 with how the third party provided the estimates, and
4 we wouldn't be able to calculate it that way.

5 MR. LOVEJOY: So you are relying on what
6 Mr. Krich told you about Mr. Fisk's approach?

7 WITNESS JOHNSON: Yes.

8 JUDGE ABRAMSON: Are you not also relying
9 on the latest clarifying letter from Mr. Fisk?

10 WITNESS MAYER: We are also relying on
11 that letter, yes.

12 MR. LOVEJOY: Your testimony says, further
13 on, kind of in an explanation of the position you
14 take, it says: While some cost elements may be
15 incurred independently for each segment of the trip,
16 i.e., loading and unloading, other elements, such as
17 driver training, vehicle maintenance, and tracking,
18 and insurance, should not be counted twice, as these
19 costs would be shared between both segments of the
20 trip.

21 The same trucks used to deliver UF6 to the
22 deconversion facility would be able to take the U308
23 produced by the deconversion facility to the disposal
24 site.

25 Do you have any information about the

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1 quantity to quantify the costs of loading and
2 unloading, driver training, vehicle maintenance and
3 those other things you have mentioned with respect to
4 the shipment from National Enrichment Facility to the
5 deconversion plant, or from deconversion plant to
6 disposal site?

7 WITNESS JOHNSON: No, we don't have any
8 specific breakdown of those individual components.

9 MR. LOVEJOY: So these are just your
10 assumptions?

11 WITNESS JOHNSON: I'm sorry?

12 MR. LOVEJOY: These are just your
13 assumptions?

14 WITNESS JOHNSON: Well, these were the --
15 these were included in the estimate from
16 Transportation Logistics. They didn't provide a
17 breakdown of those individual components, they
18 provided a total cost for all of those components.

19 JUDGE ABRAMSON: But where did you -- are
20 you reading from their statement?

21 MR. LOVEJOY: I'm reading an extract from
22 their testimony.

23 JUDGE ABRAMSON: Is that testimony
24 speculation, or is it based on some hard facts, or is
25 it based on something somebody in, either the

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1 Applicant or the transporter provided you?

2 MS. CLARK: If I may, it may be helpful to
3 go back and read the entire portion of your testimony
4 because it was really in order to discuss some of the
5 claims that Dr. Makhijani had made.

6 So do you want to -- I would refer to page
7 3 of our rebuttal testimony, starting with question 7.

8 MR. LOVEJOY: Excuse me, are we now going
9 back to redirect?

10 CHAIR BOLLWERK: Well, I want to make the
11 record clear. Having said that, you have the
12 opportunity to ask the questions you need to, in terms
13 of -- if you don't want them to refer to the whole
14 testimony, she can certainly do that on redirect.

15 MR. LOVEJOY: They are welcome to refer to
16 whatever they need to in responding. And I think the
17 question was one actually propounded by the Court
18 which was, essentially, to ask whether these
19 statements were essentially speculation.

20 WITNESS MAYER: There are two statements
21 in this testimony. The first is that TLI stated that
22 the overhead cost involved include the following,
23 material packaging, marking and labeling;
24 communications, vehicle tracking, vehicle maintenance,
25 driver training, security, loading and unloading of

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1 cargo, and insurance.

2 To the extent that that was provided by a
3 third party I think we can agree that that would be
4 factual.

5 The second statement, while some cost
6 estimates may be incurred independently for each
7 segment of the trip, loading and unloading, other
8 elements, such as driver training, vehicle
9 maintenance, and tracking, and insurance, should not
10 be counted twice, as these costs would be shared
11 between both segments of the trip.

12 That is an assertion that we make. It is
13 our assumption.

14 CHAIR BOLLWERK: Based on?

15 WITNESS MAYER: Our reading of that, and
16 common sense, that some of those things would not be
17 incurred twice.

18 This part of this discussion was provided
19 to discuss Dr. Makhijani's assumption that you should
20 add those two cost estimates. Which, as we have
21 described, would be inappropriate.

22 CHAIR BOLLWERK: And just for my
23 edification, the factual portion that you mentioned
24 first, those facts come from where, LES 99?

25 WITNESS MAYER: From LES 99, that is

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1 right.

2 CHAIR BOLLWERK: All right, that is fine,
3 just to make sure that the record is clear.

4 MR. LOVEJOY: But the point you make in
5 your statement, that costs should not be counted
6 twice, you don't know whether that is what Mr. Fisk
7 was thinking, do you?

8 WITNESS MAYER: Not being Mr. Fisk we
9 can't attest to what he is thinking.

10 MR. LOVEJOY: That is your assumption?

11 WITNESS MAYER: Yes.

12 MR. LOVEJOY: No further questions.

13 CHAIR BOLLWERK: All right. Let's see,
14 then, if there is any redirect. Do you have any
15 further questions, Mr. Curtiss?

16 MR. CURTISS: I will defer to the Staff.

17 CHAIR BOLLWERK: All right.

18 MS. CLARK: Go ahead.

19 MR. CURTISS: I just have one, probably
20 two questions for Mr. Johnson.

21 EXAMINATION BY MR. CURTISS OF

22 DEAN CRAIG

23 TIMOTHY JOHNSON

24 JENNIFER MAYER

25 MR. CURTISS: In understanding the basis

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1 for this cost estimate, from your perspective, was it
2 reasonable for LES to rely on a third party commercial
3 estimate from a company such as TLI?

4 WITNESS JOHNSON: Yes.

5 MR. CURTISS: And from your perspective,
6 and the review of this estimate, is there a reasonable
7 basis for the cost estimate that has been provided by
8 LES?

9 WITNESS JOHNSON: Yes. In our review we
10 felt the cost estimate was reasonable.

11 MR. CURTISS: Thank you.

12 CHAIR BOLLWERK: Any redirect?

13 MS. CLARK: Just a couple of questions.

14 EXAMINATION BY MS. CLARK OF

15 CRAIG DEAN

16 TIMOTHY JOHNSON

17 JENNIFER MAYER

18 MS. CLARK: I think we have established
19 that it was your understanding that the cost estimates
20 were provided for both legs of the trip.

21 In other words, they provided a cost for
22 transportation of UF6, for both legs, and the cost of
23 transportation of U308 for both legs, is that correct?

24 WITNESS MAYER: Yes.

25 MS. CLARK: We also know, isn't it true

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1 that this cost was broken down into various elements,
2 and these elements included insurance, did it not?

3 WITNESS MAYER: I'm not sure that I would
4 say it was broken down into those elements. I would
5 say included those elements.

6 MS. CLARK: Right, I'm sorry, thank you
7 for correcting me.

8 So it included various elements, including
9 insurance, vehicle tracking, driver training,
10 security, did it not?

11 WITNESS MAYER: Yes.

12 MS. CLARK: Now, assuming that TLI is
13 responsible for both legs of the trip, would you
14 assume that they would incur insurance costs twice,
15 once for one leg, and again for the second leg?

16 WITNESS MAYER: It would be a matter of
17 how they account for it. A driver would be insured
18 for both legs of the journey. They would incur that
19 cost, presumably, for that driver, for the entire
20 year.

21 How they allocated it between the legs
22 would be entirely up to them.

23 MS. CLARK: But if they account for
24 insurance to cover their transport of cargo, I would
25 presume that this would not be a cost that would be

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1 doubled because they are doing two legs of a trip,
2 would that be safe to assume?

3 WITNESS JOHNSON: I would expect that that
4 would be a common cost for both legs of the trip.

5 MS. CLARK: And this would apply, perhaps,
6 to other elements, such as driver training?
7 Presumably they wouldn't have to train their drivers
8 for each segment of the trip?

9 WITNESS JOHNSON: I would also expect that
10 would be a common cost.

11 MS. CLARK: And, therefore, for this
12 reason would it be safe to say that it would not make
13 sense to necessarily add the costs of the two trips as
14 if they were completely independent costs?

15 WITNESS JOHNSON: Yes.

16 MS. CLARK: Thank you. I don't have
17 anything further.

18 JUDGE ABRAMSON: Let me just ask one
19 simple question. Does it matter what would make sense
20 if what you are relying on, as I understand it, is
21 that the estimate is based on both legs?

22 So does it matter what makes sense and
23 what doesn't?

24 WITNESS JOHNSON: Well, I think the
25 estimate has to, you know, make sense when you look at

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1 it together. But --

2 JUDGE ABRAMSON: And you relied on looking
3 at what?

4 WITNESS JOHNSON: But we looked at the
5 estimate as including both legs of the trip, which was
6 confirmed by LES.

7 JUDGE ABRAMSON: And consistent with the
8 bids, the estimates you got from DOE, as I understand
9 it?

10 WITNESS JOHNSON: Yes.

11 JUDGE ABRAMSON: In fact much higher than
12 that estimate?

13 WITNESS JOHNSON: Yes.

14 JUDGE ABRAMSON: That you saw from DOE?

15 WITNESS JOHNSON: Yes.

16 JUDGE ABRAMSON: Okay.

17 JUDGE KELBER: Let me put a matter to you.
18 If I want to estimate the cost of shipping a kilogram
19 of uranium which happens first to be in the form of
20 uranium hexafluoride, ultimately to a disposal site
21 somewhere, where it happens that it will be in the
22 form of uranium oxide, U308; does it matter very much
23 if the kilogram goes out in one cylinder, and another
24 kilogram, having been generated at this deconversion
25 site, goes out from there?

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1 It is still a kilogram. I'm just asking
2 for --

3 WITNESS JOHNSON: Well, I think --

4 JUDGE KELBER: -- ultimately I want to get
5 a kilogram from A to B.

6 WITNESS JOHNSON: We are looking at the
7 prices it doesn't look like there is that much
8 difference on a kilogram basis. The differences would
9 be in the way they pack it.

10 JUDGE KELBER: Well, I'm not quarreling
11 with the averaging. I'm just saying that why I would
12 really care about the cost of shipping oxide, or
13 hexafluoride, I really want to get a kilogram from A
14 to B.

15 I may have to go through C, but that is
16 all I want to do.

17 WITNESS JOHNSON: Well, I think the
18 principal difference is the form of the waste, which
19 is uranium hexafluoride, which has to be shipped in
20 special containers.

21 JUDGE KELBER: All right, so --

22 WITNESS JOHNSON: -- the uranium oxide is
23 a fairly inert material and can be shipped in 55
24 gallon drums.

25 JUDGE KELBER: So the shipper will tell

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1 me, gee, I have to charge you a little extra for
2 transferring from the 48Y to the 55 gallon drums?

3 WITNESS JOHNSON: Well, those would be
4 part of the considerations in the cost. But looking
5 at the averages that were presented, the numbers that
6 were presented by TLI, it looks like they are both
7 fairly comparable.

8 JUDGE KELBER: Thank you.

9 WITNESS JOHNSON: On a kilogram per
10 uranium basis.

11 CHAIR BOLLWERK: All right. Any further
12 questions from any of the counsel? Mr. Lovejoy would
13 be the first one, obviously.

14 EXAMINATION BY MR. LOVEJOY OF

15 JENNIFER MAYER

16 TIMOTHY JOHNSON

17 CRAIG DEAN

18 MR. LOVEJOY: Did you understand that TLI
19 was making a bid?

20 WITNESS MAYER: TLI was providing an
21 estimate of a service it could provide.

22 MR. LOVEJOY: Thank you, that is all.

23 CHAIR BOLLWERK: Anything further from
24 either of the counsel?

25 MR. CURTISS: No.

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1 CHAIR BOLLWERK: Anything from the Board
2 at this point?

3 (No response.)

4 CHAIR BOLLWERK: All right, thank you very
5 much then for your testimony today. We appreciate your
6 service to the Board.

7 And at this point I think we are ready for
8 Dr. Makhijani. Unless we want to take a break? Let's
9 do that, then, let's take a ten minute break right
10 now, and we will come back at approximately 10:30.

11 (Whereupon, the above-entitled matter
12 went off the record at 10:20 a.m. and
13 went back on the record at 10:35 a.m.)

14 CHAIR BOLLWERK: We are back after our
15 break, and I think we are ready to hear Dr.
16 Makhijani's testimony regarding transportation cost
17 estimate.

18 MR. LOVEJOY: Dr. Makhijani, you are still
19 under oath, of course.

20 CHAIR BOLLWERK: Yes, you are. Thank you
21 for pointing that out.

22

23

24

25

1 Whereupon,

2 ARJUN MAKHIJANI

3 was called as a witness by Counsel for the Intervenor
4 and, having been previously duly sworn, assumed the
5 witness stand, was examined and testified as follows:

6 MR. LOVEJOY: Do you have the two copies
7 of your prepared direct testimony in front of you?

8 WITNESS MAKHIJANI: I've given one of them
9 already. I have one copy.

10 MR. LOVEJOY: Thank you. Is this
11 testimony, testimony you are prepared to give in this
12 case on the subject of transportation?

13 WITNESS MAKHIJANI: Yes.

14 MR. LOVEJOY: We offer this testimony for
15 admission to the record.

16 CHAIR BOLLWERK: All right. Any
17 objections?

18 (No response.)

19 CHAIR BOLLWERK: Then the revised direct
20 testimony of Dr. Makhijani in support of NIRS/PC
21 Contention EC-5, TC-2, on the transportation cost
22 estimate, is adopted, or incorporated into the record
23 as if read.

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(Whereupon, the prefiled revised direct testimony of Dr. Arjun Makhijani was bound into the transcript as if having been read.)**

**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 CONTENTION EC-5/TC-2
CONCERNING LES'S TRANSPORTATION 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) (NRC Staff Ex. 36) 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, Ph.D. 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 deconversion of the DUF₆ to a more stable chemical form, the safe disposal of the deconversion by-

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

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.

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. 190), 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?

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

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

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 DUF_6 to DU_3O_8 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 DU_3O_8 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 U_3O_8 generated from the adjacent or offsite private conversion process would be disposed at another disposal site licensed to accept this material.⁵

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.

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.

Finally, LES has stated that it will consider only the neutralization of the hydrofluoric acid generated during deconversion to form calcium fluoride (CaF₂). They have also proposed that the CaF₂ would be disposed of in the Lea County landfill as industrial waste.⁶

Q6. What is your understanding of how the LES transportation cost estimate was made?

A6. Rod Fisk from Transportation Logistics International, quoted to Rod Krich from LES the cost of transporting DUF6 and DU3O8 in an email exchange. These costs were reported as:⁷

Chemical Form	Cost per Transport	Cost per Transport
DUF6	██████ to ██████ per kg DUF6	██████ to ██████ per kg DU
DU3O8	\$██████ to \$██████ per kg DU3O8	\$██████ to \$██████ per kg DU

In a later email exchange Rod Fisk stated that the transportation costs were dominated by overhead associated with things like “material packaging, marking and labeling, communications, vehicle tracking, vehicle maintenance, driver training, security, loading and unloading of cargo, insurance, etc.” and were thus essentially independent of distance.⁸

Rod Krich then averaged the lowest value from the DUF₆ and DU₃O₈ costs to arrive at the LES estimate of \$0.85 per kg U for the transportation cost.⁹

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

⁷ Fisk 2004 (LES Ex. 98) (The costs per kilogram of uranium reported in the table were calculated from the information in the Fisk email).

⁸ Fisk 2005 (LES Ex. 99).

⁹ Krich 2005 (LES Ex. 96) Enclosure and Rod Krich Deposition August 26, 2005 (NIRS/PC Ex. 226) p. 8-14.

Q7. What criticisms do you have of how the LES transportation cost estimate was made?

A7. First, the NRC guidelines require that, at a minimum, all cost estimates be “based on documented and reasonable assumptions”¹⁰ The exchange of vague emails that contain only the costs without detailed justification is insufficient to document the assumptions made, much less determine if they are reasonable. The claim that the overhead costs dominate the costs in transit also contains no quantification beyond the statement that “time and fuel, amounts to fractions of a cent per kilogram/mile.”¹¹ This lack of documentation is made more significant by the withdrawal of Rod Fisk as an expert for LES, which means that the person who actually developed the estimates will not testify in this proceeding, leaving only the person who received the emails to discuss their meaning.

The second criticism relates to Rod Krich’s interpretation of the estimates from TLI. When the depleted uranium leaves the enrichment plant for dispositioning there are two different stages of transport that are required. The first is the transport of DUF₆ from the enrichment plant to the deconversion facility. The second is the transport of the DU_{3O₈} from the deconversion facility to the disposal site. This was readily acknowledged by Rod Krich in his deposition of August 26, 2005:

- Q Will there be transportation of DUF₆ from the enrichment plant to a deconversion plant?
- A Yes.
- Q Okay. Will there be transportation of converted or deconverted uranium in the form of U₃O₈ from a deconversion plant to a disposal site?
- A Yes.¹²

¹⁰ NUREG 1757, Vol. 3 p. 4-9 to 4-10 (NIRS/PC Ex. 249).

¹¹ Fisk 2005 (LES Ex. 99).

¹² Rod Krich Deposition August 26, 2005 (NIRS/PC Ex. 226) p. 13-14.

Given that Rod Fisk has argued that the transportation costs are effectively independent of distance due to the dominance of overhead costs, the cost of both of these transportations of the DU will be incurred for every kilogram of DU that is generated by the proposed NEF facility. Thus, instead of averaging the costs as Rod Krich did, they should be added to reflect the costs of both legs of the journey. This change would alone increase the LES transportation cost estimate to \$ [REDACTED] to \$ [REDACTED] per kg U based on the range of prices quoted by TLI. This is not a minor change, and would alone add \$111 to 148 million to the LES financial assurance assuming 133,000 metric tons of DU is generated by the proposed NEF.

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**Curriculum Vita of
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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
Economic and Social Commission for Asia and the Pacific
United Nations Development Programme

Languages: English, French, Hindi, Sindhi, and Marathi.

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(Newsletter, newspaper articles, excerpts from publications reprinted in books and magazines or adapted therein, and other similar publications are not listed below)

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- Principal author of three chapters in Schwartz, S., ed., *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940*, Brookings Institution, Washington, D.C., 1998.
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Institute for Energy and Environmental Research, *Lower Bound for Cesium-137 Releases from the Sodium Burn Pit at the Santa Susana Field Laboratory*, IEER, Takoma Park, Maryland, January 13, 2005.
(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.
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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 Contention EC-5/TC-2 concerning LES's Transportation Cost Estimate was served by expedited delivery upon the following:

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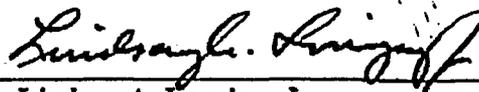
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1 MR. LOVEJOY: You also have in front of
2 you the prepared rebuttal testimony on the
3 transportation issues?

4 WITNESS MAKHIJANI: Yes.

5 MR. LOVEJOY: Is this testimony that you
6 are prepared to give under oath, in this matter, on
7 transportation?

8 WITNESS MAKHIJANI: Yes.

9 MR. LOVEJOY: Thank you. We offer this
10 testimony to be admitted into the record.

11 CHAIR BOLLWERK: All right. Any
12 objections?

13 (No response.)

14 CHAIR BOLLWERK: Then the revised rebuttal
15 testimony of Dr. Makhijani concerning LES'
16 transportation cost estimate is adopted into the
17 record as if read.

18 (Whereupon, the prefiled revised rebuttal
19 testimony of Dr. Makhijani was bound into the record
20 as if having been read.)**

21

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24

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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 CONTENTION EC-5/TC-2
CONCERNING LES'S TRANSPORTATION 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 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 transportation cost 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 development of the LES cost estimate for transportation of depleted uranium, 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 was as follows:

A12. I computed the average of the two lower-end cost values provided by TLI [Transportation Logistics International], i.e., the \$ [REDACTED] per kg for DUF_6 and \$ [REDACTED] per kg for DU_3O_8 . I found this to be a reasonable approach in view of Mr. Fisk's characterization of the TLI-supplied cost figures as "very conservative."¹

A15. ... LES used the information obtained from that vendor [TLI] in a reasonable and fully transparent manner.²

The testimony of interest from Timothy Johnson, Jennifer Mayer, and Craig Dean was as follows:

Q.5. Has LES provided a basis for its estimate of transportation of the DU for conversion and disposal (\$0.85/kgU)?

A.5. (TJ, JM, CD) Yes. *The transportation cost includes the cost of both shipping the DUF_6 from the NEF to the conversion facility and then transporting the U_3O_8 from the conversion facility to the disposal site.* The cost was based on an estimate from a transportation company, Transportation Logistics International (TLI). TLI provided two ranges of estimates – one for DUF_6 and one for oxides and represented the quote as being very conservative.

¹ LES Transportation 2005 p. 6.

² LES Transportation 2005 p. 7.

Of these, *LES used the average of the lower range estimate for each material, after converting the cost to \$/kgU.*³

Q3. Given the witness testimony cited above, what conclusions have you drawn regarding the reasonableness and credibility of the LES transportation estimate?

A3. I have concluded that the use of the TLI cost estimate presented by LES was neither “reasonable” nor “fully transparent.” As I stated in my direct testimony, the cost of transportation must include both the cost of transporting the DUF6 from the enrichment plant to the deconversion plant as well as the cost of transporting the DU3O8 from the deconversion plant to the disposal site. This was also the conclusion stated by the NRC staff in the first part of their answer cited above. However, Rod Krich averaged the costs of transporting the DUF6 and DU3O8 instead of adding them. The fact that the witnesses for the NRC Staff could, in the very same paragraph, testify that the cost of transporting both the DUF6 and DU3O8 need to be included and then turn around and accept the use of the average cost of one leg rather than the total cost of both legs implies a lack of understanding of the LES cost estimate on the part of the NRC Staff witnesses Timothy Johnson, Jennifer Mayer, and Craig Dean.

Q4. 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?

³ NRC Transportation 2005 p. 3-4 (emphasis added).

A4. 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.

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.⁴



⁴ Makhijani and Smith 2004 (NIRS/PC Ex. 190) p. 51.

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).

Q5. Does this conclude your testimony for today?

A5. Yes.

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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 Contention EC-5/TC-2 concerning LES's Transportation Cost Estimate was served by expedited delivery upon the following:

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1 MR. LOVEJOY: We can clean up any missing
2 exhibits later but I did -- I believe I identified
3 exhibit 242 in the previous cross examination, and I'm
4 afraid my notes are not so good as to tell me whether
5 I --

6 CHAIR BOLLWERK: Hold on one second, here,
7 maybe I can help you out.

8 JUDGE KELBER: Exhibit 242 is admitted.

9 CHAIR BOLLWERK: Yes, 242 has been
10 admitted already.

11 MR. LOVEJOY: Thank you.

12 CHAIR BOLLWERK: It is in.

13 MR. LOVEJOY: I don't think there are any
14 individual -- any separate --

15 CHAIR BOLLWERK: Hold on one second. I
16 think the only one I have listed here, potentially, is
17 exhibit 226. Do the parties want to check that as
18 well?

19 MR. LOVEJOY: Excuse me, yes. We offer
20 exhibit 226 in support of this testimony.

21 CHAIR BOLLWERK: All right, exhibit 226 is
22 a deposition of Rod Krich, dated August 26th, 2005,
23 marked proprietary and it will be identified for the
24 record.

25

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1 (Whereupon, the above-
2 referenced to document was
3 marked as NIRS/PC Exhibit No.
4 226 for identification.)

5 CHAIR BOLLWERK: Any objections?

6 (No response.)

7 CHAIR BOLLWERK: Hearing no objections,
8 then, exhibit 226 is admitted.

9 (The document referred to,
10 having been previously marked
11 for identification as NIRS/PC
12 Exhibit No. 226 was admitted in
13 evidence.)

14 MR. LOVEJOY: I tender the witness for
15 cross examination.

16 CHAIR BOLLWERK: The witness is available.
17 Let's see, Mr. Curtiss, I guess you are first.

18 MR. CURTISS: Thank you, Mr. Chairman.

19 EXAMINATION BY MR. CURTISS OF

20 ARJUN MAKHIJANI

21 MR. CURTISS: Dr. Makhijani, are you an
22 expert in transportation costs?

23 WITNESS MAKHIJANI: Not in this context.
24 I have reviewed the testimony and provided my opinion
25 about what needs to be done to calculate the costs.

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1 MR. CURTISS: Outside of this proceeding
2 have you --

3 WITNESS MAKHIJANI: No less than Mr.
4 Krich, certainly.

5 MR. CURTISS: Thank you. Outside of this
6 proceeding have you had any experience in preparing
7 transportation cost estimates?

8 WITNESS MAKHIJANI: Well, I have examined
9 the question of transportation, extensively, for many
10 years in the context of energy, and energy policy, so
11 I'm quite familiar with transportation questions in
12 that context.

13 I don't believe I have testified in the
14 context of movement of nuclear shipments. I have
15 looked at transportation questions in regard to spent
16 fuel transportation, from time to time, and so on.

17 MR. CURTISS: I have --

18 WITNESS MAKHIJANI: I don't believe I have
19 offered testimony about it.

20 MR. CURTISS: I have a more specific
21 question. Do you have any experience in preparing
22 transportation cost estimates?

23 WITNESS MAKHIJANI: Well, I don't believe
24 I have ever prepared estimates like this myself, no.

25 MR. CURTISS: Are you familiar with the

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1 company that LES relied on for its transportation cost
2 estimate, Transportation Logistics International, or
3 TLI?

4 WITNESS MAKHIJANI: Other than what has
5 been said in this record, and testimony, no. But I
6 understand that they routinely transport.

7 MR. CURTISS: Independent of the testimony
8 in this proceeding, do you have any basis for knowing
9 what their qualifications or expertise is, their
10 experience in the area of transportation of nuclear
11 materials?

12 WITNESS MAKHIJANI: No, I accepted it at
13 face value, so I didn't investigate it. I could have,
14 but I thought it likely to be okay, so I didn't pursue
15 the investigation.

16 MR. CURTISS: So it would be plausible to
17 rely on a company like TLI, you don't have any dispute
18 with respect to LES' reliance on TLI?

19 WITNESS MAKHIJANI: No.

20 MR. CURTISS: Could I refer you to your
21 rebuttal testimony, please? Do you have that before
22 you?

23 WITNESS MAKHIJANI: Yes.

24 MR. CURTISS: I'm looking at page 4 of
25 your rebuttal testimony.

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1 WITNESS MAKHIJANI: Yes.

2 MR. CURTISS: Do you see the table at the
3 bottom of page 4?

4 WITNESS MAKHIJANI: Yes.

5 MR. CURTISS: You have a line item there,
6 deconversion to U308, transportation and storage.

7 WITNESS MAKHIJANI: Yes.

8 MR. CURTISS: And in both columns you've
9 identified the cost estimate as 7 dollars and 10
10 cents?

11 WITNESS MAKHIJANI: Yes.

12 MR. CURTISS: You've conflated those three
13 topics, deconversion, transportation storage. Can you
14 tell me what the transportation component is, insofar
15 as the cost of that component?

16 WITNESS MAKHIJANI: Well, I can tell you
17 the cost of transportation and storage are separately
18 from the cost of deconversion. This comes from, of
19 course, the report, if I might refer to my November
20 report?

21 MR. LOVEJOY: It is exhibit 190.

22 WITNESS MAKHIJANI: Sorry?

23 MR. LOVEJOY: Exhibit 190.

24 WITNESS MAKHIJANI: NIRS/PC 190?

25 MR. LOVEJOY: Yes.

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1 JUDGE KELBER: Excuse me, what number is
2 that?

3 MR. LOVEJOY: It is NIRS/PC 190.

4 WITNESS MAKHIJANI: At the end of the
5 report, exhibit 190, that Dr. Smith and I prepared and
6 submitted in November 2004, let me just find the
7 table, excuse me.

8 On page 51 there is a table 9, which is
9 abbreviated as conversion and storage. But since it
10 does include transportation since the storage is not
11 in the same location as the deconversion plant, the
12 storage is in Holland, and the deconversion plant is
13 in France.

14 And the contract between Urenco and
15 Cogema, for the entire service of UF6 transportation
16 to Pierrelatte deconversion, and transportation back
17 and storage, is at that stated price of [REDACTED]
18 [REDACTED], I believe it was [REDACTED]

19 MR. CURTISS: I see the table here, and
20 maybe you can help me --

21 WITNESS MAKHIJANI: I'm just trying to
22 remember. This is in dollars, I believe that contract
23 is [REDACTED], if I remember
24 correctly is for the deconversion and the rest of it
25 is for the transportation and storage.

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MR. CURTISS: I understand. And I think on page 4 of your testimony, the double asterisked footnote indicates that that is the source of your 7 dollar and 10 cent estimate.

WITNESS MAKHIJANI: Yes.

MR. CURTISS: And I'm asking if you can deconflate that estimate and tell me what the transportation component is?

WITNESS MAKHIJANI: Well, I can tell you what the transportation, both legs, and storage component is.

MR. CURTISS: For transportation and storage?

WITNESS MAKHIJANI: For transportation in both legs, and storage. And I don't know what the breakdown is between transportation and storage. But total is about ■ dollars.

MR. CURTISS: Do you have an independent basis for knowing what the transportation cost estimate is, specifically, here?

WITNESS MAKHIJANI: No, I don't have a

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1 breakout of that █ dollars.

2 MR. CURTISS: Okay, I don't have --

3 WITNESS MAKHIJANI: I know it is a lot
4 more than the transportation cost estimate that I
5 believe should be used in this case, which is 1.70,
6 I would have to look at my testimony. Something like
7 that.

8 MR. CURTISS: I don't have any further
9 questions of this witness.

10 CHAIR BOLLWERK: All right, let me see if
11 the Staff has any questions.

12 MS. CLARK: I have no questions.

13 CHAIR BOLLWERK: Any redirect?

14 MR. LOVEJOY: Just a couple of things.

15 EXAMINATION BY MR. LOVEJOY OF

16 ARJUN MAKHIJANI

17 MR. LOVEJOY: Dr. Makhijani, as you
18 understand the plan for the operations of tails
19 disposal from the National Enrichment Facility, is it
20 the --

21 CHAIR BOLLWERK: Well, just one second, we
22 are trying to find the table, sorry.

23 (Pause.)

24 CHAIR BOLLWERK: All right, I'm sorry,
25 please.

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1 MR. LOVEJOY: As you understand the plan
2 for tails disposal from the National Enrichment
3 Facility, are there two shipments to be carried out
4 with respect to any depleted uranium?

5 WITNESS MAKHIJANI: Yes, I actually --
6 there is not two legs of one trip, like pulling over
7 on a truck stop, or something. It is two completely
8 different shipments, and in two different trucks, that
9 are of different types, and that would have to have
10 two separate insurance policies for the two trucks,
11 because they are different trucks, there are different
12 arrangements, one is a flat bed truck, as has been
13 said, the other carries 55 gallon drums.

14 I would think that somebody that is
15 carrying the UF6, which is a lot more hazardous, in
16 shipment should at least be trained more, unless there
17 is a lot of training, extra training provided that may
18 not be necessary to the driver of a grout shipment, or
19 a powder shipment.

20 They also take place at quite different
21 times, if you track a kilogram of uranium. So they
22 are two completely different shipments of different
23 materials, at different times, in different trucks,
24 that have to be differently insured.

25 And so I think that those costs have to be

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1 added up. One shipment, and since the shipments are
2 independent, costs are independent of distance, you
3 have to take one shipment, and we have the numbers for
4 those, provided by the shipper, whose qualifications
5 I don't dispute.

6 And there is another shipment, and you
7 have to add them up. I drew a little diagram just to
8 make sure I was understanding the thing right. And I
9 don't know if you want to introduce my art into
10 evidence, I wouldn't recommend it.

11 JUDGE ABRAMSON: I think we understand
12 your proposition.

13 WITNESS MAKHIJANI: Yes, thank you.

14 MR. LOVEJOY: Have you looked at how costs
15 of shipment have been estimated with respect to the
16 cost estimate for DOE, deconversion and disposal?

17 WITNESS MAKHIJANI: Yes, I just actually
18 reviewed those here, since it came up in the
19 testimony. And I noted that in the DOE cost estimate,
20 I guess it is LES exhibit 86 --

21 MR. LOVEJOY: It is 86 or 87, I'm not
22 sure.

23 WITNESS MAKHIJANI: It says 86 on your
24 copy. Let me get the actual exhibit so I'm sure that
25 I refer to the right one. I don't have the LES

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1 exhibits with me. I believe it is LES Exhibit 86.

2 MR. LOVEJOY: Okay, what did you find?

3 WITNESS MAKHIJANI: On page 2-4, I'm not
4 talking about the amount of cost, but I know that
5 there is a line item that says transportation to
6 Paducah.

7 That's a separate line item. So that's
8 the first trip in that flatbed truck where the
9 cylinder is to be transported. And I think I can make
10 an educated guess that that truck would actually go
11 back because the cost would dramatically estimate if
12 you dump the truck every time you made a shipment.

13 Both trucks would be reused, I think.
14 Then I noted in the other NIRS exhibit -- no LES
15 Exhibit 87, there is the reconciliation or explanation
16 of difference between the DOE and the LES cost.

17 And on page 13 of that I note that DOE is
18 -- a line item cost of transportation of DU308 to
19 Envirocare is included in the DOE cost estimate as a
20 minus ■ item of difference between DOE and LES, which
21 is a separate shipment.

22 So as I read these documents, clearly
23 there are two separate shipments that are accounted
24 for with two different costs. They may be added up,
25 which is what I recommend be done if you want a total

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1 cost.

2 But I actually -- I am very puzzled by the
3 utter clarity and conviction on both sides of this
4 debate because I think it really was a mistake to
5 average these things.

6 And that mistake should be corrected.
7 This is a matter that's extremely straightforward.
8 These -- the letter that was provided subsequently in
9 October, if I might borrow your phrase, Your Honor, is
10 Monday morning quarterbacking from a potential vendor
11 to a potential client.

12 I think that the original costs that were
13 offered are very clear. They're also more or less in
14 line with the European costs where round trip plus
15 storage is about [REDACTED] dollars and some fraction of
16 that.

17 And I don't know what fraction, but there
18 -- if the transportation cost -- let me step back. If
19 the transportation cost calculated, as I suggest, had
20 been five dollars, and more than what the Dutch are
21 paying Cogema for the two legs plus storage, you'd say
22 well stop.

23 This is -- this real world experience that
24 says you ship from Holland to France and back, we know
25 it's independent of distance. We accept that.

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1 There's something wrong with adding it up, and
2 probably there was some confusion in the way the
3 original estimate was offered.

4 But I would suggest that the on the ground
5 costs that are happening routinely in this kind of
6 enterprise for transportation, two legs plus storage,
7 are about [REDACTED] dollars.

8 And what -- and the original material
9 submitted by the shipper is very clear. DUF6 cost of
10 shipment, U308 cost of shipment, the separate trucks,
11 separate drivers, separate times, separate forms, I do
12 not see what the confusion is.

13 For me this is an absolutely clear matter
14 that there should not have been any debate about.
15 There was an error -- on my institute's website on the
16 home page.

17 We all make mistakes. It's not mistake
18 proof, but I think this mistake should be corrected
19 and not be allowed -- that's a hundred million dollar
20 doodle on Mr. Krich's page and that should not be
21 allowed to stay there.

22 JUDGE KELBER: May I -- in this context of
23 getting the uranium to the disposal site, I note that
24 in the table you referred to in the -- what is the
25 exhibit number?

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1 JUDGE ABRAMSON: On table 2-4?

2 JUDGE KELBER: Yes, well --

3 JUDGE ABRAMSON: Table 2-2?

4 JUDGE KELBER: I think it was -- no, it
5 doesn't matter. I note that the unit is always
6 kilograms of uranium.

7 WITNESS MAKHIJANI: Yes.

8 JUDGE KELBER: In this context is uranium
9 fungible?

10 WITNESS MAKHIJANI: Depleted uranium, I
11 would imagine, wouldn't be, since it's a waste
12 material.

13 JUDGE KELBER: It is fungible. So I'm
14 shipping some depleted uranium from A to B via an
15 intermediate stop, and I'm shipping it one time in one
16 form and then one time in another form.

17 And at the intermediate stop I get a
18 charge for transforming it. But the fact is that it's
19 just going from A to B. It's a fungible quantity. If
20 I send a kilogram of uranium to the intermediate stop
21 and another kilogram of uranium from the intermediate
22 stop to B, does it make any difference to me? No.
23 Does it?

24 WITNESS MAKHIJANI: Your Honor, that --
25 I'm not understanding your question. There are three

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1 points involved, not two. There's an A, B, and a C.

2 JUDGE KELBER: All right.

3 WITNESS MAKHIJANI: There's a shipment
4 from A to B, as I understand it, Your Honor, and I'm
5 certainly happy to be corrected here, in one type of
6 truck.

7 And then it's -- B is not a stop, it's a
8 processing center where the uranium is actually
9 transformed.

10 JUDGE KELBER: I understand this.

11 WITNESS MAKHIJANI: Right.

12 JUDGE KELBER: But I'm asking you is the
13 -- if the uranium is a fungible quantity does it
14 matter what happens to a particular kilogram of
15 uranium at the processing center? Isn't it what
16 matters is that ultimately a kilogram of uranium goes
17 from the origin to it's final disposition?

18 WITNESS MAKHIJANI: Yes, ultimately that
19 is what matters. In this particular case --

20 JUDGE KELBER: Okay, that's all I wanted
21 to hear, thank you.

22 WITNESS MAKHIJANI: Well, might I provide
23 an answer to what I think was a question --

24 JUDGE KELBER: No.

25 WITNESS MAKHIJANI: -- or an implication?

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1 JUDGE KELBER: You've given me the answer.

2 WITNESS MAKHIJANI: I don't know what I've
3 given you. I'm -- because I don't want to argue with
4 you, Your Honor, but at least --

5 JUDGE KELBER: Go ahead, complete the --

6 WITNESS MAKHIJANI: Yes, thank you very
7 much, because I ought to be able to understand what I
8 said, because your question in the manner that it was
9 posed was not clear to me.

10 The -- what I want to say in regard to
11 your question is that if the shipper is asked for an
12 estimate of what it would take to ship it from A to B
13 to C and to provide a total estimate, and he gave a
14 total estimate, that would be easily understandable.

15 In this case the shipper, in my opinion,
16 has give a cost from A to B and B to C, and said it's
17 independent costs are per shipment and they're
18 independent of distance.

19 And I think that is very, very clear, to
20 me anyway. And so this question of whether it's
21 fungible and ultimately it has to go to disposal is
22 not, in my opinion, relevant.

23 It's the number of shipments that you have
24 to make and the number of times you incur this cost.

25 JUDGE ABRAMSON: So how do you take, Dr.

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1 Makhijani, the -- how do you interpret the October
2 letter from the shipper when he describes the -- that
3 it's appropriate to average? What does that tell you?

4 WITNESS MAKHIJANI: Well, I have given my
5 opinion, and I am dismayed that the one person who has
6 been said to be a transportation expert is not here to
7 represent his own.

8 And I question why he is not here and has
9 not been deposed, as I understand. Is that correct,
10 Mr. Lovejoy, he has not been deposed?

11 MR. LOVEJOY: He has not been deposed --

12 WITNESS MAKHIJANI: And did not appear for
13 deposition. And I question how this kind of evidence
14 can be admitted as a legitimate evidence in the record
15 when what appears to be a change in the meaning of
16 cost estimates provided o the tune of 100 million
17 dollars is being second guessed in regard to the
18 transportation expert without any opportunity to
19 examine that expert's views.

20 JUDGE ABRAMSON: But did you think the
21 second letter was unclear, the October --

22 WITNESS MAKHIJANI: No, I didn't think the
23 second letter was unclear. I did -- to borrow your
24 phrase, Your Honor --

25 JUDGE ABRAMSON: I'm sorry.

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1 WITNESS MAKHIJANI: Yes.

2 JUDGE ABRAMSON: Do you think there's any
3 different evidentiary value in the earlier e-mail
4 correspondences than there is in this last one?

5 WITNESS MAKHIJANI: Absolutely. I think
6 the earlier e-mail correspondences are very clear.
7 There's a shipment cost for DUF6 --

8 JUDGE ABRAMSON: Okay, I understand.

9 WITNESS MAKHIJANI: -- and a shipment cost
10 for --

11 JUDGE ABRAMSON: So you think that he
12 doesn't need to be deposed on the first one but he
13 does need to be deposed on the last one? Is that what
14 --

15 WITNESS MAKHIJANI: Well I think he needs
16 to be deposed on the whole thing,

17 JUDGE ABRAMSON: Okay.

18 WITNESS MAKHIJANI: and on the change of
19 heart he had.

20 JUDGE ABRAMSON: I understand. Let me
21 move on for a minute. You referred to Exhibit 2- --
22 table 2-2 and LES Exhibit 86, which was a DOE cost
23 estimate.

24 Can I bring you back to that for a minute
25 because you said there's a line item there for

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1 transportation to Paducah. And nobody doubts that
2 there are two legs of transportation here, by the way,
3 and we understand that -- the question you're raising.

4 As -- when I'm reading that table am I
5 misreading this to say that DOE's estimate of
6 transportation to Paducah is [REDACTED] cents per kilogram?

7 WITNESS MAKHIJANI: That is DOE's
8 estimate, but I'm not allowed to offer my opinion on
9 what I think of DOE's estimates.

10 JUDGE ABRAMSON: Whether that's a good
11 estimate or not.

12 WITNESS MAKHIJANI: Because that has all
13 been deleted from my testimony.

14 JUDGE ABRAMSON: We understand that. But
15 so they're saying [REDACTED] cents a kilogram to get it to
16 Paducah. And then back on Exhibit 87 you referred to
17 table 2, which was the reconciliation table.

18 WITNESS MAKHIJANI: Yes, Your Honor.

19 JUDGE ABRAMSON: And hear the transport,
20 the number they've assigned to it is [REDACTED] cents a
21 kilogram or [REDACTED] -- original was [REDACTED] cents a kilogram.
22 I'm not sure which of those numbers is relevant, or
23 even the [REDACTED] cents a kilogram that I see in there as a
24 new transportation number, but all those numbers, even
25 if I take the [REDACTED] and add the [REDACTED] I'm looking at [REDACTED]

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1 cents a kilogram.

2 Those would seem to me to be quite
3 disparate from the numbers you're referring to as
4 appropriate transportation costs in Europe. Is it
5 just because you think DOE's off the mark?

6 WITNESS MAKHIJANI: Well, the Department
7 of Energy track record in costs is truly lamentable.

8 JUDGE ABRAMSON: Let's not go into --

9 WITNESS MAKHIJANI: This is not even,
10 since you asked me, Your Honor, I do feel I should
11 respond since there is a great difference between what
12 I said and what you've offered as possibly reasonable.

13 JUDGE ABRAMSON: I'm just asking you
14 whether you think the DOE numbers are off the mark.

15 WITNESS MAKHIJANI: This is not even a DOE
16 budget estimate. This is simply a study that was done
17 and not offered as a contract or -- and from the DOE
18 I don't -- I have said earlier that from the DOE even
19 a contract wouldn't be good enough.

20 And you can ask your neighboring utility,
21 nuclear utility, whether a contract with the DOE is
22 worth anything without going to court.

23 JUDGE ABRAMSON: We appreciate fully your
24 concern about DOE. But so you're saying that you have
25 not much confidence in these DOE numbers.

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1 WITNESS MAKHIJANI: This would be a polite
2 way to put it, Your Honor.

3 JUDGE ABRAMSON: They did, they did.

4 CHAIR BOLLWERK: The Staff, as I recall
5 offered an explanation. They thought that the
6 estimate was based in part, whether large part or
7 small part, on rail transportation. Does that have
8 anything to do with this?

9 WITNESS MAKHIJANI: Possibly. They
10 haven't included possibly the cost of this famous rail
11 spur that was alluded to earlier. Where this plant
12 would be is unknown.

13 We know where it would go, but I think
14 transportation is from one point to another. And if
15 it's unknown whether there's rail there, we don't know
16 where it's going to be built, it would be rather
17 remarkable to come up with a precise estimate of [REDACTED]
18 cents if you don't know -- you know, whether there's
19 railroad there or not.

20 JUDGE ABRAMSON: Okay, that's all I have,
21 I think. Charlie?

22 JUDGE KELBER: No.

23 CHAIR BOLLWERK: I think -- we've actually
24 started here originally with some questions from Mr.
25 Lovejoy. Let's see if he has any others.

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1 MR. LOVEJOY: I have no further questions
2 of this witness.

3 CHAIR BOLLWERK: All right. Let me see.
4 We'll turn back to the other two parties and see if
5 either of them have anything they want to ask this
6 witness.

7 MR. CURTISS: I do, but I'll defer to the
8 Staff if you'd like to --

9 MS. CLARK: I have nothing further at this
10 time.

11 MR. CURTISS: I must say I'm struck by the
12 breadth of the opinions expressed by this witness in
13 light of the acknowledgement at the outset that he has
14 no expertise in transportation cost estimates.

15 In fact I'm so struck I'm inclined to
16 suggest that the entire testimony be stricken, but you
17 can afford it the weight here that it deserves. The
18 testimony on insurance rates and trucking and all of
19 the testimony we've hear, as I say, I'm struck about
20 the testimony in light of the lack of any expertise
21 that this witness has.

22 And I would have left it at that. But
23 there are a couple of scurrilous charges that have
24 been made here, one of which is that Mr. Fisk was not
25 deposed.

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1 And the fact of the matter is he was made
2 available for a deposition on October 4th, 2004. And
3 he was in fact deposed. And he could have been called
4 subsequent to that in light of any e-mails that the
5 parties desired to pursue.

6 WITNESS MAKHIJANI: I apologize for that
7 before you proceed.

8 MR. CURTISS: Okay, thank you.

9 WITNESS MAKHIJANI: I apologize. This was
10 an error on my part, and I certainly withdraw the
11 statement. I was -- it's definitely -- if he was
12 deposed it's an error on my part.

13 MR. CURTISS: Thank you for the
14 clarification. I would also say --

15 WITNESS MAKHIJANI: I apologize.

16 MR. CURTISS: I would also say that the
17 charge that the Fisk letter, which is Exhibit 110,
18 constituted Monday morning quarterbacking completely
19 ignores the testimony that was delivered by the
20 witness for LES that the discussion took place between
21 Mr. Fisk and Mr. Krich.

22 And the initial understanding of both of
23 those parties was that it was appropriate to average
24 those costs. And it was only upon the rather
25 confusing statement in the testimony that arrived in

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1 the direct pre-filed testimony that we thought it
2 appropriate to secure additional clarification.

3 So I haven't any further questions for
4 this witness, but I did want to clarify the record.

5 MR. LOVEJOY: May I --

6 CHAIR BOLLWERK: Yes.

7 MR. LOVEJOY: -- speak to some of that?

8 CHAIR BOLLWERK: Yes.

9 MR. LOVEJOY: I think the record already
10 indicates Mr. Fisk was deposed in October of 2004
11 before any of these cost estimates emerged. He was
12 deposed at that time.

13 He was testifying in support of some cost
14 figures in the Lawrence Livermore report which are not
15 an issue here. So the cost estimates came well after
16 the deposition.

17 And he actually -- I believe his
18 deposition was scheduled -- or he was at least
19 announced as an expert in this phase of the
20 proceedings and then withdrawn.

21 WITNESS MAKHIJANI: Mr. Lovejoy, if I
22 might, then. Your Honor, this is very confusing for
23 me because it was my understanding that there was no
24 testimony from Mr. Fisk.

25 And what I meant to say during my

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1 testimony was I as not aware of any testimony from Mr.
2 Fisk about the topic on which I was testifying. So I
3 guess I do not stand corrected on that point.

4 There is no testimony from Mr. Fisk on
5 that point, and I think there ought to be.

6 CHAIR BOLLWERK: All right.

7 MR. CURTISS: I will close the comment
8 here and we can just move on.

9 CHAIR BOLLWERK: All right.

10 MR. CURTISS: I would say that the
11 testimony of Mr. Fisk on deposition was that the
12 initial estimate included in the application from the
13 Lawrence Livermore National Lab, which happened to be
14 lower than the estimates that this witness is
15 proffering for transportation, were highly
16 conservative and not realistic of the lower commercial
17 rates that are obtained today.

18 And secondly, as I think the Staff witness
19 clarified and is certainly LES's view, and as
20 reflected in this Board's rulings and the Commission
21 rulings, we're certainly entitled to rely on the
22 independent commercial estimates of third parties.

23 And this witness has not spoken to the
24 lack of qualifications or expertise or experience of
25 TLI. So I have nothing further.

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1 CHAIR BOLLWERK: All right. Mr. Lovejoy,
2 anything further?

3 MR. LOVEJOY: Nothing further.

4 CHAIR BOLLWERK: Anything from either the
5 Board members or the Staff? Are there any other Board
6 members?

7 (No verbal response.)

8 CHAIR BOLLWERK: No? All right then. I
9 believe, Dr. Makhijani, we complete your testimony on
10 transportation. We appreciate your service to the
11 Board and we will be seeing you again.

12 WITNESS MAKHIJANI: Sorry the small point
13 of contention there.

14 CHAIR BOLLWERK: That's not a problem. I
15 think unless any of the parties see a need to take a
16 break we'll go ahead and move into the argument on the
17 motions that were filed, and then I suspect once that
18 is done we will take our lunch break and come back
19 this afternoon and start with disposal.

20 (Pause.)

21 CHAIR BOLLWERK: All right. Since this is
22 an LES motion, we'll allow you all to speak first.

23 MR. REPKA: Judge Bollwerk, were you
24 referring to LES?

25 CHAIR BOLLWERK: Yes, I'm sorry, yes.

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1 Whoever is going to present the argument this would be
2 the time, from LES.

3 MR. REPKA: Our motion is it's clear on
4 the face of it it's a direct response to the
5 Commission's order in CLI 05-20. And in general I
6 would characterize it as having two pieces.

7 The first part of the motion is the --
8 what I'll call the footnote 48 motion. And it relates
9 to any challenge -- any contention or testimony that
10 would challenge the draft Environmental Impact
11 Statement based on the dose analysis -- related to the
12 dose analysis of impacts of deep geological disposal,
13 or the so-called mine option.

14 Our bases for that are laid out in the
15 motion, and I won't repeat them all here. But to make
16 a long story short it's essentially a mootness
17 argument, because the original contention asserted
18 that the DEIS was inadequate in that it did not state
19 the parameters and the models used in the deep
20 geological repository analysis.

21 That has been cured in the FEIS. That
22 issue has been explained by the Staff in response to
23 interrogatories, and as reflected in the Commission's
24 footnote is essentially moot.

25 In addition, as the Commission also

1 intimated in footnote 48, there is a timeliness
2 component to that argument as well, because any
3 subsequent or new challenge to those issues would be
4 late because they could have been based on the
5 original LES Environmental Report which clearly
6 identified the Claibourne analysis as the basis for
7 LES's analysis at that time of the geological disposal
8 option.

9 So that's the first part of the motion,
10 the footnote 48 motion. The second part of the motion
11 is what I'll call the footnote 52 motion. And that
12 relates to any contention, basis, or testimony that
13 would relate to the substance of the Department of
14 Energy PEIS related to radiological dose estimates.

15 Those were in fact referenced in the LES
16 Environmental Report. And at this point our argument
17 is, as the Commission suggested in footnote 52 that
18 any challenge at this point is essentially waived.

19 It's untimely because those challenges
20 could have been based upon the LES Environmental
21 Report. I would characterize this part of the motion
22 as largely a defensive one in terms of the scope of
23 the proceeding and the scope of the evidence in the
24 discussions were about to have on the disposal issue.

25 I would characterize there has been a

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1 penchant in the past in this proceeding for arguments
2 and testimony to recycle continuously. And our point
3 is some of the bases that appear in the February
4 amended contentions relate to the substance of the
5 PEIS calculations.

6 And we don't think that that's what the
7 Commission -- the issue that the Commission remanded
8 in CLI 05-20. Our point is that the issue in this
9 proceeding on disposal should be whether the dose
10 analyses in the PEIS and elsewhere are representative
11 or sufficient from a NEPA perspective to -- with
12 respect to the disposal options that are currently on
13 the table.

14 And as we've explained before the deep
15 geological repository option is not on the table. And
16 the issue now is whether or not the doses in the PEIS
17 are representative or bounding relative to what
18 actually being proposed.

19 On Monday in ruling on the motions in
20 limine in this case, the Board talked about the issues
21 in it's decision as to what's in the scope of the
22 disposal contention.

23 And I'll refer to transcript 1818 through
24 1819, in which Judge Bollwerk explains the ruling on
25 the motions in limine. In fact in the transcript it

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1 appears to be incorrectly attributed to Mr. Lovejoy.

2 But after that discussion, the Board
3 concludes in our estimation what we would like to hear
4 from the parties is an analysis of is the DEIS
5 sufficient given the large quantities at issue here.

6 That's the central issue in the Board's
7 estimation. Also in addressing that issue we think
8 that it may be necessary to have additional argument
9 or testimony on whether the reference studies
10 adequately bound what can be expected from the
11 quantity of DU anticipated under the LES application.

12 So that's the issue. Whether the analyses
13 of record are adequately bounding given the quantities
14 and concentrations at issue for LES, not whether the
15 assumptions, the modeling techniques in the PEIS are
16 valid, accurate, or should be second guessed.

17 And that's the basis of our motion, that
18 a number of the bases in the February amended
19 contention really relate to -- go beyond the scope of
20 the issue of bounding or sufficiency from a NEPA
21 perspective.

22 JUDGE ABRAMSON: Let me ask you Counselor,
23 of we're in agreement that what's at issue, what's
24 been remanded to us, is a question of whether the EIS,
25 the FEIS, takes a sufficient hard look, and -- on the

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1 NEPA side, and whether or not therefore this -- these
2 environmental impact analyses are bounding.

3 What is the relevance to examining that of
4 whether or not something was addressed in the ER?
5 Help me get to that. Is it that if it was addressed
6 in the ER it needed to be challenged under it's
7 untimely, or is that where you're --

8 MR. REPKA: That's precisely right, Judge
9 Abramson. The point is the Programmatic Environmental
10 Impact Statement was referenced in the ER and so to
11 the extent that there was a challenge to the bases for
12 the PEIS, it could have and should have been raised at
13 that time.

14 JUDGE ABRAMSON: Okay, so let's take the
15 next step. Kindly show us precisely where in the ER
16 these studies were referenced and how they were used,
17 and then we can try to understand whether that's
18 linearly extrapolated or incorporated in the EIS or
19 not.

20 MR. REPKA: Okay, that's going to take us
21 a minute to pull out --

22 JUDGE ABRAMSON: I understand it's going
23 to take a minute. But I don't see how we get there if
24 the claim as it was addressed in the ER -- let's see.
25 Well let's see -- yes. I don't mind. If the Staff

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1 wants to say something about this while they're trying
2 to find the spots.

3 MR. REPKA: Or would you prefer we wait?

4 CHAIR BOLLWERK: I don't know how long
5 it's going to take them. We can wait until they've
6 found it or we can turn to you all. If other than
7 this point you're finished with your presentation --

8 MR. REPKA: Yes, I have nothing more to
9 say other than respond to the question.

10 CHAIR BOLLWERK: All right.

11 MS. CLARK: I just wanted to ask my expert
12 one question. So just a couple moments.

13 CHAIR BOLLWERK: Okay.

14 MR. REPKA: Yes. I now have the ER in
15 front of me.

16 JUDGE ABRAMSON: Charlie, you brought the
17 whole thing, right?

18 JUDGE KELBER: I brought two thirds of it.

19 JUDGE ABRAMSON: What section are we
20 looking at?

21 MR. REPKA: We're in the ER revision 2,
22 the July 2004 revision, section 4.13.3.1.4.

23 JUDGE ABRAMSON: Okay, hang on a minute.

24 MR. REPKA: It's Exhibit 109, LES Exhibit
25 109.

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1 JUDGE ABRAMSON: LES -- oh, it's in -- the
2 whole thing is in the Exhibit?

3 CHAIR BOLLWERK: I'm sorry, what are the
4 page citations rather than the sections?

5 MR. REPKA: Page --

6 CHAIR BOLLWERK: Down at the bottom,
7 probably, in the corner.

8 MR. REPKA: Page 4.13-10. It begins
9 there.

10 CHAIR BOLLWERK: Okay. And this is what
11 date? July --

12 MR. REPKA: July 2004.

13 JUDGE ABRAMSON: But you're telling us it
14 is LES 109, so we can look at LES 109?

15 MR. REPKA: You can.

16 JUDGE ABRAMSON: Okay.

17 MR. REPKA: And the citations are also
18 given in our motion, in fact, on page 8.

19 JUDGE KELBER: Four -- let's repeat this.
20 4.13.3.1.4. Title is converted depleted uranium
21 hexafluoride disposal options.

22 MR. REPKA: That is correct, 4.13.3.1.4.

23 JUDGE KELBER: Why don't you read the
24 first sentence in that top paragraph?

25 MR. REPKA: The following provides a brief

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1 summary of the different disposal options considered
2 in the Programmatic Environmental Impact Statement,
3 PEIS, for alternative strategies for the long-term
4 management and use of depleted uranium hexafluoride,
5 reference DOE 1999.

6 JUDGE KELBER: Thank you.

7 MR. REPKA: And then it goes on to talk
8 about Appendix I of the PEIS.

9 JUDGE ABRAMSON: Now is this information
10 what's incorporated in the DEIS or did the DEIS go
11 deeper? It seems to me that's the question that we
12 have to address because this simply says we've got
13 certain if here.

14 And is four -- is this section the
15 entirety of where you've used the -- where the ER uses
16 these prior studies?

17 MR. REPKA: There's also a reference in
18 section --

19 JUDGE ABRAMSON: I'm sorry. But is there
20 more to it than what I'm seeing in 1.4?

21 MR. REPKA: There's -- it's also 1.5,
22 potential impacts of each disposal option, which
23 begins at page 4.13-12.

24 JUDGE ABRAMSON: I see.

25 CHAIR BOLLWERK: Let me just raise one

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1 other question for purposes of what we're talking
2 about here as between the December 2003 Environmental
3 Report and the July 2004, are there any differences
4 that we need to be aware of?

5 MR. REPKA: I'm looking at revision 4, and
6 there are rev. bars, I believe, and --

7 CHAIR BOLLWERK: Okay.

8 MR. REPKA: I don't see any on this
9 section.

10 CHAIR BOLLWERK: All right.

11 JUDGE ABRAMSON: Okay. So I see this as
12 a -- kind of a general reference to the PEIS studies.
13 Is that correct?

14 MR. REPKA: A general reference, plus a
15 discussion of the conclusions in terms of the impacts.
16 And our point being that would leave the only issue
17 based on the remand would be are those impacts
18 sufficiently bounding and sufficiently representative
19 to satisfy the NEPA requirement.

20 JUDGE ABRAMSON: And when you look at the
21 EIS, the FEIS or the draft, is it your view that they
22 contain more detail than this in terms of the
23 information that's set out in the Environmental Impact
24 Statements?

25 MR. REPKA: I don't believe that there's

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1 more detail in the FEIS. The documents were
2 introduced as an exhibit in the proceeding and
3 reviewed by the Staff in the context of this
4 proceeding.

5 JUDGE ABRAMSON: The documents, meaning
6 the --

7 MR. REPKA: The PEIS.

8 JUDGE ABRAMSON: The PEIS, okay. But the
9 FEIS doesn't go to any more depth than this, in your
10 mind? Is that --

11 MR. REPKA: Not at this time, it does not.

12 JUDGE ABRAMSON: Okay. So the challenge
13 that's been made is that the FEIS didn't take a
14 sufficiently hard look at these elements. And the
15 challenge -- the motion that you're making is that
16 they didn't take any different look than we took in
17 the ER.

18 And therefore the challenge should have
19 been raised at the ER level. Am I reading that right?

20 MR. REPKA: To the extent that the
21 challenge is to the PEIS numbers, it should have been
22 raised based upon the ER.

23 JUDGE ABRAMSON: Okay.

24 MR. REPKA: SO the question now is only to
25 what degree does that satisfy the NEPA obligations.

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1 So to the extent the FEIS needs to be amended or
2 supplemented, it would be done -- could be done in the
3 context of this record.

4 But that would be the discussion here, is
5 what's the extent of the amendment required, not let's
6 go back and rechallenge the PEIS, because those
7 numbers could have been challenged back in the ER.

8 JUDGE ABRAMSON: Okay. I think I
9 understand where you're coming from. Do we all want
10 to hear from the Staff first before we hear from --

11 CHAIR BOLLWERK: Yes, I think so.

12 MS. CLARK: Thank you. First I'd like to
13 say that we do support the motion for summary
14 disposition, but we support it on somewhat different
15 grounds. And --

16 CHAIR BOLLWERK: Let me just clarify. Is
17 this a motion to dismiss, or a motion for summary
18 disposition, because procedurally they have a slightly
19 different -- one basically says all the facts are
20 taken as accepted and we win, and other one says that
21 there are certain facts that we put forward that are
22 not disputed and thus we win.

23 MR. REPKA: I don't think it's summary
24 disposition. I think what we're really talking about,
25 we're focused at this point on a number of the bases

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1 for the amended contention that appeared in February.

2 And we're saying that to the extent that
3 those issues should recycle they would be precluded
4 because they would be waived. So it's more of an
5 anticipatory motion than it is summary disposition.

6 MS. CLARK: And I agree with that
7 characterization of the motion. But let me discuss
8 -- I think it might be helpful here to give a little
9 background in how the Staff perceives the scope of
10 these environmental reviews.

11 First of all in the CEC Environmental
12 Impact Statement it was the Staff's assessment at that
13 time that shallow land disposal was not a viable
14 option for that facility.

15 And that was based on our assessment that
16 the conditions in the southeastern part of the United
17 States were such that the performance criteria, part
18 61, would not be satisfied for these large quantities
19 of depleted uranium. For that reason --

20 JUDGE ABRAMSON: I'm sorry. And the Staff
21 made an assumption that disposition would be made in
22 the southeast, that it wouldn't go to some dry
23 climate?

24 MS. CLARK: Well actually it was somewhat
25 more complicated than that. They knew that the

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1 Barnwell facility -- actually Don, could you please
2 come up here?

3 Just make sure I get this correct. The
4 Staff was aware that the Barnwell facility was not a
5 viable option because it wasn't part of the agreement
6 state compact.

7 That would be involved. So there was an
8 analysis done by Sandia, and that was using a generic
9 site. And as I recall that generic site was actually
10 based on site specific conditions that were found in
11 central Illinois.

12 And those -- that assessment was used --
13 the results of that assessment was used to determine
14 that shallow land disposal was not likely to be the
15 acceptable alternative.

16 For that reason in the Claibourne
17 Environmental Impact Statement the Staff evaluated
18 disposal in a mine. And that's -- the results of that
19 analysis were of course in that environment impact
20 statement.

21 When the Staff prepared it's draft
22 Environmental Impact Statement for the NEF, the Staff
23 came to a different conclusion with regard to
24 disposal.

25 The Staff knew that there were disposal

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1 options available in the western part of the United
2 States in an arid climate, and that -- and we also
3 knew that Envirocare was licensed to accept large
4 quantities of depleted uranium.

5 Therefore our assessment in the NEF EIS
6 was based on the assumption that shallow land disposal
7 would be available. With regard to deep mine
8 disposal, and I'm reading -- I'm going to read to you
9 a little bit from the final Environmental Impact
10 Statement at page 4-63.

11 JUDGE ABRAMSON: This is the NEF FEIS?

12 MS. CLARK: Yes. We said that in addition
13 to shallow disposal, LES has presented the potential
14 for disposition in an abandoned mine as a geological
15 disposal site.

16 Although no existing mine is currently
17 licensed to receive or dispose of low level
18 radioactive waste, nor has any application been made
19 to license such a facility, the postulated
20 radiological impacts from such a disposal site are
21 also presented in this section.

22 The way the Staff assess those impacts was
23 by relying on the earlier analysis that had been
24 conducted in the Claibourne Environmental Impact
25 Statement.

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1 We did not, at this point in time, do any
2 additional or independent analysis. And that is why
3 when NIRS/PC requested the underlying analysis we
4 explained to them that we don't have the underlying
5 calculations that were made.

6 So that is basically the scope of our NEF
7 EIS. Now with regard to shallow land disposal, the
8 Staff determined that those environmental impacts
9 would be assessed by the low level waste facility as
10 licensed to receive the material.

11 We know that in order for any facility to
12 be licensed to receive low level waste, the facility
13 must demonstrate compliance with the performance
14 criteria in part 61. On the basis of that knowledge
15 we determined that the resulting environment impacts
16 would be small.

17 The Staff in the draft Environmental
18 Impact Statement did not rely in any respect on the
19 Department of Energy PEIS to determine environmental
20 impacts.

21 And for that reason NIRS's challenge to
22 the Staff's NEPA analysis on the basis of the PEIS is
23 irrelevant. It did not form the basis of the Staff's
24 environment impact analysis.

25 JUDGE ABRAMSON: So your argument is -- or

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1 your -- yes, your argument is that the challenge
2 should be forbidden because the challenge is based on
3 a faulty premise. Is that --

4 MS. CLARK: Correct. It would only be a
5 valid contention if the Staff relied on a DOE PEIS.
6 But the Staff has not.

7 CHAIR BOLLWERK: So what -- if I'm
8 understanding what you're saying, essentially the
9 discussion on pages 4- -- 4.13- was it 10 and 11 of
10 the ER was essentially irrelevant to the Staff's
11 conclusion relative to it's DEIS and it's FEIS?

12 MS. CLARK: Yes. The Staff did not
13 incorporate that information in its Environmental
14 Impact Statement.

15 JUDGE ABRAMSON: And therefore in your
16 view, in the Staff's view, the Applicant's motion is
17 misdirected. It's not that this could have been
18 raised earlier, it's that it's irrelevant.

19 MS. CLARK: Correct.

20 JUDGE ABRAMSON: Okay. That said, I
21 suppose --

22 CHAIR BOLLWERK: Well, let me go back to
23 -- before we do, before we hear Mr. Lovejoy, let's get
24 it all out, and then we can -- to the degree we can.
25 Does LES have any comments on that viewpoint on their

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1 motion?

2 MR. REPKA: I think that's a separate
3 independent basis for not conducting that inquiry in
4 this forum. I don't think we either support it or
5 oppose it.

6 We're confident in our basis for the
7 motion, and are prepared to the extent necessary to
8 deal as the Commission suggested in footnote 52 of
9 their order, they talk about the record already
10 contains information and specifically point us to the
11 DOE PEIS.

12 And so our point is to the extent that
13 that information is necessary to satisfy the NEPA
14 obligation, to satisfy the NEPA issue that's been
15 remanded by the Commission, we are prepared to rely on
16 that and show that it is representative and sufficient
17 for NEPA purposes.

18 JUDGE ABRAMSON: And if the -- if the
19 proposition is that the EIS, the FEIS at this point,
20 is insufficient because it didn't evaluate -- didn't
21 do the kind of evaluation that was done in the PEIS,
22 and the Staff is saying that it didn't rely in the
23 PEIS, am I correct in understanding that what LES is
24 arguing is okay, PEIS is in evidence so we can proceed
25 to hear evidence related to the PEIS, but would a

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1 challenge that you can't challenge the PEIS as a basis
2 still be relevant when Staff is telling us they didn't
3 use the PEIS analysis at all?

4 MR. REPKA: It would still be relevant
5 because if there is an issue as to whether what the
6 Staff has done is adequate and we want to rely on the
7 PEIS as suggested by the Commission as sufficient to
8 cure that defect --

9 JUDGE ABRAMSON: Okay.

10 MR. REPKA: -- then we can discuss the
11 PEIS, but only with respect to bounding, or given the
12 quantities and concentrations.

13 JUDGE ABRAMSON: Using the PEIS numbers to
14 bound as opposed to challenging whether they are
15 accurately prepared?

16 MR. REPKA: Exactly.

17 JUDGE ABRAMSON: All right. I think I
18 understand that position.

19 CHAIR BOLLWERK: Mr. Kelber, any
20 questions?

21 JUDGE KELBER: No.

22 CHAIR BOLLWERK: All right. Let's turn
23 then to Mr. Lovejoy and see what --

24 JUDGE ABRAMSON: Is it framed for you, Mr.
25 Lovejoy?

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1 MR. LOVEJOY: Well part of it is. And I
2 went last night and kind of tracked through the
3 history, and forgive me if I go through my notes
4 showing you that, but I think it's important.

5 CHAIR BOLLWERK: We've heard a lot of
6 history before, so we certainly would appreciate that.

7 MR. LOVEJOY: Okay. First, there are two
8 grounds to the motion. They want to dismiss, first of
9 all, any contentions about the EIS analysis of doses
10 from deep repository type disposal.

11 And second, they -- I keep shifting a
12 little bit. I think they want to bar NIRS/PC from
13 disputing analyses contained in the DOE PEIS. Here's
14 some background. The application when it was filed in
15 the ER concerning private sector deconversion and
16 disposal gave the following as LES's strategy.

17 Quote, one of the two Converdne partners,
18 General Atomics, may have access to an exhausted
19 uranium mine, the Cotter mines in Colorado, where
20 depleted U308 could be disposed, unquote.

21 That is what was on the table as a
22 proposal. Now there was a discussion of environment
23 impacts of waste disposal in various methods different
24 from this proposal.

25 They described engineered trenches,

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1 vaults, mine disposal. They paraphrased and condensed
2 some of the analyses from the DOE PEIS. They note, as
3 is true, that the analyses in that document were
4 focused on a 1,000 year window only.

5 They also noted, which is interesting,
6 that potential exposures on the order of 10 rams per
7 year could occur from shallow earthen structures, if
8 the cover material eroded.

9 That is true, that is what the DOE
10 PEIS found. They talked about the Claibourne EIS very
11 briefly. They said that its analysis of near surface
12 disposal showed that doses would exceed 10 CFR part 61
13 limits. That's --

14 JUDGE ABRAMSON: This is all in the ER?

15 MR. LOVEJOY: It's in the ER.

16 JUDGE ABRAMSON: Okay.

17 MR. LOVEJOY: And they stated that
18 analyses of deep disposal in the Claibourne case had
19 shown impacts that were within those limits.

20 JUDGE ABRAMSON: And where is this in the
21 ER, just quickly?

22 MR. LOVEJOY: It's in 14.13, generally.

23 JUDGE ABRAMSON: Okay.

24 MR. LOVEJOY: These were paraphrases of
25 earlier EISs in cases that NIRS/PC was not involved in

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1 and I was not involved in. But there was no claim in
2 the ER that these analyses reported the impact for the
3 strategy that they proposed, which was putting the
4 depleted uranium in the Carter mine.

5 In our petition we advanced contentions
6 asserting, first of all, that the prospect of disposal
7 in the exhausted uranium mine had no basis and that
8 the owner of the mine had denied that it was
9 available.

10 And we said that they had made no serious
11 presentation that disposal in the mine would meet
12 environmental requirements. We also -- perhaps this
13 was an abundance of caution.

14 I don't know what you'd call it. But, we
15 looked at the discussion of engineered trenches. And
16 they weren't proposing that. But even so, we said
17 that in any case they would not be acceptable and they
18 would violate several provisions of 10 CFR part 61.

19 And those contentions were admitted. And
20 we're here now, among other things, trying the
21 contention about engineered trench disposal. Now, in
22 September of '04 the draft EIS was issued.

23 And it contained for the first time in the
24 sequence of environmental documents, numerical values
25 for the releases from a repository disposal. Those are

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1 in table 4-19.

2 They were not in the ER. Those values
3 were not in the ER. The draft EIS was also very
4 different in its discussion of near surface disposal.

5 It said first that near surface disposal
6 looked like the only viable method. But, unlike the
7 ER, the draft EIS had no analysis of impacts of near
8 surface disposal.

9 There was no paraphrase from the DOE PEIS.
10 In our view this was clearly an omission. Under --

11 JUDGE ABRAMSON: From the EIS?

12 MR. LOVEJOY: From the EIS, the public
13 disclosure document. Now, under the rules we may
14 amend our contentions or file new contentions if there
15 are data or conclusions in the draft or final EIS that
16 differ significantly from the data or conclusions in
17 the Applicant's documents.

18 So we did. We moved to add contentions,
19 among them being the contention that the deep disposal
20 calculations contained in the DEIS were erroneous,
21 could not be accurate.

22 And another contention stated that NRC
23 Staff had omitted to make the necessary environmental
24 analysis of near surface disposal and had erroneously
25 assumed that it would be permissible.

1 That was in October. And the motion we
2 made in February was longer. But it also contained
3 these elements. For example, we said, concerning the
4 contentions about deep disposal, we said that the
5 modeling was unsupported.

6 The Staff had failed to disclose the
7 models used and the parameter values, and that results
8 are unlike any reported in connection with the
9 Claibourne facility.

10 Concerning near surface disposal, we
11 asserted that depleted uranium was not suitable for
12 near surface disposal. And there was a lack of any
13 environmental analysis to support a decision to allow
14 such disposal.

15 We contended that depleted uranium should
16 be disposed of in the same manner as greater than
17 class C waste.

18 JUDGE ABRAMSON: And which of those, if
19 any, was addressed in the ER of those assertions?

20 MR. LOVEJOY: In the ER, the proposal was
21 disposal in the Carter mine. That's the thing.

22 JUDGE ABRAMSON: Was --

23 MR. LOVEJOY: And there were references to
24 other methods of disposal, such as engineered trench.

25 And we attacked that. So, we never --

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1 JUDGE ABRAMSON: But, as to what was
2 addressed in the ER and what was addressed in the
3 DEIS, which I think is where we're going here, can you
4 be concrete or more concrete about what showed up in
5 the DEIS which was not in the ER?

6 MR. LOVEJOY: What showed up was an
7 omission. There was essentially no analysis at all of
8 near surface disposal.

9 JUDGE ABRAMSON: In the DEIS?

10 MR. LOVEJOY: In the draft EIS.

11 JUDGE ABRAMSON: Okay.

12 MR. LOVEJOY: The final EIS is just about
13 the same. We now have a remand. The Commission has
14 directed the following, that the hearing include the
15 issues of dose impacts, quote, which at bottom goes to
16 whether the impacts of near surface disposal have been
17 adequately estimated or assessed for NEPA purposes.

18 And they said they looked for an
19 assessment of the estimated impacts at one or more
20 represented or referenced sites can be sufficient. In
21 this type of analysis the impact for a range of
22 potential facilities or locations having common site
23 or design features can be founded, unquote.

24 Now, we are prepared to conduct that
25 analysis. But --

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1 JUDGE ABRAMSON: In so doing, do you need
2 to challenge or intend to challenge similar analyses
3 that might be in the PEIS? Or are they relevant for
4 us?

5 MR. LOVEJOY: They may come up. I would
6 say that some of the points raised by the PEIS
7 analysis are things we agree with. I think the PEIS
8 analysis clearly is not a bounding analysis.

9 And no one could consider it that because
10 it's only on a 1,000 year window. And we do have
11 other analysis that we wish the Board to consider.
12 But, we never had the burden of challenging the PEIS
13 in connection with our contentions about the draft EIS
14 because it wasn't in the draft EIS. And, as we know,
15 it --

16 JUDGE ABRAMSON: I'm sorry. Is it in the
17 PEIS?

18 MR. LOVEJOY: No.

19 JUDGE ABRAMSON: Okay.

20 MR. LOVEJOY: And, as we know, a
21 contention of omission is properly made by contending
22 that something that's needed has been omitted.

23 And we said what's omitted is any
24 environmental analysis of near surface disposal.

25 JUDGE ABRAMSON: So, is that where we're

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1 focused here? Is that the challenge that you would
2 like to mount to the EIS?

3 MR. LOVEJOY: It's a contention.

4 JUDGE ABRAMSON: Is that it?

5 MR. LOVEJOY: It is a contention of
6 omission. And the hearing of such contention, I mean,
7 I think it's undisputedly --

8 JUDGE ABRAMSON: I understand that. But
9 I'm asking, is that the subject matter and the sole
10 subject matter that NIRS/PC feels needs to be
11 addressed in the EIS?

12 And that is whether or not there is a
13 sufficient analysis of the impacts of near surface
14 disposal.

15 MR. LOVEJOY: That's the principal one.
16 We have the contention, which I think can be disposed
17 of fairly easily, that the numerical values, the only
18 ones in there for dose from disposal, the numerical
19 values for repository disposal are unsupported.

20 We think that's pretty much uncontested
21 too. And they're wrong. But, last time I heard, when
22 you have scientific data that are unsupported, that's
23 a pretty serious claim.

24 JUDGE ABRAMSON: I think I understand.
25 I'm sorry, I didn't want to cut you off. Do you have

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1 more to say?

2 MR. LOVEJOY: Well, on remand, as the
3 Commission's directive has indicated, when there's a
4 contention of omission, the hearing soon enough
5 involves what should be said on the subject that has
6 been omitted.

7 And that's the assessment of the estimated
8 impacts that one or more representative or referenced
9 sites, etcetera, that the Commission has put in their
10 commission and asked us to do.

11 JUDGE ABRAMSON: Okay. We've heard from
12 the interveners what they think we ought to be looking
13 at. Can we hear from the Staff about what they think
14 is in the DEIS and the FEIS and whether there's
15 omissions there or not, and how they view it?

16 MR. REPKA: Judge Abramson, perhaps before
17 we do that, I would like to his characterization of
18 what was in the ER.

19 JUDGE ABRAMSON: All right.

20 MR. REPKA: And then we can talk about the
21 DEIS. Mr. Lovejoy has stated that the ER addressed
22 only the deep geological disposal option, the so-
23 called Converdnye option.

24 And, in fact, in the sections that we
25 cited you to earlier, there's a discussion of two

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1 options. And one of the options is the near surface
2 disposal option.

3 And that's why the reference is made to
4 the PEIS. So, any suggestion that there was no
5 discussion of near surface disposal in the ER is
6 simply incorrect.

7 And that's the basis for our timeliness
8 argument. Now, the second point is, the example he
9 raises of the inadequacy or why the PEIS is not
10 bounding.

11 Mr. Lovejoy, talks about the 1,000 year
12 window. And that's exactly the type of challenge
13 we're saying could have been made based upon the ER.
14 And what we're focused on now is no the 1,000 year
15 window of the PEIS.

16 We're focused on the quantities and
17 concentrations as referenced by the Commission.

18 CHAIR BOLLWERK: All right. At this
19 point, let's see. Is there anything further you want
20 to say about his argument before we turn to the Staff?

21 MR. REPKA: No. And I just really wanted
22 to clear up what's in the ER.

23 CHAIR BOLLWERK: Okay.

24 MS. CLARK: I would like to address what
25 I think is a very important issue, which is what

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1 exactly is at issue in this proceeding and what
2 exactly is the challenge that NIRS made to the
3 Environmental Impact Statement.

4 So, I turn to the motion that was the
5 subject of their amendment of this contention dated
6 October 20th, 2004. And I'm turning to page 15, in
7 which on that page NIRS sets forth the basis for its
8 challenges to the draft Environmental Impact
9 Statement.

10 And I'm looking at paragraph A. NIRS
11 begins by making the claim that the DEIS is in error
12 in claiming that it can be disposed of as class A low
13 level waste.

14 I think the second sentence is very
15 significant here. It goes on to state, it is also
16 erroneous because the Commission's adoption of 10 CFR
17 part 61 included no analysis of the environmental
18 impact of disposal of depleted uranium as low level
19 waste.

20 And the Commission could not lawfully
21 decide that such disposal is permissible without
22 undertaking a full environmental impact analysis.
23 And, in fact, I think that NIRS has really gone to the
24 heart of the issue in this statement.

25 Essentially, the use of the generic impact

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1 statements by the Commission has not been for the
2 purpose of determining the impacts of shallow land
3 disposal in our NEPA analyses.

4 In fact, the purpose of relying on those
5 and being informed by those assessments was to
6 determine whether it was plausible that such disposal
7 could be utilized.

8 So, therefore, I think that what really
9 this goes to is more of this plausible strategy part
10 of this whole issue, which is one of the first
11 determinations the Staff has to make when it's doing
12 its environmental analysis is what are the potential
13 options that we need to evaluate.

14 In a CEC case we did a generic analysis
15 for the purpose of deciding what options were
16 plausible. And that's the -- that would be any import
17 of any knowledge of environmental analyses in a
18 generic basis, would be determine whether it's
19 plausible that disposal of the DU generated by the NEF
20 could be in shallow land disposal.

21 And the Staff did look at not a generic
22 analyses so much, although we were certainly aware of
23 those. But we had much better information. We had
24 information about site specific pathway analysis at a
25 site that we knew was available to the NEF,

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1 Envirocare.

2 So we had very good sound basis for our
3 determination that shallow land burial was a plausible
4 option. And that's why we relied on that option in
5 our Environmental Impact Statement.

6 Now, we also did include the impacts of a
7 mine disposal. But we now know that LES is not
8 planning to use that type of disposal. And I think
9 that that is the heart of NIRS' challenge.

10 Now, moving on into the rest of their
11 basis, NIRS also challenges the numbers that were in
12 the draft EIS that were drawing from the Claibourne
13 EIS.

14 Now, those numbers were actually
15 incorrectly translated from the CEC -- the Claibourne
16 analysis to the draft EIS. And, when NIRS raised this
17 challenge, the Staff realized that there had been an
18 error, which we corrected in the final.

19 CHAIR BOLLWERK: Let's make sure. This is
20 a different paragraph, right?

21 MS. CLARK: Yes.

22 CHAIR BOLLWERK: This is paragraph C, have
23 I got it?

24 MS. CLARK: Correct. So I think those are
25 the challenges that NIRS raised. And those are the

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1 issues that need to be addressed in this proceeding.

2 JUDGE ABRAMSON: So, if we look at C, what
3 C is stating on its face is that the DEIS fails to
4 dispose of the models used or the parametric values
5 and then suggests that it was CEC, however, the
6 reports are off base.

7 MS. CLARK: Correct.

8 JUDGE ABRAMSON: The numbers are
9 inconsistent. Now, so just taking those two
10 sentences, without going on to the end of that basis,
11 did the DEIS indeed disclose that they used the CEC
12 analysis?

13 MS. CLARK: Let me just check if we can
14 find the cite. If you give us a moment, maybe we can
15 find it.

16 JUDGE ABRAMSON: Sure.

17 CHAIR BOLLWERK: That would be good.

18 JUDGE ABRAMSON: And, while you're at it,
19 if so, did the DEIS disclose the models or did the CEC
20 analysis somewhere disclose the models that were used
21 in analysis, which is what's allegedly -- which would
22 allegedly makes the analysis unable to be challenges.

23 CHAIR BOLLWERK: The FEIS, right?

24 JUDGE ABRAMSON: The FEIS analysis, or the
25 DEIS, either way.

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1 (Pause.)

2 JUDGE ABRAMSON: Are you looking at the
3 final or at the draft?

4 MS. CLARK: I'm looking at the draft. And
5 I see the information on page 4-59. And, beginning at
6 the top of the page, it says, in addition to shallow
7 disposal, LES also presented the potential for
8 disposition in an abandoned mine as a geologic
9 disposal site.

10 And the postulated radiological impact
11 from such a disposal site are also presented in the
12 section. The analysis of the radiological impacts
13 from the disposal of the converted waste as U308 and
14 a geological disposal site was previously presented in
15 the EIS for the Claibourne Enrichment Center. And
16 then it cites NRC 1994.

17 JUDGE ABRAMSON: So --

18 CHAIR BOLLWERK: What does C say about
19 that?

20 JUDGE ABRAMSON: C says that the text
21 suggests that the models used in the CEC site were
22 used, however their results were inconsistent,
23 essentially. Is that right, Mr. Lovejoy?

24 MR. LOVEJOY: If we can't trace the
25 results to the CEC data, we ask for the data, the data

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1 does not exist.

2 JUDGE ABRAMSON: The CEC data does not
3 exist or --

4 MR. LOVEJOY: You can't get it, yes.

5 JUDGE ABRAMSON: Okay.

6 MR. LOVEJOY: That's what Ms. Clark just
7 said. We --

8 JUDGE ABRAMSON: They couldn't find the
9 CEC.

10 MR. LOVEJOY: -- there's no basis for the
11 numbers.

12 MS. CLARK: No, I don't think that's
13 completely accurate.

14 JUDGE ABRAMSON: Okay. Lets' see what the
15 scoop is.

16 MS. CLARK: Okay. The CEC contains a
17 table. It explains how the analysis was conducted in
18 the CEC EIS. And it also produces the results of the
19 analysis.

20 What Mr. Lovejoy had asked from the Staff
21 is the underlying calculations and parameters used by
22 the Staff in the CEC analysis. That information, as
23 I explained to him, was no longer available to us
24 since this was done back in 1994.

25 JUDGE ABRAMSON: And so, you did not

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1 revise the analysis. You took the CEC analysis and
2 portioned it, if you will, or adapted it to this
3 situation?

4 MS. CLARK: We incorporated it into this
5 Environmental Impact Statement. We had no reason to
6 think that that analysis was incorrect. Hold on.

7 (Pause.)

8 MS. CLARK: If I may add, Dr. Palmrose
9 informs me that, when he was preparing the
10 Environmental Impact Statement, he had a hydrologist
11 on his staff review the information in the Claibourne
12 EIS and confirm that the methodology described there
13 was still appropriate.

14 JUDGE ABRAMSON: The methodology was
15 appropriate.

16 MS. CLARK: So, we did assume that the
17 methodology was appropriately applied in that
18 Environmental Impact Statement.

19 JUDGE ABRAMSON: Okay. So, let me ask.
20 Did the DEIS disclose the models used or the values
21 that were -- the parameters that were used in making
22 the computations? That's the allegation.

23 MR. LOVEJOY: Did not.

24 MS. CLARK: Yes, the CEC does explain what
25 models were used.

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1 (Pause.)

2 MS. CLARK: If it -- it might be helpful.
3 I have the page in the CEC. I don't know if this is in
4 the -- in any of the exhibits. But, if not, perhaps
5 it would be helpful for us to make copies of this to
6 show you because it does describe specific models that
7 were used and the data, the foundation for the data
8 that went into the model.

9 CHAIR BOLLWERK: Let me cut to the chase
10 here. It sounds to me like, in terms of what they are
11 seeking, that the best that you are ever going to be
12 able to provide them, and whether that complies with
13 NEPA or not is a different question, but the best that
14 you are ever going to be able to provide them is what
15 Dr. Palmrose did when he reanalyzed it for the FEIS,
16 is that correct?

17 MS. CLARK: Correct.

18 CHAIR BOLLWERK: So, let then suggest, is
19 the way to deal with this particular part of this
20 contention to put Dr. Palmrose on the stand and let
21 Mr. Lovejoy question him?

22 And, if it meets NEPA, it meets it, and if
23 it doesn't, it doesn't. And that's where we're at.

24 JUDGE ABRAMSON: But let's get back to the
25 more basic, is that there's a challenge by both LES

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1 and the Staff that this contention shouldn't come in
2 because, either it's irrelevant or because it should
3 have been dealt with earlier as a challenge to the ER.
4 Am I hearing that right?

5 MR. REPKA: With respect to LES' challenge
6 to this piece, which is that the Claibourne models
7 weren't identification and disclosed, or that the
8 basis for the DEIS conclusions wasn't identified and
9 disclosed, that was the contention.

10 And, in fact, Ms. Clark has pointed us to
11 some places in the DEIS where it was disclosed. And
12 the data was available in the Claibourne FEIS Appendix
13 A.

14 But more fundamentally, our point is that
15 issue has been cured because the basis was clearly
16 included in the FEIS. So, to the extent it was a
17 contention of omission in the DEIS, it was cured in
18 the FEIS.

19 But I think Ms. Clark is pointing out it
20 probably wasn't an accurate contention of omission in
21 the first place because it was addressed in the DEIS.

22 JUDGE KELBER: Please be care in referring
23 to the EISs because there's the Claibourne EIS and the
24 EIS for the NEF.

25 MR. REPKA: Right. And that reference was

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1 to the NEF DEIS, which references the Claibourne EIS.

2 MR. LOVEJOY: If it would help the Board,
3 I can point out that extracts from the Claibourne EIS
4 are in NIRS/PC Exhibit 58. And I think this contains
5 all the discussion that's been made available
6 concerning Claibourne's analysis of deep disposal.

7 It does not tell you. I mean, it's not
8 enough for a scientist to look at the investigation
9 and see whether it's valid or invalid, certainly not
10 to see whether the values for dose that are contained
11 in the NEF draft EIS are valid.

12 The numbers can't be tested, in other
13 words, with what information is available. The
14 numbers look incredibly low. But, the point is, you
15 know, they're not even in a position to defend them
16 because they don't know how they were generated.

17 And we're saying that that is not good
18 data.

19 MR. REPKA: And that's a different
20 contention.

21 MR. LOVEJOY: That's the same contention.

22 MR. REPKA: Well, I mean, with a
23 contention of omission, first the information is
24 omitted, then it's supplied. Then there's a second
25 contention amendment, however you want to put it, that

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1 says, okay, you've now given us the information and
2 it's no good.

3 So the question is, where are we at, if
4 you want to look at this in a procedural matter.

5 JUDGE ABRAMSON: For the same reason we
6 can't collapse the procedure.

7 MR. LOVEJOY: The information has never
8 been supplied. We don't know how those numbers were
9 generated. I mean, we know how they were generated by
10 somebody, you know, applying a fraction to some
11 release figures or dose figures that were in the
12 Claibourne case. But, where they came from --

13 JUDGE ABRAMSON: Well, let's make sure we
14 follow this. Initially there was no description, is
15 that what you're saying?

16 (No verbal response.)

17 JUDGE ABRAMSON: Initially you didn't know
18 how -- the only thing that you saw initially was a
19 reference that it came from Claibourne. But the
20 numbers didn't make sense.

21 MR. LOVEJOY: Right.

22 JUDGE ABRAMSON: Right. So, now they made
23 the numbers make sense in at least how they got them
24 from Claibourne. But they still don't, in your mind,
25 explain the origin of the numbers themselves.

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1 MR. LOVEJOY: Right.

2 JUDGE ABRAMSON: So, the first step was
3 they say they came from Claibourne, but they don't
4 look like they came from Claibourne. Now they say
5 here's how we got them from Claibourne.

6 And now your argument is, those numbers
7 themselves don't make sense. And the question that's
8 before us is, is it too late to challenge what's in
9 the Claibourne analysis because it was referred to
10 generally in the ER? Have I got that right?

11 MR. REPKA: That is correct. And, in
12 fact, if you go to the Claibourne FEIS that was
13 referenced in the ER, Appendix A, Section A.2.3, Deep
14 Disposal of U308, there's a lengthy discussion of the
15 results.

16 It references two and with some tables.
17 And it also includes -- discusses for comparison
18 purposes the ranges and sites to the specific computer
19 codes that were used, the Phreeque code and the co-
20 data data set, for example.

21 MR. LOVEJOY: With all respect, the
22 material in the Claibourne EIS, frankly, it may look
23 detailed to a lawyer. It doesn't tell you how those
24 numbers arose.

25 I've spoken with hydrologists about it.

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1 I've spoken with Dr. Makhijani about it. The general
2 position is, you know, there's nothing really to
3 criticize. They don't tell you what they did.

4 MR. REPKA: And that contention could have
5 been made based upon the ER.

6 MR. LOVEJOY: The ER did not have the
7 numbers that are in the EIS.

8 CHAIR BOLLWERK: And again, just so I'm
9 clear, when the Staff put out the FEIS, you corrected
10 the discussion how? How is it the FEIS differs from
11 the DEIS?

12 MS. CLARK: What happened was, in the
13 draft EIS we reproduced -- attempted to reproduce the
14 numbers from the table. And actually, maybe it would
15 be helpful to have Dr. Palmrose explain the error.

16 There was an error made. But it's
17 difficult for me to --

18 CHAIR BOLLWERK: I want to be careful
19 about getting into testifying here.

20 MS. CLARK: Yes. But he can explain
21 later. But, there was actually an error in the way
22 the numbers were reported originally in the CEC from
23 what I understand.

24 CHAIR BOLLWERK: And that appears to be at
25 least part of what NIRS/PC had spotted.

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1 MS. CLARK: It was a --

2 MR. LOVEJOY: We did just fix the error.

3 CHAIR BOLLWERK: They fixed the error?

4 Okay.

5 MR. LOVEJOY: It was just math.

6 MS. CLARK: It was a math error, exactly.

7 CHAIR BOLLWERK: Okay.

8 MR. LOVEJOY: Just math.

9 CHAIR BOLLWERK: So the math error was
10 fixed. And what other differences, if any?

11 (Pause.)

12 CHAIR BOLLWERK: Okay, sorry. I guess the
13 question, besides the correction of the mathematical
14 error, was there any substantive differences that were
15 made in the discussion of the -- what's at issue in
16 paragraph C of the October contention?

17 MS. CLARK: I don't believe so.

18 CHAIR BOLLWERK: All right. Okay. Let me
19 then -- any other questions that the Board members
20 have at this point?

21 JUDGE ABRAMSON: I don't think so. But I
22 don't know that we're -- we're going to have to confer
23 before we --

24 CHAIR BOLLWERK: Obviously. Let me just
25 see. Is there anything else that the parties want to

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1 say on this subject, having heard everything that we
2 talked about?

3 MR. REPKA: I would just like to make one
4 last comment on the deep geological disposal. And
5 that's just again to reiterate that, with respect to
6 deep geological disposal, the contention is
7 essentially moot in any event because LES is not
8 relying on the so-called mine option.

9 CHAIR BOLLWERK: All right. Does the
10 Staff want to say anything about that?

11 JUDGE ABRAMSON: Well, here's the
12 question, it seems to me. What is the NEPA
13 obligation.

14 CHAIR BOLLWERK: That's true.

15 JUDGE ABRAMSON: Because you're not
16 relying on it, but does the Staff's NEPA obligation
17 require them to look at deep as an alternative. And
18 I don't have that off the top of my head answer. I'm
19 sure the parties have different views.

20 MS. CLARK: I don't believe that that
21 would eliminate our need for obligation.

22 CHAIR BOLLWERK: The fact that they have
23 not -

24 MS. CLARK: They are not planning to use
25 that, yes.

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1 CHAIR BOLLWERK: All right. Then what I
2 hear you saying is an equal obligation exists
3 regardless of --

4 MS. CLARK: Yes, it still remains.

5 CHAIR BOLLWERK: All right.

6 MR. LOVEJOY: Well, if Staff deems it an
7 appropriate alternative, and I think they have, then
8 it needs to be discussed. And if it is going to be
9 discussed accurately.

10 CHAIR BOLLWERK: All right. And it has
11 been discussed accurately in terms of the correction
12 of the numerical error. But you still contend that it
13 is not -- the discussion of it is not such that you
14 can check it as it were technically.

15 MR. LOVEJOY: They are undefended figures.

16 CHAIR BOLLWERK: All right.

17 MR. LOVEJOY: And they certainly disagree
18 with our reasonable calculations. They're way
19 understated. But, because of that, we ask for the
20 support. And we find that there's no support.

21 JUDGE KELBER: Can you point to portions
22 in Appendix A of the Claibourne Environmental Impact
23 Statement that cannot be used to calculate what they
24 say they calculate?

25 Can you point to deficiencies in the

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1 reports in that Appendix?

2 MR. LOVEJOY: Well, it's really a kind of
3 impressionist description of a detailed modeling --

4 JUDGE KELBER: There's a table of --

5 MR. LOVEJOY: Excuse me.

6 JUDGE KELBER: Do you have it in front of
7 you?

8 MR. LOVEJOY: Yes.

9 JUDGE KELBER: Let me ask you, is the
10 paragraph entitled solubility estimates adequate?

11 JUDGE ABRAMSON: Do you have a paragraph
12 number?

13 JUDGE KELBER: There is no paragraph
14 number. It's on page 8 at A10.

15 MR. LOVEJOY: It says, we -- Dr. Makhijani
16 tried to reproduce the analyses and came up with
17 completely different results.

18 I'm not sure I'd be in a position to give
19 you, you know, line-by-line faults here. I see that
20 they say that solubilities were generated using
21 Phreeque and some other computer programs.

22 I don't think we get the actual values,
23 default values, what were variable parameters, how
24 they were varied, that kind of thing that you need to
25 reproduce a modeling exercise.

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1 JUDGE KELBER: The hydraulic conductivity
2 tables are useful?

3 MR. LOVEJOY: Yes. Trying to glean data
4 from here and use the models identified, we could not
5 reproduce the results.

6 JUDGE KELBER: But the data worked
7 adequate to try and reproduce the results. We're not
8 missing data.

9 MR. LOVEJOY: I would be very reluctant to
10 say that the data were sufficient. From my experience
11 in other performance assessments, you know, I see
12 things missing.

13 JUDGE KELBER: In other words, to
14 reproduce the results, you would have to introduce
15 data that are not in this report, is that correct?

16 MR. LOVEJOY: Your Honor, I believe so,
17 yes.

18 JUDGE KELBER: Can you tell us what's
19 missing?

20 MR. LOVEJOY: Okay. The calculations were
21 attempted to be reproduced by Dr. Rice, who testified
22 previously. And he's not here.

23 CHAIR BOLLWERK: It's currently about 10
24 after 12. Let's take a lunch break until 1:30 if we
25 can, please.

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JUDGE ABRAMSON: But be prepared to stay late. We're going to crunch tonight. Let's get as much done as we can this afternoon.

CHAIR BOLLWERK: All right. Thank you.

(Whereupon, at 12:15 p.m. the above-entitled matter was recessed for lunch.)

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A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

1:35 p.m.

CHAIR BOLLWERK: We are back on the record, and we will take care of a couple of procedural things, here, quickly first.

We are back after our noon break. Just so you know we are getting some questions about when we will have the last open session for the contingency. And so by the end of this afternoon I will be raising that question, trying to get a best estimate from you all as to whenever we finish this evening, because we do need to update our phone line that we promised people we would do.

And apparently our office of public affairs tells us they are getting some enquiries about exactly what is going on. And at that point we just need to give a best estimate. It might be -- I don't know, we will talk about it then, and we can give people a range of possibilities.

So I hate to have people standing outside the door wanting to get in. On the other hand, it is what it is. Let me take up one other question about some evidence.

There had been a question raised, at one point, about some exhibits, 265 through 269, I believe

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1 it was, or 68.

2 MR. CURTISS: I believe 268, sir.

3 CHAIR BOLLWERK: Right. I take it the
4 concern was that it wasn't clear exactly what these
5 related to, in terms of the testimony?

6 MR. CURTISS: Yes. We have two related
7 concerns, Your Honor. First, those four exhibits were
8 identified and disclosed after the motion in limine
9 that we filed on the earlier exhibits, so we hadn't
10 had an opportunity to raise those, any issues with
11 respect to those exhibits.

12 Secondly, they have not been cited at any
13 point in the testimony, that we have been able to find
14 or determine. And then, third, based upon our review
15 of the individual exhibits, which we now have copies
16 of, we question the relevance of all four of those
17 exhibits.

18 And at the appropriate time would object
19 for those reasons to their admission.

20 CHAIR BOLLWERK: I guess the question I
21 have goes to, basically, the same point. Given the
22 way we have indicated that exhibits need to relate to
23 testimony, I couldn't find where these related to any
24 testimony, either.

25 If you could elucidate, you know, give us,

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1 throw some light on that, anything you want to say
2 about it, or --

3 MR. LOVEJOY: Your Honor, these were
4 exhibits identified in the course of inserting exhibit
5 citations into Dr. Makhijani's reports.

6 CHAIR BOLLWERK: All right.

7 MR. LOVEJOY: Dr. Makhijani and Dr.
8 Smith's reports. And number one, we thought it was
9 appropriate to produce them because we understood that
10 the practice was to produce anything an expert relied
11 on.

12 CHAIR BOLLWERK: Correct.

13 MR. LOVEJOY: So we did that. They do
14 relate to disposal, they are cited in the reports. I
15 think they are all from the November 2004 report. I
16 can't say they are cited in the testimony.

17 CHAIR BOLLWERK: Okay. I think, in light
18 of -- there seems to be some misunderstanding about
19 that. And one thing we tried to do, at one point, was
20 after we had gone through and given you the final
21 revision of the testimony, tried to offer you an
22 opportunity, given what seemed to be a
23 misunderstanding, if there were any additional
24 exhibits that were cited in footnotes to the report,
25 that you wished to move into the testimony, and we

1 didn't see that happen.

2 MR. LOVEJOY: We did not have time to do
3 that.

4 CHAIR BOLLWERK: Okay. Well, at this point
5 I think we do have them in our exhibit list. And if
6 they come up, certainly, in cross examination, they
7 can certainly be used for those purposes.

8 If at some point you want to try to tie
9 them to something specific, I have no problem with
10 that. But at this point I'm simply not going to admit
11 them into the record when they aren't cited in the
12 testimony.

13 And, you know, again -- some of the ones
14 we have not admitted before, after being used in cross
15 examination, or for other purposes, we will certainly
16 receive them for those purposes.

17 The problem, again, we just didn't want to
18 accept evidentiary material that doesn't relate to the
19 testimony in some way. So at this point these haven't
20 been identified for the record, they are sitting here.

21 If at some point you have a concern about
22 them, Mr. Lovejoy, we will certainly talk more about
23 them, or identify them in some way. But at this point
24 they really stand in the same stead as the others that
25 were prefiled, and the exhibit list incorporated, or

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1 indicated were potentially part of the proceeding, but
2 we did not -- indicated in that order we weren't going
3 to admit.

4 CHAIR BOLLWERK: Let's go off the record
5 for one second here.

6 (Whereupon, the above-entitled matter
7 went off the record at 1:42 p.m. and
8 went back on the record at 1:43 p.m.)

9 CHAIR BOLLWERK: With these matters out of
10 the way let's turn to the motion that was filed
11 yesterday, and which we heard argument about just
12 before lunch time.

13 MR. LOVEJOY: In connection with that,
14 Judge Bollwerk --

15 CHAIR BOLLWERK: Yes?

16 MR. LOVEJOY: I did find out a little bit
17 more over the recess, that might respond to some of
18 the questions that Judge Kelber was raising. If it
19 would be useful for me to give you that information?

20 CHAIR BOLLWERK: If it is brief, yes.

21 MR. LOVEJOY: It is brief. What I did
22 find I think, to begin, was that for the solubility
23 values, which are critical to one of these analysis,
24 the description in the CEC, environmental impact
25 statement, indicates values for what they consider

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1 certain significant parameters but certainly not all
2 parameters.

3 I'm looking at page A-12 of exhibit 58,
4 where there are some values. But it does say that not
5 all values for the groundwater are present. There are
6 default values in the models and there the values
7 assigned to those are not indicated.

8 There is, and this is important to
9 solubility, there is no discussion of the presence or
10 absence of CO2 in the hypothesized disposal area.
11 What is quite indicative to us is that our
12 calculations, which were carried out by Mr. Rice,
13 using the Phreeque code, could not reproduce anything
14 like the values as to solubilities, that came up in
15 the Claibourne environmental impact statement.

16 Mr. Rice got values in the range of ten to
17 the minus six for uranium solubility, and he looked at
18 the Kozak report, which was also prepared in
19 connection with the Claibourne case, and Kozak was
20 developing values in the range of ten to the minus
21 five, or ten to the minus six.

22 The Kozak report is exhibit 128, NIRS/PC
23 exhibit 128. As we see it the CEC EIS was using
24 values for solubility in the range of ten to the minus
25 ten.

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1 JUDGE KELBER: Ten to the minus --

2 MR. LOVEJOY: Ten to the minus ten, in
3 that order of magnitude, and we don't know how they
4 got that. And it seriously affects the releases of
5 the exposure calculations.

6 JUDGE KELBER: There may be an explanation
7 for that.

8 MR. LOVEJOY: The analyses that Mr. Rice
9 did were attached to the November 2004 report when it
10 was first filed as an expert report.

11 JUDGE KELBER: November --

12 MR. LOVEJOY: November 2004.

13 JUDGE KELBER: The one that we heard in
14 February?

15 MR. LOVEJOY: This report covered
16 essentially all issues in the case. And it certainly,
17 it covered the issues that we are hearing now too.
18 That was in Dr. Makhijani and Dr. Smith's November
19 2004 report. It is exhibit 190 to this proceeding.

20 JUDGE KELBER: All right, thank you.

21 CHAIR BOLLWERK: Okay, do we need to have
22 any further discussion, or do you think we can --

23 MS. CLARK: May I respond to that?

24 CHAIR BOLLWERK: Surely.

25 MS. CLARK: I presume that Mr. Lovejoy is

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1 relying on the information in the CEC EIS to make
2 these allegations, is that correct?

3 MS. CLARK: Yes.

4 MS. CLARK: Then I would just like to make
5 the point that it is too late now to raise these as
6 contentions.

7 This is the first that we have heard of
8 these allegations, and they are not in the contentions
9 in the October 2004 report. And so this is not the
10 time to raise allegations, and to claim that there is
11 testimony that he can obtain later on, presumably.

12 CHAIR BOLLWERK: All right, anything
13 further from any of the parties?

14 MR. REPKA: No.

15 CHAIR BOLLWERK: All right. Let me just
16 check with --

17 (Pause.)

18 CHAIR BOLLWERK: We are prepared to deal
19 with both of the matters that were raised in the LES
20 motion. As to the question of the, I think, the
21 Claibourne matter, using the dose estimates in their
22 relationship to what is perceived as problems with the
23 DEIS, the Board's view is that while this was a
24 contention of omission that raised certain questions
25 about what wasn't there, and also about, at least

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1 peripherally, what the items that were there, and the
2 validity of them.

3 Generally, with a contention of omission,
4 procedurally, when that omission is corrected, and
5 there was an FEIS that was issued, the way to respond
6 is to file an additional contention which then raises
7 questions about the omission, if it is incorrect.

8 To cure it, essentially to cure it,
9 questions about the cure. The problem here was that
10 at that point, when the FEIS came out in June of 2005,
11 I believe it was the 15th of June, if I have the right
12 date, this matter was pending with the Commission on
13 appeal.

14 And filing a new contention at that time
15 would have been procedurally difficult, to say the
16 least. It is our feeling that under the circumstances
17 that the best way to proceed, in this instance, is we
18 are going to deny the motion with respect to that
19 particular, I guess it is paragraph C of the original
20 October 2004 motion, and allow that to go forward.

21 The Commission had mentioned summary
22 disposition, that seems to us that may well be
23 appropriate in this instance. So at some point the
24 parties are going to have to interact.

25 It sounds to me like from what has been

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1 described, there are deficiencies, the Staff has
2 provided an explanation, whether that is adequate or
3 not, I don't know.

4 In terms of the technical side of it we
5 don't know the adequacy of that, either, but it needs
6 to be addressed. I don't think that is going to be
7 done today, I don't see how you all could do that. It
8 sounds like Dr. Rice -- is it Mr. Rice, or Dr. Rice?

9 MR. LOVEJOY: Mr. Rice.

10 CHAIR BOLLWERK: Mr. Rice has some
11 concerns, and the Staff may well need to bring
12 additional expertise to bear as well.

13 So that matter will go forward, I guess,
14 on a separate path. Although it doesn't strike us as
15 one that needs to take a great deal of time. And if
16 the summary disposition is not going to work let us
17 know, and we will set it, we have a hearing coming up
18 in March, in theory we can set it then.

19 Right, and we will need a schedule of
20 filings. You all need to talk about whether there is
21 any discovery involved. It sounds like you have
22 already talked about this to some degree, so that may
23 not be the case.

24 It may well be that you can simply join
25 the issue. And if the Staff reaches a determination,

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1 or NIRS/PC that a summary disposition isn't going to
2 be appropriate, and neither of you want to file a
3 motion, let us know, and we will set it for an
4 evidentiary proceeding.

5 In terms of the second half of the motion
6 which deals with the question of the PEIS and whether
7 or not in the context of the Commission's remand,
8 things that we need to be concerned with that has
9 been, essentially, challenges based on that have been
10 waived.

11 We do believe that they have been, such
12 that we wouldn't be considering any challenges to the
13 adequacy of the dose estimates for the wet and dry
14 disposal sites, to the degree that those are set forth
15 in the PEIS.

16 So those are the two rulings that we have
17 on the motion. At this point, then, I think we are
18 ready to move forward with the testimony.

19 I should also say that the Commission, in
20 your motion you mentioned a number of things that the
21 Commission had indicated were not appropriate for
22 disposition, or for consideration, and we would agree,
23 and we have no basis for disagreeing with what the
24 Commission has said with respect to those various
25 items. They have been very clear about it.

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1 Okay, that is where we are at. Let us,
2 then, begin with the disposal testimony. And let me
3 just stop here one second.

4 The Commission has remanded an issue to us
5 that deals with the size of, specifically, with the
6 impacts of large amounts of disposal, potential
7 disposal of large amounts of material.

8 Is that something that you still intend to
9 try to litigate here, given our rulings? Or are we
10 looking at -- are you going to be able, is the
11 evidence that we are going to be hearing on disposal,
12 which again was put in for a different purpose,
13 adequate to deal with that issue, or are we looking at
14 some supplemental, as the Commission indicated might
15 be necessary, supplemental evidence?

16 MR. CURTISS: I think from the Applicant's
17 perspective, Mr. Chairman, what we would propose to
18 do, given the fluidity issue, up until this point, is
19 to call our panel, Mr. Krich and Mr. Potter, at this
20 point.

21 We would like to take the opportunity to
22 ensure that the direct and rebuttal prefiled testimony
23 is supplemented on the issues that are additional to
24 what they addressed, at the beginning of their
25 testimony, through oral questioning, to have basically

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1 direct verbal testimony on some issues.

2 I would conduct that examination at the
3 beginning.

4 CHAIR BOLLWERK: Additional surrebuttal,
5 as we called it before? Although maybe that is not
6 what it is.

7 MR. CURTISS: Well, we would also like to
8 preserve the right to have surrebuttal, as you have
9 previously authorized, after Dr. Makhijani.

10 CHAIR BOLLWERK: All right.

11 MR. CURTISS: But at the beginning of the
12 panel, after introducing the exhibits, and the
13 prefiled testimony, we would like to have the
14 opportunity for oral testimony on certain issues.

15 CHAIR BOLLWERK: All right. Then I guess
16 we are ready to begin with the disposal panel then.
17 Does anyone else want to say anything on that subject,
18 in terms of -- I listened to LES. Mr. Lovejoy or the
19 Staff?

20 MS. CLARK: We are going to also attempt
21 to address some of these issues in our testimony. We
22 may need to supplement later.

23 CHAIR BOLLWERK: All right.

24 JUDGE KELBER: Could I interject a remark?
25 In that connection the reference recently made, Mr.

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1 Lovejoy, is on page 23 of the exhibit 190. And I
2 would think it would be useful if the Staff were able
3 to comment on the analysis presented there, at the
4 appropriate point.

5 CHAIR BOLLWERK: Let me raise, I think,
6 the point that Mr. Lovejoy is about to raise, which is
7 that I think he is a little uncertain about exactly
8 what he is about to be litigating. Am I correct in
9 that respect?

10 MR. LOVEJOY: Well, that is usually the
11 case.

12 CHAIR BOLLWERK: Well, I don't know about
13 usually, but maybe this time. Are you going to
14 attempt to litigate the environmental contention that
15 has been sent back to us as part of this proceeding,
16 or are you --

17 MR. LOVEJOY: Me?

18 CHAIR BOLLWERK: Well, I'm looking at Mr.
19 Curtiss.

20 MR. CURTISS: We intend to establish a
21 record relative to the issue that the Commission has
22 remanded on the impacts of large volumes, insofar as
23 the evaluations that have been done. Yes, sir.

24 CHAIR BOLLWERK: All right. And I take it
25 that that is something that the Staff intends to do,

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1 as well, if I'm hearing correctly?

2 Putting aside the issue that we've
3 indicated probably, it is at least our feeling that it
4 cannot be resolved in this instance. Mr. Lovejoy?

5 MR. LOVEJOY: The issue that is not to be
6 resolved is the one about the deep disposal?

7 CHAIR BOLLWERK: Yes, the Claibourne, if
8 I can use that, the footnote, as it has been referred
9 to, footnote 48, as opposed to 52.

10 MR. LOVEJOY: Well, we are prepared to go
11 forward. I have a sense that the scope of the direct
12 and surrebuttal, and all of that, is sort of being
13 expanded as we sit here.

14 CHAIR BOLLWERK: Well, there may be some
15 discussion about large amounts of material that I
16 don't know, it may have been implicit in some of the
17 testimony, as explicit as it was before, if I'm
18 correct in that assumption.

19 MR. LOVEJOY: Yes, there will certainly be
20 discussion of that. And one of the analysis that will
21 come up is the DOE PEIS. And I'm not absolutely sure
22 what the ground rules are on that, and we hope to
23 actually make reference to some of it, as informative,
24 on some points.

25 CHAIR BOLLWERK: All right, well --

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1 MR. LOVEJOY: There will certainly be
2 other sources of information on these issues that have
3 been remanded to this board.

4 CHAIR BOLLWERK: Well, we will try to deal
5 with those one at a time. And maybe we will get
6 there, and maybe we won't, I don't know. We will have
7 to see.

8 As the Commission said, we should be sort
9 of, they didn't use the word flexible, but use our
10 authority to try to do what is appropriate to get the
11 issue resolved, if we can, here.

12 So we will do the best we can. They also
13 indicated that if there is some supplemental
14 information that we need to take, then we will do
15 that. So we have both options.

16 It may well be that we can develop a
17 record here which everyone will be satisfied with,
18 within the legal parameters the Board has to deal
19 with. And, if not, we can hear argument about that,
20 and do what is appropriate.

21 All right, let me take one second here to
22 pull my testimony.

23 (Pause.)

24 CHAIR BOLLWERK: All right. I see a new
25 face which generally means someone needs to be sworn

1 in.

2 Whereupon,

3 THOMAS POTTER

4 was called as a witness by Counsel for the Applicant

5 and, having been duly sworn, assumed the witness

6 stand, was examined and testified as follows:

7 Whereupon,

8 ROD KRICH

9 was recalled as a witness by counsel for the Applicant

10 and, having been previously duly sworn, assumed the

11 witness stand, was examined and testified as follows:

12 MR. SMITH: Good afternoon. Do you have

13 in front of you the prefiled direct testimony of Rod

14 Krich and Thomas Potter, on behalf of Louisiana Energy

15 Services regarding the Applicant's strategy and cost

16 estimate for the private sector disposal of depleted

17 uranium from the proposed National Enrichment

18 Facility?

19 WITNESS POTTER: Yes.

20 WITNESS KRICH: Yes.

21 MR. SMITH: And was that testimony

22 prepared by you, and under your supervision?

23 WITNESS POTTER: Yes.

24 WITNESS KRICH: Yes.

25 MR. SMITH: And do you have any

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1 corrections to the document at this time?

2 WITNESS POTTER: No.

3 WITNESS KRICH: No.

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

6 WITNESS KRICH: Yes.

7 WITNESS POTTER: Yes.

8 MR. SMITH: I would like to move that
9 their direct testimony be admitted into the record.

10 CHAIR BOLLWERK: All right. Any
11 objections?

12 (No response.)

13 CHAIR BOLLWERK: Hearing none the prefiled
14 direct testimony of Rod Krich and Thomas Potter,
15 regarding the private sector disposal of depleted
16 uranium from the proposed National Enrichment Facility
17 will be adopted into the record as if read.

18 (Whereupon, the direct prefiled testimony
19 of Rod Krich and Thomas Potter was bound into the
20 record as if having been read.)**

21

22

23

24

25

September 16, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

**PREFILED DIRECT TESTIMONY OF ROD KRICH AND
THOMAS POTTER ON BEHALF OF LOUISIANA ENERGY
SERVICES, L.P. REGARDING APPLICANT'S STRATEGY AND COST
ESTIMATE FOR THE PRIVATE SECTOR DISPOSAL OF DEPLETED
URANIUM FROM THE PROPOSED NATIONAL ENRICHMENT FACILITY**

I. WITNESS BACKGROUND

A. Rod M. Krich ("RMK")

Q1. Please state your name, occupation, and by whom you are employed.

A1. (RMK) My name is Rod M. Krich. I am Vice President of Licensing, Safety, and Nuclear Engineering for Louisiana Energy Services, L.P. ("LES"), the license applicant in this matter. I am presently "on loan" to LES from Exelon Nuclear, where I am Vice President, Licensing Projects, and lead Exelon Nuclear's licensing activities relative to future generation ventures. As an Exelon employee, I also have assisted in the Yucca Mountain Project licensing effort, and served as the lead on strategic licensing issues related to the development of a new approach to licensing advanced reactors, such as the Pebble Bed Modular Reactor.

Q2. Please describe your current responsibilities.

A2. (RMK) I am responsible for leading the effort on behalf of LES to obtain a license from the U.S. Nuclear Regulatory Commission ("NRC"), and all necessary state and

federal permits, to construct and operate the proposed National Enrichment Facility ("NEF"), a 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 am testifying as an expert in this proceeding. The purpose of my testimony is to demonstrate that LES has presented a reasonable cost estimate for private sector or commercial disposal of depleted uranium ("DU") byproduct from the proposed NEF, in accordance with the applicable NRC requirements. In so testifying, I will respond to specific concerns raised by intervenors Nuclear Information and Resource Service and Public Citizen ("NIRS/PC") regarding: (1) the plausibility of near-surface disposal of DU in a low-level radioactive waste disposal facility, and (2) the bases for LES's cost estimate for the disposal of DU from the NEF.

B. Thomas E. Potter ("TEP")

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

A7. (TEP) My name is Thomas E. Potter. I am an independent Radiation Protection Consultant based in Washington, D.C.

Q7. Please describe your current responsibilities.

A7. (TEP) As an independent consultant, I provide technical advice, primarily to NRC and Agreement State materials licensees, on a wide array of radiation protection issues. In this capacity, I provide radiation assessments associated with operations and decommissioning, assist in the formulation of licensee positions and comments on proposed radiation protection regulations, perform radiation protection management reviews, conduct radiation protection program audits, and assist in developing plans to implement 10 C.F.R. Part 20.

Q8. Please summarize your educational and professional qualifications.

A8. (TEP) I hold a B.S in Chemistry from the University of Pittsburgh and an M.S. in Environmental Science (Radiation Protection focus) from the University of Michigan. I have

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over 30 years of professional experience in the area of radiation protection. With respect to the contention under consideration, my experience includes health physics, waste management, and environmental aspects of the handling and processing of uranium, trans-uranium, fission product and activation product radionuclides, and the decommissioning of facilities used for processing those radionuclides. This experience specifically includes waste classification evaluations. It also includes radiological dose assessments of operations and decommissioning actions. A detailed statement of my professional qualifications is attached hereto.

Q9. What is the basis of your familiarity with the NEF?

A9. (TEP) I was hired by LES as an expert witness to testify on the proper waste classification of DU under 10 C.F.R. Part 61 and the radiological properties of DU, insofar as these issues relate to the plausibility of disposing of DU in a near-surface disposal facility (*see* Basis I of Contention NIRS/PC EC-6/TC-3). In this capacity, I have reviewed relevant portions of the NEF license application and the NRC's related review documents.

Q10. What is the purpose of your expert testimony?

A10. (TEP) I will testify that depleted U_3O_8 ("DU₃O₈") (the DU disposal form identified by LES in its license application) is appropriately classified as Class A low-level waste under 10 C.F.R. Part 61, and that it may therefore be disposed of in an engineered trench (*i.e.*, near-surface disposal facility) in accordance with the applicable requirements of 10 C.F.R. Part 61 (or compatible Agreement State regulations). In so testifying, I will demonstrate that the comparisons of DU to greater-than-Class C ("GTCC") and transuranic ("TRU") waste made by NIRS/PC (based on certain radiological properties of those materials, such as decay mode, specific activity, and half-life) are inapposite as a regulatory and technical matter, and do not support the conclusion that DU should be disposed of in a deep geologic repository.

II. REGULATORY BACKGROUND - APPLICABLE NRC REQUIREMENTS

Q11. Please describe the NRC regulatory requirements, as well as related NRC guidance, pertinent to LES's proposed private sector strategy and associated cost estimate for the disposal of depleted uranium hexafluoride ("DUF₆") from the NEF.

A11. (RMK) The applicable NRC requirements and guidance, and the manner in which LES has sought to comply with those requirements and guidance, are described in the concurrently filed testimony of another LES witness panel. 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. As explained in that testimony, LES prepared a cost estimate that reflects its "Preferred Plausible Strategy" (or "Option 1") for dispositioning DU, which entails the deconversion, transportation, and disposal of NEF-generated DU by private sector entities within the U.S. See Section 4.13.3.1.3 of the NEF Environmental Report ("ER") (LES Exhibit 109). Using cost information obtained from third party commercial sources, LES estimated the total DU dispositioning cost to be \$4.68/kgU (\$4,680 per MT of uranium), in 2004 dollars. See LES Exhibit 83, at 10.3-3; LES Exhibit 84, Attach. 1 at 2. This figure includes: (1) \$2.69/kgU for deconversion of DUF₆ to DU₃O₈ (of which CaF₂ disposal accounts for \$0.02/kgU), (2) \$0.85/kgU for transportation of DUF₆ and DU₃O₈ (independent of distance), and (3) \$1.14/kgU for disposal of DU₃O₈ in an engineered trench or near-surface low-level radioactive waste disposal facility. See LES Exhibit 84, Attach. 1 at 2. The disposal component of that estimate is the subject of this testimony.

III. RESPONSE TO NIRS/PC CLAIMS REGARDING THE ADEQUACY OF LES'S COST ESTIMATE FOR PRIVATE SECTOR DISPOSAL OF DEPLETED URANIUM

Q12. In Contentions NIRS/PC EC-5/TC-2 ("Decommissioning Costs") and EC-6/TC-3 ("Costs of Management and Disposal of Depleted UF₆"), NIRS/PC have raised certain concerns relative to LES's cost estimate for the commercial dispositioning of DUF₆ from the NEF, including the estimated cost of disposing of DU from the NEF. Are you familiar with these contentions?

A12. (RMK,TEP) Yes. In its current admitted form, and as it pertains to the adequacy of LES's cost estimate for commercial disposal of DU, Contention NIRS/PC EC-5/TC-2 states as follows:

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

In its current admitted form, and as it pertains to the adequacy of LES's cost estimate for commercial disposal of DU, Contention NIRS/PC EC-6/TC-3, in turn, 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:

* * * *

- (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.

In sum, Contentions NIRS/PC EC-5/TC-2 and EC-6/TC-3 contest the adequacy of LES's cost estimate for commercial disposal of DU from the proposed NEF in two respects. First, NIRS/PC claim that LES's estimated disposal cost of \$1.14/kgU lacks "factual bases or documented support." Second, NIRS/PC claim that \$1.14/kgU represents a "serious underestimation" of the disposal cost insofar as disposal of DU in an "engineered trench" is not likely to be technically plausible.

Q13. Please explain what is meant by disposal in an "engineered trench."

A13. (RMK, TEP) The concept of "engineered trench" disposal is discussed briefly in Section 4.13.3.1.4.1 of the NEF Environmental Report ("ER"). See LES Exhibit 109, at 4.13-11. As stated therein, this disposal method is one of the most commonly used methods of low-level radioactive waste ("LLRW") disposal, particularly in arid climates. Disposal in an engineered trench refers to disposal in a "shallow" earthen structure or excavation. Under Part 61 of the Commission's regulations, which address licensing requirements for land disposal of LLRW, shallow or "near-surface" methods of disposal involve disposal at a depth of 30 meters or less (although burial deeper than 30 meters also may be acceptable). See 10 C.F.R. § 61.7(a) (LES Exhibit 101). Generally speaking, a trench is excavated to a depth falling within this range, with the exact depth, length, and width determined by site conditions and the annual volume of waste to be disposed of. Disposal in such a structure involves placing the waste on a stable structural pad with barrier walls of compacted clay, which provides structural stability and a relatively impermeable barrier to waste migration. The containers housing the waste at issue -- grouted DU_3O_8 in this case -- are stacked tightly in the bottom of the structure with forklifts. (Grouted waste refers to the solid material created by mixing the DU_3O_8 with cement and repackaging it in

drums. The purpose of grouting is to increase the structural strength of the waste and reduce its solubility in water.) Any open space between the containers is filled with earth, sand, gravel, concrete or other similar material as each layer of drums is placed in the trench. After the structure is filled, a thick cap of engineered fill and clay is typically placed on top of the waste and compacted to further isolate the waste. Additional material (e.g., gravel and large rocks) is then usually placed on top of the cap to provide a drainage layer and an erosion barrier.

Q14. Is LES's cost estimate for the commercial disposal of DU based on the premise that DU from the NEF would be disposed of in a near-surface disposal facility?

A14. (RMK) Yes. LES intends to deconvert the DUF_6 generated as a byproduct of NEF enrichment operations to the more chemically stable DU_3O_8 form, and to send the DU_3O_8 to an NRC or Agreement State-licensed LLRW waste disposal facility for near-surface disposal as "Class A" low-level waste.

Q15. So contrary to the assertion of NIRS/PC in Basis I of Contention NIRS/PC EC-6/TC-3, you believe that near-surface disposal of DU_3O_8 is plausible from a regulatory and technical standpoint?

A15. (RMK, TEP) Yes.

Q16. Please summarize the basis for the intervenors' claim that the "engineered trench" method of waste disposal is not likely to be acceptable if " DUF_6 is not considered low-level waste."

A16. (RMK, TEP) As an initial matter, we emphasize that the DU to be disposed of by LES is, in fact, LLRW. The DU will result from the isotopic enrichment of natural UF_6 , and hence, the feed, product, and byproduct streams at the NEF will all be in the form of UF_6 . LES will later deconvert the DUF_6 byproduct to DU_3O_8 for disposal purposes. In any event, in CLI-05-5, the

Commission, in this very proceeding, concluded that DU is appropriately classified as LLRW. As the Commission noted, the issue that NIRS/PC appear to be raising in Basis I of Contention NIRS/PC EC-6/TC-3 is whether DU from the NEF can be disposed of in a manner that complies with the 10 C.F.R. Part 61 (or compatible Agreement State) requirements for near-surface disposal. As we understand it, the crux of the intervenors' argument is that near-surface disposal would not be acceptable, because the "radiological hazards" of DU purportedly indicate that DU should be classified in a manner that would require its disposal in a "deep geologic repository," or in a facility comparable to the DOE's Waste Isolation Pilot Plant ("WIPP"). Specifically, NIRS/PC maintain that certain radiological properties of DU -- namely, the decay mode, specific activities, and half-lives of its isotopes -- make DU "most directly analogous to" TRU or GTCC waste.

Q17. Do you agree with these NIRS/PC assertions in any respect?

A17. (RMK, TEP) No.

Q18. Please states the basis for your disagreement.

A18. (TEP) As a regulatory matter, DU is appropriately classified as Class A low-level waste under 10 C.F.R. Part 61. See LES Exhibit 101. Among other things, Subpart D, "Technical Requirements for Land Disposal Facilities," of Part 61 establishes a classification system for evaluating whether radioactive wastes are suitable for near-surface disposal, and for assigning appropriate waste form and stability requirements. See 10 C.F.R. § 61.55. This classification system is based on the amount of radioactivity in waste that results from radionuclides listed in 10 C.F.R. Part 61, Tables 1 and 2. See 10 C.F.R. § 61.55(a)(3). Table 1 lists certain long-lived radionuclides, and Table 2 lists certain short-lived radionuclides. Three classes of radioactive waste (A, B, and C) are defined as eligible for near-surface disposal.

~~PROTECTED MATERIALS~~
~~Confidential Proprietary Information~~

Wastes having more radioactivity than the upper bound of Class C (i.e., "greater than Class C wastes") are generally unacceptable for near-surface disposal.

Thus, for wastes generally suitable for near-surface disposal, there are three classifications. Class A waste is the lowest activity waste suitable for near-surface disposal, and because of the low hazard of such material, Class A waste can be disposed of if it meets the minimum waste form requirements. Minimum waste form requirements include minimizing the amount of free standing liquids not to exceed one percent of the volume; no explosive or reactive materials; and no pyrophoric, toxic, pathogenic, or infectious materials. Class B waste contains radioactivity levels greater than Class A waste, and because of the higher relative hazard, Class B waste must meet the waste form requirements regarding stability. Class C waste, which is the highest activity waste generally suitable for near-surface disposal, must meet the stability requirements and be disposed of with an intruder barrier (which is intended to prevent direct contact of the waste by an inadvertent intruder after institutional control over the disposal site is assumed to cease). See LES Exhibit 101.

Importantly, a radioactive waste that does not contain any radionuclide listed in Tables 1 and 2 is designated as Class A. See 10 C.F.R. § 61.55(a)(6) (LES Exhibit 101). The NRC has listed no form of uranium on either Table 1 or Table 2. Therefore, under the NRC's classification system, DU₃O₈ is a Class A low-level waste. As such, DU₃O₈ is eligible for near-surface disposal, provided that the disposal facility receiving the waste meets the performance objectives and applicable technical standards in 10 C.F.R. Part 61. This is the same conclusion reached by the NRC Staff in this proceeding. See NRC Staff Exhibit 36 (FEIS), at 2-27, 2-31.

Q19. As suggested above, however, the intervenors' expert witness, Arjun Makhijani, has asserted that, "from a scientific point of view the risks that would arise from DU disposal

cannot be considered as less than those from TRU waste disposal." See Arjun Makhijani & 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" (Nov. 24, 2004), at 7 ("Makhijani November 2004 Report"). See NIRS/PC Exhibit [TBD]. In this same vein, he has stated that "10 C.F.R. §.61.55(a) is internally inconsistent," and that "in terms of its radiological properties, [DU] would be most comparable to [TRU] waste, which is similar to the classification of [GTCC] waste under 10 C.F.R. § 61.55(a)." *Id.* at 20. According to Dr. Makhijani, "the clear inference, other than nomenclature" is that "no classification of depleted uranium should be allowed that permits its disposal in anything other than a deep geologic repository." Arjun Makhijani July 21, 2005 Deposition, Tr. at 24, 31. What is your response to these assertions?

A19. (TEP) I would first note that the regulations state what the regulations state, and the conclusion is clear: DU_3O_8 is a Class A low-level waste, and, accordingly, DU_3O_8 is eligible for near-surface disposal. I have reviewed the various technical arguments raised by NIRS/PC and Dr. Makhijani, and they give me no reason to believe that DU_3O_8 , even in large quantities, is unsuitable or otherwise ineligible for near-surface disposal at a licensed LLRW disposal facility.

Q20. Please state the basis for your disagreement with the technical arguments advanced by NIRS/PC and Dr. Makhijani in this proceeding.

A20. (TEP) As I stated earlier, in comparing DU waste to TRU waste and concluding that the two waste types are "directly analogous," Dr. Makhijani focuses on three radiological properties: decay mode, specific activity, and half life. In short, Dr. Makhijani asserts that DU and TRU are comparable because: (1) both emit primarily alpha radiation; (2) the specific activity (radiation emission rate per unit mass) of DU is roughly two to four times the regulatory

threshold (100 nanocuries per gram) used to define TRU waste; (3) and both are long-lived. See NIRS/PC Exhibit [TBD] (Makhijani November 2004 Report), at 4-8. Each of these comparisons, however, is highly misleading, whether viewed in isolation or viewed collectively. These comparisons, which are truly of the "apples-to-oranges" kind, certainly do not support the conclusion that DU is comparable to TRU waste and requires a comparable disposal facility, such as the WIPP.

Q21. Please explain the significance of the fact that DU is an alpha emitter relative to Dr. Makhijani's argument.

A21. (RMK, TEP) The fact that a given isotope is an alpha emitter is, by itself, no indication that the isotope is TRU, or comparable to, TRU material. In fact, many isotopes which are not TRU materials are long-lived alpha emitters that occur in nature.

Q22. Please explain the basis for your conclusion that Dr. Makhijani's comparison of the specific activities of DU and certain TRU radionuclides (Np-237, Pu-238, Pu-239, Pu-240, and Am-241) is similarly misleading.

A22. (TEP) In ostensibly comparing DU and TRU waste, Dr. Makhijani loses sight of an important distinction, *i.e.*, the distinction between TRU "waste" and transuranic radionuclides. TRU waste is defined as waste contaminated with radionuclides possessing atomic numbers greater than uranium (which is 92) and half-lives greater than 20 years, and in concentrations exceeding 100 nanocuries per gram. Thus, although the threshold concentration of TRU waste is 100 nanocuries per gram, when averaged over the entire mass of the waste, only a small fraction of that waste is actually radioactive TRU material. The remainder of the waste is non-radioactive diluting material, typically paper waste, plastic, metal, or other material used in processing plutonium.

In this regard, the specific activity of TRU material in TRU waste is typically on the order of 1 curie per gram or more (*i.e.*, 1 billion nanocuries gram). It follows, therefore, that the radioactivity concentration of TRU waste is typically far higher (indeed, thousands of times higher) than the 100-nanocurie per gram regulatory threshold. In contrast, the maximum possible radioactivity concentration of DU waste is the radioactivity of the DU itself, *i.e.*, about 400 nanocuries per gram on average, far less than that of typical TRU material or TRU waste (*e.g.*, the specific activity of DU_3O_8 is approximately 200,000 times less than the specific activity of TRU nuclides such as Pu-239).

Q23. So in your expert opinion, the disposal of DU does not require the use of methods comparable to those used for TRU waste at the WIPP facility?

A23. (TEP, RMK) Yes. The intervenors' conclusion that a TRU waste facility like WIPP is needed for the disposal of DU is based on the observation that the upper range of specific activities for DU overlaps with a small portion of the lowest end (which NIRS/PC neglect to point out) of what is a very wide range of specific activities for TRU waste. As noted above, the specific activity of typical TRU waste is orders of magnitude higher than the upper limit specific activity for DU. With respect to the WIPP facility in particular, this fact is illustrated in LES Exhibit 102. The average activity concentration in materials placed in WIPP through September 2002 is about 530 times the activity concentration of DU, and the average activity concentrations in the radionuclide component of material deposited in WIPP is even much higher. Specifically, the average activity concentration for all radionuclides (total activity divided by total radionuclide weight) is 84,000 times higher than the average activity of DU. If uranium nuclides are excluded from the nuclide mix, this ratio jumps to 770,000. See LES Exhibit 102. It is important to note that the special design features required for TRU disposal

facilities such as the WIPP are dictated largely by the requirements for the highest specific activity TRU waste, not by the lowest activity waste.

Q24. Does the long half-life of DU indicate that it is comparable to TRU material, as NIRS/PC suggest?

A24. (TEP) No. A longer half-life is directly related to a proportionately lower radiation activity concentration (radiation emission rate per unit mass, in units such as curies per gram). For example, U-238, the principal uranium isotope in DU, has a half-life of approximately 4.46 billion years, corresponding to an activity concentration of 400 nCi/g. Table 2 of Dr. Makhijani's November 2004 Report (*see* NIRS/PC Exhibit [TBD], at 5), which lists half-lives for Np-237, Pu-238, Pu-239, Pu-240, and Am-241 as 2.14 million; 87.7; 24,110; 6,357; and 432 years, respectively, demonstrates that all of these nuclides decay only slowly, but masks the related fact that activity concentrations of these nuclides are higher than the DU activity concentration by the ratio of the U-238 half-life, 4.46 billion years, to the half-life of each particular nuclide. This is an important consideration in limiting TRU wastes to nuclides that are "trans-U", *i.e.*, elements with an atomic number greater than 92.

Q25. Are there any other considerations that you wish to mention in connection with your assessment of the intervenors' argument that DU is comparable to TRU or GTCC and should be disposed of in a deep geologic repository?

A25. (RMK, TEP) Yes. We would note that in considering the characteristics of radioactive materials for purposes of evaluating its suitability for a particular land disposal method, it is useful to consider the manner in which releases of those materials could impact human health (*i.e.*, what the relevant dose equivalents are). For example, NIRS/PC implicitly assume in their specific activity comparison that all nanocuries are equivalent in all respects.

However, from the standpoint of radiation dose -- the ultimate measure of potential radiation harm -- a nanocurie of uranium inhaled or ingested is not necessarily equivalent to a nanocurie of TRU inhaled or ingested. For example, the radiation dose from a nanocurie of plutonium-239, a typical TRU nuclide, dissolved in drinking water is at least 10 times higher than the dose from a nanocurie of uranium dissolved in drinking water. This difference results from different chemical behaviors of uranium and plutonium in the body. Different radionuclides also behave differently in the environment because of chemical differences. That is, quantitatively identical sources of TRU and uranium nuclides can be expected to result in different radionuclide concentrations in environmental media, quantitatively different radionuclide intakes to persons consuming the media, and thus different radiation doses. The bottom line is that, if a disposal facility receiving the DU waste meets the performance objectives and applicable technical standards in 10 C.F.R. Part 61, the DU-related dose equivalents will be acceptable.

Q26. Do have any reason to believe that a near-surface disposal facility cannot meet the performance objectives and applicable technical standards in 10 C.F.R. Part 61 or compatible Agreement State regulations?

A26. (RMK, TEP) No. We have no reason to doubt the technical feasibility of near-surface disposal of large volumes DU_3O_8 at a licensed low-level radioactive disposal facility. By way of example, Envirocare of Utah ("Envirocare") has confirmed for LES that the existing licenses and permits for Envirocare's Clive, Utah facility currently allow Envirocare to dispose of DU_3O_8 subject to the material meeting Envirocare's licenses, permits, and operational requirements, and that Envirocare has previously received and disposed of DU_3O_8 using the shallow land burial method in accordance with its regulatory authorizations in a cell with a cap (i.e., a Class A disposal cell). See LES Exhibit 103.

On a related note, staff from the pertinent Agreement State regulator, the Utah Division of Radiation Control ("DRC"), has confirmed that DRC has "no reservations about [Envirocare] accepting DU in the oxide form (specifically DU_3O_8)," and that the DRC is aware of "no volume restrictions in the Envirocare license." See LES Exhibit 104, at 2. As reflected in its FEIS, the NRC has effectively concurred in this determination. See Staff Exhibit 36, at 4-63.

It also warrants mention that the DOE, based on its own generic analyses of DU disposal in Appendix I of its 1999 Programmatic Environmental Impact Statement for the management of DUF_6 , has concluded that near-surface disposal of DU_3O_8 in a dry environment is acceptable from a radiological health standpoint. See LES Exhibit 18, Appendix I ("Environmental Impacts of Options for Disposal of Oxide"). Indeed, in its 2004 site-specific EISs for the Portsmouth and Paducah deconversion facilities, DOE has identified Envirocare as its primary or "Proposed Disposition" site. See, e.g., LES Exhibit 16, Vol. 1, at 2-12 (Table 2.2-1), 2-18 (Table 2.2-2). Significantly, the volume of DU_3O_8 to be disposed of by DOE exceeds the volume of DU_3O_8 to be disposed by LES by roughly four times.

Q27. Putting aside the issue of the technical plausibility of near-surface disposal, please state your view relative to intervenors' argument that LES's commercial cost estimate lacks "factual bases and documented support."

A27. (RMK) The specific bases and assumptions underlying LES's estimated disposal cost of \$1.14/kgU for DU_3O_8 have been fully documented through clarifying information packages submitted to the NRC Staff, and approved as reasonable by the Staff in its SER. The estimate is based on information provided by WCS and Envirocare. Specifically, in its January 14, 2005 Memorandum of Agreement ("MOA") with LES, WCS indicated that anticipated disposal prices for depleted uranium waste disposal at the WCS site would range from

approximately [REDACTED] per cubic foot. See LES Exhibit 105. In view of the \$75 per cubic foot cost estimate previously provided by Envirocare for disposal of large quantities of bulk low-level radioactive waste, LES used the lower end of the WCS range (i.e., \$ [REDACTED] per cubic foot). See LES Exhibits 106, 107; Staff Exhibit 37 (SER), at 10-12. Taking into account the total volume of DUF_6 that will require disposal (roughly 130 thousand MT of DU), LES used appropriate conversion factors ($1 \text{ MT DUF}_6 = 0.68 \text{ MT U} = 0.8 \text{ MT DU}_3\text{O}_8$) and two different DU_3O_8 densities (i.e., [REDACTED] and [REDACTED] grams per cubic centimeter, which are considered to be representative of the actual DU_3O_8 density that would be achieved) to compute an average unit disposal cost of \$1.14 per kgU. See LES Exhibit 96 (Enclosure).

Q28. Please explain why LES views \$1.14/kgU to be a reasonable cost estimate for the disposal of DU_3O_8 from the NEF.

A28. (RMK) LES considers the \$1.14/kgU cost estimate to be reasonable insofar as it is based on information obtained from commercial sources with relevant cost information and/or experience. The DOE's DU dispositioning cost estimate lends further support to this conclusion. The DOE's cost estimate for disposal of DU_3O_8 , which likewise is premised on near-surface disposal of DU_3O_8 , is \$ [REDACTED] /kgU, approximately [REDACTED] times less than LES's cost estimate. See LES Exhibit 87, at 13. In this regard, LES's estimate appears to be conservative. The DOE \$ [REDACTED] /kgU cost figure is based on a DU near-surface disposal cost of approximately \$ [REDACTED] /ft³ (a price quote provided by Envirocare to UDS) (see LES Exhibit 87, at 10), which falls within the range of disposal costs cited by DOE on its online "Depleted UF_6 Management Information Network" (<http://web.ead.anl.gov/uranium>). Specifically, on its website, DOE states that "[c]urrent estimates of disposal costs range from about \$250 to \$1,100 per cubic meter," which is about \$7 to \$31 per cubic foot (using the conversion of 1 cubic meter = 35.315 cubic feet). See

LES Exhibit 108. Notably, the average or typical disposal fees charged by Envirocare to commercial entities (about \$25/ft³) for disposal of low-level radioactive waste at Envirocare's Utah facility, as identified in the prefiled direct testimony of LES witness Thomas LaGuardia (on the contingency factor issue), also fall within this range. 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," dated September 16, 2005. These facts indicate the conservatism inherent in LES's use of \$/ft³ as the estimated cost for near-surface disposal of DU₃O₈.

Q29. Does this conclude your testimony?

A29. (RMK, TEP) Yes.

RESUME

Rod M. Krich
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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 10CFR50.59 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 10CFR50.59 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 I-Honorary Fraternity
American Association for the Advancement of Science

REFERENCES

Furnished upon request

THOMAS E. POTTER

Education

M.S. Environmental Science (Radiation Protection), University of Michigan, 1972
B.S. Chemistry, University of Pittsburgh, 1963

Professional Experience

1991-present INDEPENDENT CONSULTANT

Radiation Protection Consultant. Consultant on wide variety of radiation protection matters, primarily for private U.S. Nuclear Regulatory Commission or Agreement State materials licensees. Projects include environmental radiation dose assessments associated with operations and decommissioning, assistance in formulation of licensee positions and comments on developing decommissioning regulations, radiation protection management reviews, radiation protection program audits, and assistance in planning implementation of revisions to 10 CFR Part 20.

1984-1990 MORTON AND POTTER

Partner and Consultant. Responsible for consulting projects on radiation protection matters related primarily to nuclear power and the nuclear fuel cycle. Projects included radiation protection management reviews, radiation protection program audits, and environmental radiation dose assessments. Lectured and conducted computer workshops in Cairo as part of a course on environmental radiation dose assessment sponsored by the International Atomic Energy Agency for the Egyptian government.

1973-1984 PICKARD, LOWE AND GARRICK, INC.

Consultant and Senior Consultant. Consulted and managed consulting projects on health and safety aspects of nuclear power at Pickard, Lowe, and Garrick, Inc. Projects included probabilistic analyses of off-site consequences of power reactor accidents as part of full-scope probabilistic risk assessments for nuclear power plants, design and development of software for such analyses, environmental radiation dose assessments, independent review of in-plant radiation protection programs, and design and implementation of occupational and environmental radiation monitoring programs. Participated in comprehensive assessment of radiation dose to the public from the Three Mile Island accident (dose reconstruction).

1972-1973 CONTRACT CONSULTANT

Consultant to Dr. G. Hoyt Whipple of the University of Michigan in his private radiation protection consulting practice. Assisted in preparation of radiation protection programs and environmental radiological assessments in support of licenses for construction and operation of nuclear power plants.

1963-1970

NUCLEAR MATERIALS AND EQUIPMENT CORPORATION

Plutonium Process Chemist (1963-66), Plutonium Fuel Facility Health and Safety Supervisor (1966-69), and License Administrator (1969-70). Performed radiation safety reviews, prepared license applications, and served as corporate licensing contact with AEC. Organized and supervised a radiation protection program for a plutonium fuels fabrication facility and irradiated fuel examination hot cell facility. Secretary of a plant safety committee that inspected all operations and reviewed detailed operating procedures. Member of a corporate safety committee, which determined corporate policy regarding health and safety.

Summary of Professional Accomplishments

Managed and performed environmental radiological assessments for the no action case and for candidate remedial action alternatives supporting U.S. Nuclear Regulatory Commission license termination for two sites that processed niobium-tantalum ore containing source material concentrations of uranium, thorium and their radioactive progeny, including radium-226.

Managed and performed environmental radiological assessments for the no action case and for candidate remedial action alternatives for a 10 CFR 20.302 uranium disposal area under the U.S. Nuclear Regulatory Commission Site Decommissioning Management Plan.

Managed and performed an environmental radiological assessment for a uranium fuel fabrication facility decommissioning under the U.S. Nuclear Regulatory Commission Site Decommissioning Management Plan.

Participated in environmental radiological assessment activities associated with the development of decommissioning plans for several other sites under the U.S. Nuclear Regulatory Commission Site Decommissioning Management Plan.

Managed and performed environmental radiological assessment for the disposal of soils containing uranium and thorium and decay products in a RCRA disposal facility.

Participated as one of two principal investigators in a comprehensive critical analysis of NUREG-1496, the NRC Draft GEIS in support of its rulemaking to establish radiological criteria for decommissioning.

Participated in design of an assessment of the radiological impacts on the public from past operation of a DOE weapons facility.

Participated in radiological assessment of radon emanation from naturally occurring radioactive materials (NORM) in extraction residues from ores processed for phosphate fertilizer production.

Participated in industry review and comment on EPA evaluation of the radiological assessment of radon emanation from NORM in phosphate fertilizer production residues used as fill material in housing construction.

Performed detailed management reviews of power reactor radiation protection programs at two nuclear utilities.

Participated in a detailed radiation protection management review at a fuel cycle facility.

Conducted independent audits of material licensee radiation protection programs.

Managed an environmental analysis to support federal and state licensing of a low-level radioactive waste compaction and incineration facility and provided supporting testimony in the NRC hearing.

Participated in a variety of environmental radiological assessments, including assessments supporting a

materials licensee pond decommissioning, the application of sewage sludge contaminated with low levels of radioactive material as agricultural fertilizer, and the state permitting of a phosphate ore processing plant.

Participated in activities supporting the Fuel Cycle Facilities Forum, including the preparation of formal comments on the initial draft of NUREG/CR-5512, "Residual Radioactive Contamination from Decommissioning," ultimately intended to serve as an NRC technical methodology for the derivation of permissible residual contamination levels for decommissioning.

Participated in the design and development of the CRACIT code, a computer program for probabilistic assessment of power reactor accident consequences, and managed development and integration of dose and health effect assessment modules.

Managed and participated in the performance of probabilistic analyses of off-site consequences of power reactor accidents as part of full-scope probabilistic risk assessments for six nuclear power plants.

Managed a severe accident consequence assessment performed as part of a study of the use of PRA methodology in evaluating changes to emergency response plans.

Participated in a comprehensive assessment of off-site radiation (dose reconstruction) from the Three Mile Island accident.

Developed a mathematical model to assess radiation doses from effluents from normal operation of nuclear power plants.

Performed environmental radiation dose assessments for nuclear power plant safety analyses, environmental reports, and operating reports.

Prepared radiological health sections of safety analysis reports for two nuclear power plants.

Assisted two clients in design and implementation of occupational and environmental radiation monitoring programs and interpretation of results.

Provided independent review of in-plant radiological programs and effluent analysis programs for two nuclear power plants.

Designed environmental monitoring programs for two nuclear power plants and evaluated data from those programs.

Provided radiological safety review of major plutonium fuel facility modifications, used those analyses and nuclear criticality analyses performed by others to prepare AEC special nuclear materials and byproduct license applications.

Instituted personnel monitoring programs using thermoluminescent dosimetry and breathing-zone aerosol sampling in 1967.

Professional Affiliations and Awards

Member, American Nuclear Society
Member, American Chemical Society
AEC Nuclear Science and Engineering Graduate Fellowship in Radiation Protection

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the "PREFILED DIRECT TESTIMONY OF ROD KRICH AND THOMAS POTTER ON BEHALF OF LOUISIANA ENERGY SERVICES, L.P. REGARDING THE ADEQUACY OF APPLICANT'S STRATEGY AND COST ESTIMATE FOR THE PRIVATE SECTOR DISPOSAL OF DEPLETED URANIUM HEXAFLUORIDE FROM THE PROPOSED NATIONAL ENRICHMENT FACILITY" in the captioned proceeding has been served on the following, on this 15th day of September 2005, for overnight delivery via Federal Express.

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Attn: Rulemakings and Adjudications Staff
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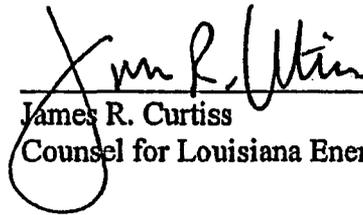
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James R. Curtiss
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1 MR. SMITH: Do you have in front of you
2 now the prefiled rebuttal testimony of Rod Krich and
3 Thomas Potter, on behalf of Louisiana Energy Services,
4 regarding the Applicant's strategy and cost estimate
5 for the private sector disposal of depleted uranium
6 from the proposed National Enrichment Facility?

7 WITNESS POTTER: Yes.

8 WITNESS KRICH: Yes.

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

11 WITNESS POTTER: Yes.

12 WITNESS KRICH: Yes.

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

15 WITNESS POTTER: 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 POTTER: Yes.

20 WITNESS KRICH: Yes.

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

23 CHAIR BOLLWERK: All right. Any
24 objections?

25 (No response.)

NEAL R. GROSS

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CHAIR BOLLWERK: Hearing none then the prefiled rebuttal testimony of Rod Krich, with the Applicant's strategy and cost estimate for private sector disposal of depleted uranium will be adopted into the record as if read.

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

October 11, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

**PREFILED REBUTTAL TESTIMONY OF ROD KRICH AND
THOMAS E. POTTER ON BEHALF OF LOUISIANA ENERGY SERVICES, L.P.
REGARDING APPLICANT'S STRATEGY AND COST ESTIMATE
FOR THE PRIVATE SECTOR DISPOSAL OF DEPLETED URANIUM**

I. WITNESS BACKGROUND

Q1. Please state you 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 Potter on Behalf of Louisiana Energy Services, L.P. Regarding Applicant's Strategy and Cost Estimate for the Private Sector Disposal of Depleted Uranium

from the Proposed National Enrichment Facility" (Sept. 16, 2005) (hereinafter "LES Disposal Direct Testimony").

I, Thomas E. Potter ("TEP"), am an independent Radiation Protection Consultant based in Washington, D.C. I provide technical advice, primarily to NRC and Agreement State materials licensees, on a wide array of radiation protection issues. For example, I provide radiation assessments associated with operations and decommissioning, assist in the formulation of licensee positions and comments on proposed radiation protection regulations, perform radiation protection management reviews, conduct radiation protection program audits, and assist in developing plans to implement 10 C.F.R. Part 20. My experience includes, among other things, the performance of waste classification evaluations and radiological dose assessments of operations and decommissioning actions. 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 Disposal Direct Testimony.

Q2. What is the purpose of this rebuttal testimony?

A2. (RMK. TEP) The purpose of this rebuttal testimony is to respond to certain claims contained in the prefiled direct testimony of Arjun Makhijani regarding LES's depleted uranium ("DU") disposal strategy and 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 LES's Disposal Strategy and 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 raise any legitimate challenge to the plausibility of LES's private sector strategy for DU disposal, or to the reasonableness of LES's associated cost estimate.

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

Q3. In Answer 5 of his prefiled direct testimony, Dr. Makhijani states that "no shallow-land burial site has been specifically identified by LES as the final destination for the DU_3O_8 that would be generated," and that "the NRC FEIS [Final Environmental Impact Statement] considers only the Hanford and Envirocare sites as potential options." Makhijani Direct Testimony, Answer 5 at 9. He adds that "the option of disposal at the proposed Waste Control Specialists LLC ("WCS") facility in Andrews County, Texas "was explicitly removed from consideration by the NRC." Do you agree with Dr. Makhijani's characterizations of the Staff's FEIS?

A3. (RMK) No. As is evident from the FEIS itself and the prefiled direct testimony of the NRC Staff on DU disposal issues, the NRC Staff considered several "currently [] active, licensed commercial low-level radioactive waste ["LLRW"] disposal facilities," a DOE disposal facility, and a potential future LLRW disposal facility in its FEIS as potential disposal options. See NRC Staff Exhibit 36, at 2-31 to 2-32; "NRC Staff Testimony Regarding Disposal" (Sept. 15, 2005) ("NRC Staff Disposal Testimony"), Answers 9-10 at 5-6. Specifically, the Staff considered the Barnwell site in Barnwell, South Carolina; the Hanford commercial site in Hanford, Washington; the Envirocare site in Clive, Utah; the DOE's Nevada Test Site ("NTS"), located in Nye County, Nevada; and the WCS facility. With respect to the WCS option in particular, the Staff has concluded that LES could dispose of DU from the NEF at WCS,

provided WCS obtains a license to accept material (WCS currently is licensed to accept RCRA hazardous waste for disposal) and "certain procedures and processes are successfully addressed," as set forth in the FEIS. *See* NRC Staff Disposal Testimony, Answer 10 at 6. As reflected in the FEIS, the Staff is alluding to the potential need for LLRW Compact approval of the exportation, importation, and disposal of depleted uranium oxides (a need that would be contingent upon the location of any future commercial facility built to deconvert depleted uranium hexafluoride ("DUF6") from the NEF to DU_3O_8). *See* Staff Exhibit 36, at 2-33. Finally, while the Staff added that the need for separate regulatory actions prior to disposal at WCS ultimately might cause LES or the DOE to favor the selection of an already-licensed disposal site (*see* NRC Staff Exhibit 36, at 2-33), the Staff did not "explicitly remove" WCS from consideration in its FEIS.

Q4. Dr. Makhijani further states that "[t]he FEIS focuses heavily on the choice of Envirocare and, in fact, draws no conclusions about the environmental impacts of disposal at Hanford." Makhijani Direct Testimony, Answer 5 at 10. Please state your views regarding this additional characterization of the FEIS.

A4. (RMK) In discussing the potential environmental impacts of disposal of DU_3O_8 , the Staff stated that, as Class A low-level waste, DU_3O_8 would need to be disposed of in a facility licensed to accept Class A waste. Staff Exhibit 36, at 4-63. As the Staff further recognized in the FEIS, "[t]he environmental impacts at the shallow disposal sites considered for disposition of low-level radioactive waste would have been assessed at the time of initial license approval of these disposal facilities or as a part of any subsequent amendments to the license." NRC Staff Exhibit 36, at 4-63. The Staff cited Envirocare as one example of this fact, noting, in particular, that Envirocare has met Utah's LLRW disposal licensing requirements, which, given Utah's status as an NRC Agreement State, are required to be compatible with the NRC's 10

C.F.R. Part 61 regulations. In any event, it is the *plausibility* of near-surface disposal of DU -- not the adequacy of the Staff's consideration of the associated environmental impacts -- that is at issue in this portion of the proceeding.

Q5. With respect to 10 C.F.R. Part 61, Dr. Makhijani points out that the final EIS issued in connection with the 1982 10 C.F.R. Part 61 rulemaking states that "[a]nalysis of the database for the Part 61 EIS indicates that the types of uranium-bearing wastes typically disposed of by NRC licensees do not present a sufficient hazard to warrant limitation on the concentration of this naturally occurring material." Makhijani Direct Testimony, Answer 5, at 12. He states that "[s]ince uranium was removed from consideration based on this fact, the results of applying the 10 C.F.R. Part 61 performance assessment methodology to uranium were not presented by the NRC at that time." Do these statements alter your conclusion that disposal of DU_3O_8 as Class A waste is plausible?

A5. (RMK, TEP) No. The absence of a specific concentration limit for depleted uranium or uranium nuclides in 10 C.F.R. Part 61 or a related Part 61 performance assessment does not preclude near-surface disposal of DU. As the Commission has pointed out in this proceeding, concentrations limits and other technical requirements are "intended to help ensure that the performance objectives established in Subpart C are met," but they are "not the end-in-themselves, ... [only] a means of achieving the end," which is meeting the performance standards. See CLI-05-5, at 11 (quoting NUREG-0945, *Final Environmental Impact Statement on 10 C.F.R. Part 61, Licensing Requirements for Land Disposal of Radioactive Waste*, NRC/NMSS (Nov. 1982), Vol. 2 at B-91 ("Part 61 FEIS")). As LES has previously noted, the Commission has emphasized that "[t]he Part 61 regulation is intended to be performance-oriented rather than prescriptive, with the result that the Part 61 technical criteria are written in

relatively general terms, allowing applicants to demonstrate how their proposal meet these criteria for various near-surface disposal methods." Advanced Notice of Proposed Rulemaking, *Definition of High-Level Waste*, 52 Fed. Reg. 5992, 5999 (Feb. 27, 1987). See LES Exhibit 111. The Part 61 FEIS cited by NIRS/PC specifically notes that "prescriptive requirements were established where they were deemed necessary and where sufficient technical information and rationale were available to support them." Part 61 FEIS, at S-3 to S-4. See LES Exhibit 112. That being said, when the Commission consciously chose not to impose specific concentration limits on uranium-bearing wastes, it necessarily recognized that such wastes would be classified as Class A waste under 10 C.F.R. § 61.55(a)(6), and, therefore, eligible for disposal in a near-surface or shallow land disposal facility.

Q6. So what is your response to Dr. Makhijani's claim that the Commission has "explicitly endorsed" the NIRS/PC position that "the legal classification of DU as low-level waste does not settle the question as to the suitability of proposed disposal options?"

A6. (RMK, TEP) To expand on our previous point, a radioactive waste that does not contain any radionuclide listed in Tables 1 and 2 of Section 61.55 (a)(6) is designated as Class A. See 10 C.F.R. § 61.55(a)(6) (LES Exhibit 101). The NRC has listed no form of uranium on either Table 1 or Table 2. Therefore, under the NRC's classification system, DU_3O_8 is a Class A low-level waste. As such, DU_3O_8 is eligible for near-surface disposal, provided that the particular disposal facility receiving the waste meets the performance objectives and applicable technical standards in 10 C.F.R. Part 61. The performance objectives thus come into play when a specific site is under consideration.

Dr. Makhijani, by contrast, ignores the regulations (or "nomenclatural differences" as he puts it), operating under the pretense that the purported "radiological similarity between [DU]

and [transuranic] TRU waste" will "require disposal [of DU] in a deep geologic repository comparable to the Waste Isolation Plant (WIPP) now operating in New Mexico." Makhijani Direct Testimony, Answer 15 at 49. The NRC's Part 61 regulations (or compatible Agreement State regulations), however, do not support such a conclusion or result, insofar as they "require" (*i.e.*, Sections 61.55(a)(2)(iv) and 61.58 permit the Commission to approve exceptions on a case-specific basis) deep geologic repository disposal for greater-than-Class C ("GTCC") waste only. In any event, for the reasons set forth in our direct testimony, it is not technically sound to characterize DU as "directly comparable" to TRU or GTCC waste.

Q7. In Question and Answer 7 of Dr. Makhijani's direct testimony, NIRS/PC seek to argue that no strategy for disposal of DU can be considered plausible without the presentation of a site-specific analysis demonstrating compliance with the dose limits of 10 C.F.R. Part 61 and other applicable environmental regulations. Do you agree with this assertion?

A7. (RMK, TEP) No. As we explained in our prefiled direct testimony, there is ample information demonstrating that disposal of large volumes of DU as Class A low-level waste in a near-surface disposal facility is plausible (*i.e.*, more than "mere speculation"), and, in turn, that the estimation of DU disposal costs on this basis is reasonable. For example, in the case of Envirocare facility, the licensee and the cognizant regulatory entity (the Utah Division of Radiation Control or "DRC") have confirmed that Envirocare is authorized to accept DU_3O_8 for disposal at its Clive, Utah facility subject to no uranium-specific volume restrictions, and that Envirocare has, in fact, previously disposed of DU_3O_8 in its Class A disposal cell. See LES Exhibits 103-104. The Utah DRC's communications with the NRC Staff indicate that site-specific performance assessments have been conducted at Envirocare. See LES Exhibit 104, at 2. Additionally, the DOE has independently concluded that shallow land disposal of its own

inventory of DU at appropriate disposal facilities is feasible and safe, and has specifically identified Envirocare and the NTS (a DOE facility) as potential disposal sites. *See, e.g.*, LES Exhibit 16, Vol. 1 at 1-20 to 1-21.

We view the foregoing third-party representations from a licensed disposal vendor (Envirocare), an NRC Agreement State agency (the Utah DRC), and the DOE as clear and reliable indications that disposal of DU in a near-surface facility is plausible. In this regard, a detailed "site-specific analysis" or "performance assessment" of the type apparently contemplated by NIRS/PC is unnecessary for purposes of demonstrating that LES's private sector disposal strategy is "plausible," and that LES's corresponding cost estimate is based on a reasonable assumption. Indeed, such a conclusion is consistent with the Board's ruling in this proceeding that the parties are not to chart and plumb the depths of the current or prospective licensing bases for particular disposal facilities (*i.e.*, Envirocare and WCS, respectively).

Q8. Please explain the significance of "Agreement State" status relative to the plausibility of disposal of DU at a near-surface disposal facility that is located in such a state.

A8. (RMK, TEP) By way of example, the Envirocare facility is licensed to operate and receive LLRW for disposal by the Utah Department of Environmental Quality's Division of Radiation Protection, which is an NRC Agreement State agency. (The Barnwell, Hanford, and WCS sites are also located in NRC Agreement state.) This means that the NRC has evaluated the Utah laws and regulations, including those pertaining to the land disposal of LLRW, implemented by the DRC, to ensure that they provide administration, licensing, and enforcement programs that are equivalent to those of the NRC. The NRC itself thus has no direct role in licensing activities pertaining to disposal of LLRW at Envirocare. Therefore, the authorization that Envirocare has received to dispose of Class A waste -- which the Utah DRC has made clear

encompasses large volumes of DU -- is a determination solely within the purview of that agency, but one which reflects the implementation and enforcement of LLRW land disposal requirements (including performance objectives and dose standards) at least as stringent as those set forth in 10 C.F.R. Part 61.

Q9. With respect to the DOE's consideration of DU disposal options, Dr. Makhijani states that it is incorrect to claim that the DOE has selected a disposal option, and that DOE has "instead reiterated the long-expressed position that disposal in a low-level waste facility would be desired, but that additional analysis would need to be done before the suitability of any particular option could be determined." Makhijani Direct Testimony, Answer 6 at 14 (citing LES Exhibit 16, Vol. 1 at 2-12; LES Exhibit 17, Vol. 1 at 2-11). Do you agree with this characterization of DOE's position on the matter of DU disposal?

A9. (RMK) No. It is correct that DOE has not made a final decision with respect to the LLRW disposal site(s) at which it will dispose of its DU inventory subsequent to deconversion activities. However, the "additional analysis" that DOE intends to conduct relates to its need to comply with the agency's obligations under the National Environmental Policy Act ("NEPA"), particularly with respect its consideration of disposal alternatives. The Portsmouth and Paducah EISs cited by Dr. Makhijani state only that "DOE plans to decide the specific disposal location(s) for the depleted U_3O_8 conversion product after additional appropriate NEPA review," and that DOE will continue to evaluate its disposal options and will consider any further information or comments relevant to that decision." See, e.g., LES Exhibit 16, Vol. 1 at 2-18, Table 2.2-2 (note a). As the Staff correctly explains in the NEF FEIS, this means only that "DOE recognizes that there could be commercial applications for the U_3O_8 , and the possibility exists that other disposal options could become available in the future (after the satisfactory

completion of appropriate NEPA or environmental review and licensing processes)." Staff Exhibit 36, at 2-31.

Q10. Thus, notwithstanding the need for additional NEPA review, is it still your view that the DOE considers of large volumes of DU_3O_8 in a near-surface LLRW disposal facility to be plausible and capable of being done in a manner protective of the public health and safety?

A10. (RMK, TEP) Yes. Section 1.6.2.4 ("Conversion Product Disposition") of the Portsmouth and Paducah EISs plainly states the DOE's conclusion:

Studies conducted by [Oak Ridge National Laboratory] ORNL for DOE indicate that both the Nevada Test Site (NTS) (a DOE facility) and Envirocare of Utah, Inc. (a commercial facility) are potential disposal facilities for depleted uranium (Croff et al. 2000a, b). These studies included reviews of the LLW acceptance programs and disposal capacities of both NTS and Envirocare of Utah, Inc. It was concluded that either facility would have the capacity needed to dispose of the U_3O_8 product from the proposed DOE DUF_6 conversion program, and that the U_3O_8 material to be sent to these facilities would likely meet each site's waste acceptance criteria. In its proposal to design, construct, and operate the DUF_6 conversion facilities, [Uranium Disposition Services] UDS provided evidence that both sites can presently accept the U_3O_8 and identified the Envirocare facility as the primary disposal site and NTS as the secondary disposal site.

See LES Exhibit 16, Vol. 1 at 1-20. Additionally, in Appendix I of its 1999 Programmatic Environmental Impact Statement ("PEIS") for the long-term management of DUF_6 , DOE performed its own generic analyses of DU disposal, and concluded that near-surface disposal of DU_3O_8 in a "dry" environment (such as that found at the Envirocare and NTS sites) would be acceptable. See LES Exhibit 18, Vol. 2 at Appendix I ("Environmental Impacts of Options for Disposal of Oxide"). In response to a public comment on the 1999 PEIS, the DOE described its analysis in summary fashion:

The PEIS assumes that any depleted uranium oxide disposed of would be classified as LLW. The evaluation of disposal options in the PEIS considered disposal in representative facilities which could be used for the

disposal of LLW, including shallow earthen structures, vaults, and mines. Because the PEIS is not intended to identify sites for future management activities, the potential impacts of the disposal options were evaluated using generic environmental settings, and considered both "wet" and "dry" sites. The characteristics of these settings were selected to provide as substantive an assessment as possible and to allow for a comprehensive comparison of the alternatives. After the Record of Decision for the PEIS, potential facility locations would be evaluated and appropriate site-specific analyses for any required facilities would be conducted. See LES Exhibit 113 (emphasis added).

Q11. Please briefly describe the results of the DOE's generic analysis.

A11. (RMK, TEP) According to the DOE, the detailed analysis of disposal presented in the PEIS does indicate that the dose to a hypothetical receptor from contaminated groundwater would exceed regulatory limits for a disposal facility in a "wet" environment for all three disposal options considered, including disposal in a mine. However, the analysis also indicates that groundwater impacts would be less than regulatory limits for a disposal facility located in a "dry" environment, including shallow earthen structures and vaults. These results are further summarized in Section 2.4.5, and presented in detail in Section I.4 of Appendix I of the PEIS. See LES Exhibit 18.

Q12. In Answer 7 (page 16) of his prefiled direct testimony, Dr. Makhijani excerpts a passage from the DOE PEIS, the gist of which is that DOE's generic disposal evaluation is subject to some uncertainty, insofar it is very dependent on assumptions made for the assessment, and key factors or parameters (e.g., soil characteristics, water infiltration rates, depth to groundwater, uranium chemistry, etc.) vary widely depending on site-specific conditions. Does this fact alter in any way your conclusion regarding the plausibility of near-surface disposal of DU?

A12. (RMK, TEP) No. Notably, Dr. Makhijani omits the last sentence of the excerpted paragraph, which states that: "Therefore, a range of these factors was selected for analysis to represent the range of actual conditions that could occur." See LES Exhibit 18, Vol. 2, App. I at I-3 to I-4. This fact did not preclude the DOE from identifying the Envirocare facility as the primary disposal site and NTS as the secondary disposal site, based on technical assessment and input from ORNL and UDS. The disposal evaluation set forth in Appendix I of the DOE PEIS was performed for NEPA purposes, and the DOE indicated that it "plans to decide the specific disposal location(s) for the depleted U₃O₈ conversion product after additional appropriate NEPA review." See LES Exhibit 16, Vol. 1 at 1-21. Moreover, the DOE noted that "[a]ssessment of the impacts and risks from on-site handling and disposal of at the LLW disposal facility are deferred to the disposal site's site-specific NEPA or licensing documents." See LES Exhibit 16, Vol. 1 at 1-21. Finally, DOE indicated that the specific disposal site(s) would be (1) selected in a manner consistent with DOE policies and orders and (2) authorized or licensed to receive the conversion products by DOE (in conformance with DOE directives), the NRC (in conformance with NRC regulations), or an NRC Agreement State agency (in conformance with state laws and regulations determined to be equivalent to NRC regulations). See LES Exhibit 16, Vol. 1 at 1-21.

Q.13 In Answer 16 of his testimony, Dr. Makhijani maintains that "[i]n terms of its radiological properties, [DU] would be most comparable to [TRU] waste," which, he further asserts, "is similar to the classification of [GTCC] waste under 10 C.F.R. 61.55(a)." Makhijani Direct Testimony, Answer 16 at 50. Do you agree with this assertion?

A13. (RMK, TEP) No. Because NIRS/PC have made this claim from the outset of this proceeding, we largely anticipated and addressed in our direct testimony the arguments offered

by Dr. Makhijani in support of the claim. See LES Disposal Direct Testimony, Answers 20-25 at 11-15. As set forth therein, we view Dr. Makhijani's conclusion that DU is "most comparable to" TRU or GTCC waste, and that it should be disposed of accordingly, as lacking a scientific or technical basis. As LES has pointed out in legal pleadings in this proceeding, the Licensing Board in the Claiborne Enrichment Center proceeding rejected this same comparison, as posited by Dr. Makhijani himself, as a technically unsound and "asymmetrical" or "apples to oranges" comparison.

It is also noteworthy that when Dr. Makhijani suggested to DOE that it treat DU as TRU waste, in the form of a comment on the 1999 PEIS (see LES Exhibit 18), the DOE rejected his suggestion. The DOE emphasized that "[b]y definition, only waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, is classified as TRU waste." See LES Exhibit 114. DOE added that waste containing DU with no or little TRU radionuclides does not fall within this definition, and, therefore, that disposal of DU oxides resulting from the conversion of DOE's DU inventory would not be subject to the EPA's regulations specified in 40 C.F.R. Part 191, which govern TRU disposal at the Waste Isolation Pilot Plant ("WIPP"). See LES Exhibit 114. This statement by DOE -- the operator the WIPP -- stands in stark contrast to the National Research Council and John Bredehoeft statements presented on page 54 of Dr. Makhijani's testimony, in which those parties suggest that DU should be disposed of in a WIPP-type facility as if it were TRU waste.

Q14. In his direct testimony, Dr. Makhijani offers a couple of additional arguments in support of his claim that DU should be treated as "analogous to TRU waste." First, he states that "[the specific activity of DU will continue to grow slowly over time until secular equilibrium is reached after more than a million years," and that there will be an increase in the amount of the

"long-lived alpha emitting radionuclides thorium-230 and radium-226." Makhijani Direct Testimony, Answer 16 at 51-52. Do you believe that Dr. Makhijani's statement justifies treatment of DU as TRU, or otherwise calls into question the plausibility of near-surface disposal of DU from the NEF?

A14. (RMK, TEP) No. The potential for ingrowth of long-lived alpha emitting daughter radionuclides is an issue that would be addressed on a site-specific basis as part of the initial licensing process. The nature of such analysis would be determined by the cognizant regulatory entity.

Q15. Second, citing data EPA Federal Guidance Report 13, Dr. Makhijani asserts that "[t]ogether, DU and its decay products are about an order of magnitude more risky (in terms of cancer mortality per unit mass consumed) than TRU waste with 100 nanocuries per gram of plutonium-239," and that uranium and its decay products generally have comparable or greater environmental mobility than plutonium. See Makhijani Direct Testimony, Answer 16 at 52-53. Do you agree with these assertions?

A15. (TEP) No. The assertion, at least in part, includes an assumption of full ingrowth of uranium decay products. The assertion also focuses on only one aspect of the comparability of U and TRU -- risk from equivalent intakes in food or water. This ignores any differences in potential transport of DU_3O_8 and TRU from waste to food or drinking water, and ignores the possibility that containment might preclude such transport of uranium, TRU, or both. Finally, the applicable regulatory numerical performance criterion is not risk, but radiation dose, as specified in 10 C.F.R. § 61.41. Lifetime committed effective radiation dose coefficients for U-238 and Pu-239 from ICRP Publication 72 ("Age-Dependent Doses to Members of the Public

from Intake of Radionuclides: Part 5 -- Compilation of Ingestion and Inhalation Dose Coefficients," *Annals of the ICRP*, 1996) (see LES Exhibit 116) are reproduced below:

Inhalation (max)

AGE	Effective dose, Sv/Bq		
	U-238	Pu-239	Pu/U
3 mo	2.90E-05	2.10E-04	7.24E+00
1 y	2.50E-05	2.00E-04	8.00E+00
5y	1.60E-05	1.50E-04	9.38E+00
10y	1.00E-05	1.20E-04	1.20E+01
15y	8.70E-06	1.10E-04	1.26E+01
Adult	8.00E-06	1.20E-04	1.50E+01

Ingestion

AGE	Effective dose, Sv/Bq		Ratio Pu/U
	U-238	Pu-239	
3 mo	3.40E-07	4.20E-06	1.24E+01
1 y	1.20E-07	4.20E-07	3.50E+00
5y	8.00E-08	3.30E-07	4.13E+00
10y	6.80E-08	2.70E-07	3.97E+00
15y	6.70E-08	2.40E-07	3.58E+00
Adult	4.50E-08	2.50E-07	5.56E+00

(It should be noted that tabulated inhalation dose factors represent the maximum for the range of possible levels of solubility and transfer factors. Values for the 3-month age group were obtained from tabulations available only on an ICRP-provided compact disk.) Examination of the tabulated values indicates that Pu-239 dose coefficient values consistently exceed U-238 values by factors ranging from 3.6 to 15.

Q16. With respect to LES's DU disposal cost estimate, Dr. Makhijani contends that WCS is not in a position to set prices for disposal, insofar as those prices would need to be set by the Texas Compact Commission. He also states that "a vague cost estimate from WCS that can be changed at any time" cannot be considered to be a reasonable or credible estimate in this case. Finally, Dr. Makhijani states that the January 2005 Memorandum of Agreement ("MOA") (see LES Exhibit 105) between LES and WCS expressly disclaims "any responsibility" for

information in the MOA. See Makhijani Direct Testimony, Answer 14 at 47-48. Please provide your views regarding these criticisms of LES's commercial DU disposal cost estimate.

A16. (RMK) None of Dr. Makhijani's assertions calls into question the reasonableness or credibility of LES's DU disposal cost estimate. While he is correct that the Texas Compact Commission is ultimately responsible for setting the exact prices for LLRW disposal services, it is LES's understanding that WCS provided the cost information in the MOA based on the current projected costs of the WCS facility and the anticipated annual volume of waste expected to be disposed of at the WCS facility. I believe it reasonable (particularly in view of Board legal rulings in this proceeding) to rely on good faith statements or representations made by third-party commercial sources. Moreover, as demonstrated in my prefiled direct testimony (which incorporates by reference a portion of Thomas LaGuardia's direct testimony), and in that of the NRC Staff's experts, the WCS-supplied \$ [REDACTED] per cubic foot used by LES to calculate its \$1.14 per kgU disposal unit price is clearly conservative in view of available information on typical DOE and commercial costs for disposal of LLRW at Envirocare. As I testified previously, those costs fall within the \$7 to \$31 per cubic foot range. See LES Disposal Direct Testimony, Answers 27-28 at 16-17; NRC Staff Disposal Testimony, Answer 15 at 8-9.

In response to Dr. Makhijani's concerns that the WCS cost estimate could change at any time, I would add that the NRC's decommissioning funding regulations contain a mechanism that is specifically intended to allow a licensee to account for changes in costs, including potential increases of costs, regardless of cause. This mechanism, which is discussed in greater detail in LES's rebuttal testimony on the contingency factor issue, is contained in 10 C.F.R.

§ 70.25(e). Section 70.25(e) requires a licensee to adjust its decommissioning cost estimate and associated funding levels at least once every three years. The NRC implemented this requirement largely in response to the recognized potential for changes in disposal costs.

Q17. Does this conclude your testimony?

A17. 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 E. POTTER ON BEHALF OF LOUISIANA ENERGY SERVICES, L.P. REGARDING APPLICANT'S STRATEGY AND COST ESTIMATE FOR THE PRIVATE SECTOR DISPOSAL OF DEPLETED URANIUM" in the captioned proceeding has been served on the following, on this 11th day of October 2005, by Hand Delivery.

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Attn: Rulemakings and Adjudications Staff
U.S. Nuclear Regulatory Commission
Mail Stop O-16C1
Washington, DC 20555-0001
(original + two copies)

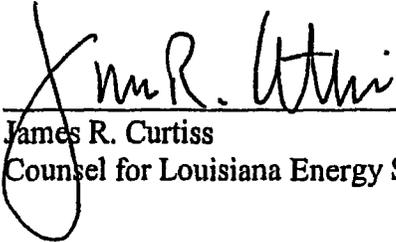
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Lindsay A. Lovejoy, Jr.
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James R. Curtiss
Counsel for Louisiana Energy Services, L.P.

1 MR. SMITH: At this time I would like to
2 identify the LES exhibits associated with this
3 particular testimony.

4 First we have LES exhibit 101, which is
5 10CFR Part 61.

6 (Whereupon, the above-
7 referenced to document was
8 marked as LES Exhibit No. 101
9 for identification.)

10 MR. SMITH: LES exhibit 102 is entitled
11 Activity Concentrations of Material Placed in WIPP
12 through September 2002, prepared by Thomas Potter.

13 (Whereupon, the above-
14 referenced to document was
15 marked as LES Exhibit No. 102
16 for identification.)

17 MR. SMITH: Exhibit number 103 is a letter
18 from Al Rafati of Envirocare to James Ferland, LES,
19 dated February 3rd, 2005.

20 (Whereupon, the above-
21 referenced to document was
22 marked as LES Exhibit No. 103
23 for identification.)

24 MR. SMITH: LES exhibit number 104 is a
25 memorandum from Matthew Blevins to Scott Flanders

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1 summarizing a telephone conversation, dated April 6th,
2 2005.

3 (Whereupon, the above-
4 referenced to document was
5 marked as LES Exhibit No. 104
6 for identification.)

7 MR. SMITH: LES exhibit number 105 is a
8 proprietary exhibit containing a Memorandum of
9 Agreement between LES and Waste Control Specialists,
10 dated January 14, 2005.

11 (Whereupon, the above-
12 referenced to document was
13 marked as LES Exhibit No. 105
14 for identification.)

15 MR. SMITH: LES exhibit 106 is the
16 handwritten notes of a telephone conversation between
17 Leo Lessard and Jay Harrison, dated December 30th of
18 2002.

19 (Whereupon, the above-
20 referenced to document was
21 marked as LES Exhibit No. 106
22 for identification.)

23 MR. SMITH: LES exhibit number 107 has the
24 document identifier NEF number 04-052, it is a
25 response to an RAI, and it is dated December 10th, of

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1 2004.

2 (Whereupon, the above-
3 referenced to document was
4 marked as LES Exhibit No. 107
5 for identification.)

6 MR. SMITH: LES exhibit number 108 is an
7 excerpt from the Department of Energy's website on
8 depleted uranium hexafluoride management.

9 (Whereupon, the above-
10 referenced to document was
11 marked as LES Exhibit No. 108
12 for identification.)

13 MR. SMITH: LES exhibit 109 is section
14 4.13 of the NEF environmental report.

15 (Whereupon, the above-
16 referenced to document was
17 marked as LES Exhibit No. 109
18 for identification.)

19 MR. SMITH: LES exhibit number 111 is an
20 advance notice of proposed rulemaking, Federal
21 Register Notice, dated February 27th of 1987.

22 (Whereupon, the above-
23 referenced to document was
24 marked as LES Exhibit No. 111
25 for identification.)

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1 MR. SMITH: LES exhibit number 112 is
2 NUREG 0945, which is the FEIS on 10CFR Part 61, dated
3 November of 1982.

4 (Whereupon, the above-
5 referenced to document was
6 marked as LES Exhibit No. 112
7 for identification.)

8 MR. SMITH: LES exhibit number 113 is an
9 excerpt of the DOE response to comments, page 3-171.

10 (Whereupon, the above-
11 referenced to document was
12 marked as LES Exhibit No. 113
13 for identification.)

14 MR. SMITH: LES exhibit number 114 is also
15 an excerpt of DOE response to comments, and it is from
16 page 3-142.

17 (Whereupon, the above-
18 referenced to document was
19 marked as LES Exhibit No. 114
20 for identification.)

21 MR. SMITH: And, lastly, LES exhibit
22 number 116 contains an excerpt from ICRP publication
23 72, and it is dated 1996.

24
25

1 (Whereupon, the above-
2 referenced to document was
3 marked as LES Exhibit No. 116
4 for identification.)

5 MR. SMITH: We would like to move to admit
6 these exhibits into evidence.

7 CHAIR BOLLWERK: All right. First of all
8 the record should reflect that exhibits 102, excuse
9 me, LES exhibits 102, 103, 104, 105, 106, 107, 108,
10 109, 110, and 111, 112, 113, 114, and 116, as
11 identified by counsel should be marked for
12 identification.

13 And the motion has been made, then, that
14 all of those -- I'm sorry, not 110. 110 has already
15 been admitted, we will strike 110, and I missed 101 on
16 the previous page.

17 Any others that I missed? All right, add
18 101, subtract 110. Those exhibits are marked for
19 identification, and a motion has been made that those
20 exhibits be admitted.

21 (No response.)

22 CHAIR BOLLWERK: No objections. Hearing
23 none, then let's do this one more time to make sure we
24 have the right numbers, 101, 102, 103, 104, 105, 106,
25 107, 108, 109, 111, 112, 113, 114, and 116, are all

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1 admitted into evidence.

2 (The documents referred to,
3 having been previously marked
4 for identification as LES
5 Exhibit Nos. 101-109, 111-114,
6 and 116 were admitted in
7 evidence.)

8 CHAIR BOLLWERK: And I thank you for your
9 patience. And if there is nothing else, I believe the
10 Panel is available for cross examination.

11 Oh, I'm sorry, you wanted to go ahead, I'm
12 getting ahead of myself. You plan to go ahead and ask
13 them some questions.

14 MR. CURTISS: Thank you, Mr. Chairman.

15 EXAMINATION BY MR. CURTISS OF

16 ROD KRICH

17 THOMAS POTTER

18 MR. CURTISS: Mr. Potter, my understanding
19 is you are testifying here today as an expert on the
20 subject of disposal of depleted uranium hexafluoride
21 to be generated by the National Enrichment Facility,
22 once it is converted to deplete U308.

23 And, specifically, in addition to the
24 issues that you have addressed in your prefiled
25 testimony, it is my understanding you will be

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1 testifying on the adequacy of the environmental
2 evaluations and in particular whether those
3 evaluations adequately bound the impacts of the
4 disposal of the volumes of DEUF that will be generated
5 by the National Enrichment Facility.

6 Is that consistent with your
7 understanding?

8 WITNESS POTTER: Yes, it is.

9 MR. CURTISS: Thank you. Are you familiar
10 with the volumes of DU to be disposed of as U308, that
11 are generated by the NEF?

12 WITNESS POTTER: Yes, I am.

13 MR. CURTISS: And what are those volumes?

14 WITNESS POTTER: The mass equivalent of
15 uranium is 133,000 metric tons, and when converted to
16 U308 and packaged for disposal, in 55 gallon drums,
17 that would correspond to either 714,000 or 1,500,000
18 drums as estimated by LES.

19 MR. CURTISS: And is the 714,000 --

20 WITNESS POTTER: I should say the 714,000
21 is ungrouted, and the larger number is after grouting.

22 MR. CURTISS: So 1.5 million barrels of
23 grouted material?

24 WITNESS POTTER: Correct.

25 MR. CURTISS: Mr. Krich, is that

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1 consistent with the information you presented in the
2 application?

3 WITNESS KRICH: Yes, that is in chapter 14
4 of the environmental report.

5 MR. CURTISS: Thank you. Mr. Potter, can
6 you describe what the applicable regulatory framework
7 is for evaluating the acceptability of near-surface
8 disposal of depleted uranium?

9 WITNESS POTTER: Yes, it is 10CFR Part 61.

10 MR. CURTISS: And are you familiar with
11 the provisions of that regulation?

12 WITNESS POTTER: Yes, I am.

13 MR. CURTISS: Would you describe what you
14 consider to be the key elements of Part 61?

15 WITNESS POTTER: Yes, let me get it in
16 front of me here. There are several major sections.

17 MR. CURTISS: And this is, my
18 understanding is that this regulation is contained in
19 exhibit 101, LES exhibit 101. Okay, go ahead, please.

20 WITNESS POTTER: There are several major
21 sections connected with the licensing of disposal
22 facilities. Two key ones of interest to us here are
23 subpart C, performance objectives and subpart D,
24 technical requirements for land disposal facilities.

25 The regulation itself is a mixture of

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1 performance objectives and explicit technical
2 requirements.

3 MR. CURTISS: Within that framework what
4 kind of dose limits apply under Part 61?

5 WITNESS POTTER: There are numerical dose
6 limits for protection of the general population from
7 releases of radioactivity in the 61.41.

8 MR. CURTISS: And what are those
9 quantitative limits?

10 WITNESS POTTER: They are 25 millirem per
11 year whole body, 75 millirem per year thyroid, and 25
12 millirem per year other organs.

13 MR. CURTISS: Is there a quantitative dose
14 limit in Part 61 for purposes of evaluating the
15 intruder scenario?

16 WITNESS POTTER: No.

17 MR. CURTISS: Does Part 61 specify an
18 evaluation period for making the required
19 determinations that you referred to?

20 WITNESS POTTER: No.

21 MR. CURTISS: Do you, having said that, do
22 you have a view about the appropriate time frame for
23 conducting such an evaluation?

24 WITNESS POTTER: Yes, I do.

25 MR. CURTISS: And what is that view?

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1 WITNESS POTTER: Well, the purpose of the
2 regulation is to protect for a long period of time,
3 and it is reasonable to have some debate about what
4 period of time constitutes long.

5 But in the application of regulatory
6 practice, typically, in analogous situations, it has
7 been 1,000 years. DOE is using 1,000 years in
8 evaluation of disposal of this material in its shallow
9 land burial facilities.

10 And 1,000 years seems to me to be a very
11 reasonable period of time.

12 MR. CURTISS: Thank you. Have you
13 personally had any experience in performing the kind
14 of radiological analyses, such as those that would be
15 performed to demonstrate compliance with 10CFR Part
16 61?

17 WITNESS POTTER: Yes, I have.

18 MR. CURTISS: And would you describe,
19 please, what your experience has consisted of?

20 WITNESS POTTER: Generally speaking
21 evaluating radiological doses from releases of site
22 after decommissioning, a fair number of sites there.
23 One evaluation of disposal of thorium and uranium
24 waste less than .05 percent in RCRA facility.

25 A number of evaluations in connection with

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1 operations of power plant and fuel cycle facilities.
2 I should say that a number of the decommissioning
3 sites that I've evaluated have included uranium and
4 thorium waste, and including uranium waste with or
5 without radioactive daughters.

6 MR. CURTISS: And in the context of that
7 experience that you have had conducting those types of
8 evaluations, have you had any experience with the
9 RESRAD code?

10 WITNESS POTTER: Yes, I have.

11 MR. CURTISS: And would you describe what
12 that is?

13 WITNESS POTTER: Well, I should probably
14 preface it by describing the process a little bit.

15 MR. CURTISS: Please.

16 WITNESS POTTER: In general what one does
17 is develop a conceptual model of the situation, where
18 the situation would consist of a general site and it
19 could be representative, or generic kind of a site.

20 A conceptual model of the radioactive
21 material waste form in quantity and concentrations,
22 and so on. And conceptual model of features of the
23 site, or the operation that would, in some way, impact
24 transportability to gain access to exposure to these
25 radioactive materials.

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1 And then, finally, conceptual model
2 related to performance or behavior, I should say, of
3 people that might use the site, or might be present in
4 the vicinity of the site.

5 One develops kind of an integrated
6 conceptual model along these lines. The next step is
7 generally a construction of the mathematical model,
8 that mathematically expresses the relationships that
9 you've established in your conceptual model, making
10 use of site specific or generically available
11 information, as applicable.

12 And, finally, one usually implements the
13 analysis by use of a computer code that basically
14 implements these mathematical models. That is it, in
15 a nutshell.

16 MR. CURTISS: And when you run a code what
17 is the output, what is produced in terms of
18 determination of the outputs, based upon the inputs
19 that you've established?

20 WITNESS POTTER: RESRAD specifically
21 produces a number of output files one of which is a
22 summary output file that begins with a listing of the
23 input, all the input data used in the RESRAD run.

24 And then produces doses by pathway, and
25 dose estimates by pathway, and for various time

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1 periods that you evaluate in your analysis.

2 MR. CURTISS: Is it possible, in reviewing
3 the output file, which documents the code run, to
4 determine from that output file what the inputs are?

5 WITNESS POTTER: Yes, the very first part
6 of the output file is a recapitulation of the input
7 data.

8 MR. CURTISS: Is it possible to know,
9 without the output file, what the inputs are?

10 WITNESS POTTER: Lacking a listing of an
11 input file someplace it is -- or lacking that, yes, it
12 is impossible.

13 MR. CURTISS: So from a QA perspective, a
14 quality assurance perspective --

15 WITNESS POTTER: From a quality assurance
16 perspective there is no substitute for an output file
17 that has a recapitulation of the input.

18 MR. CURTISS: Have you actually run the
19 code yourself, the RESRAD code?

20 WITNESS POTTER: Yes, I have, many times
21 since it was first introduced.

22 MR. CURTISS: And are you also familiar
23 with the pathway code?

24 WITNESS POTTER: I'm familiar with it,
25 yes, I am. I have not used it as extensively as

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1 RESRAD, I have not used it in any applications, but I
2 have exercised it.

3 MR. CURTISS: And when you say exercised
4 it, you actually --

5 WITNESS POTTER: I've run it.

6 MR. CURTISS: -- run the code?

7 WITNESS POTTER: Examined it.

8 MR. CURTISS: For an evaluation such as
9 one that would be performed for purposes of compliance
10 with Part 61, expand a little bit on how one
11 constructs a scenario and what, typically, are the key
12 variables, or inputs that would be considered.

13 WITNESS POTTER: I'll describe the
14 process, in general terms. It may, it varies from
15 situation to situation. In certain situations some
16 features, or some characteristics are more important
17 than others.

18 And, consequently, the relative
19 importance, when it gets down to running the code, the
20 relative importance of various parameters and values
21 you use for those parameters may differ from situation
22 to situation.

23 But in general such as a shallow land
24 disposal facility in an arid site, such as the
25 Envirocare facility, or some facility kind of like it,

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1 one would characterize the site in general terms such
2 as rainfall rate, evapotranspiration rate.

3 Those would be important factors in
4 determining the potential for migration of uranium
5 from the waste deposit, downward into, potentially, to
6 the groundwater.

7 Characterizing the location and quality,
8 and various other aspects of the groundwater at the
9 site would be an important thing. An important aspect
10 of characterizing the site.

11 And this can be done on a fairly generic
12 -- some of these kinds of exercises can be done in a
13 fairly generic basis. You would also need to
14 conceptualize a waste disposal cell, dimensions of the
15 cell or something like that, and the dimensions of the
16 waste, and the location of the waste in it, and so on.

17 And, finally, since we are basically most
18 interested, this would not be our exclusive interest,
19 but our primary interest here, would be performance
20 post-closure, after closure of the site.

21 We would be interested in conceptualizing
22 a cap and cover for the cell. That is the source and
23 site aspects of it, the major ones, in a situation
24 like this.

25 Then you would also want to look at the

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1 potential for the use of a site, or areas near the
2 site. And if it is a desert site, for example, an
3 uninhabitable one, we would want to identify pathways,
4 and exposure parameters, and values for those
5 parameters that are suitable for that kind of
6 situation.

7 And I think that captures the main ones.

8 MR. CURTISS: Mr. Potter, are you familiar
9 with the environmental evaluations that have been
10 performed of disposal of depleted uranium in near-
11 surface disposal facilities?

12 WITNESS POTTER: Yes, I am.

13 MR. CURTISS: Let's begin with the
14 evaluation undertaken by the NRC Staff. Have you
15 reviewed the treatment of this issue in the DEIS, and
16 the FEIS?

17 WITNESS POTTER: Yes, I have.

18 MR. CURTISS: Let's begin with the DEIS.
19 Would you describe how the issue of disposal of
20 depleted uranium, in a near-surface disposal facility
21 was addressed in the DEIS?

22 WITNESS POTTER: I'm going to need to look
23 at --

24 (Witness reviews document.)

25 WITNESS POTTER: Yes. For shallow land

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1 disposal, at the DEIS stage, was identified but not
2 evaluated explicitly. There were evaluations, or the
3 results of evaluations included for deep disposal of
4 the material at the DEIS stage.

5 MR. CURTISS: And how was this issue, the
6 near-surface disposal of depleted uranium addressed in
7 the Staff's FEIS, and here I refer you, I think, to
8 Staff exhibit 36, for the discussion.

9 WITNESS POTTER: Right.

10 MR. CURTISS: If you have it there on page
11 4-63.

12 WITNESS POTTER: I do. The Staff in the
13 FEIS ascertained that the Envirocare site,
14 specifically, is licensed by an agreement state, Utah,
15 to receive this material.

16 And the Staff conducted a review of the
17 state of Utah's evaluation performed in the process of
18 licensing that site. And reached a conclusion that as
19 Utah is an NRC agreement state, and Envirocare has met
20 Utah's low level radioactive waste licensing
21 requirements, which are compatible with 10CFR Part 61,
22 the impacts from the disposal of depleted uranium
23 generated by the proposed National Enrichment Facility
24 at the Envirocare facility, would be small.

25 They do mention several site-specific

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1 factors that contribute to that conclusion.

2 MR. CURTISS: And what you are reading
3 there from, was the second paragraph under section
4 4.2.14.4?

5 WITNESS POTTER: That is correct.

6 MR. CURTISS: In other words, between the
7 DEIS and the FEIS the Staff ascertained the extent of
8 the evaluation undertaken by the regulator in Utah, an
9 agreement state, with respect to the Envirocare site?

10 WITNESS POTTER: That is correct.

11 MR. CURTISS: And in looking at that
12 discussion, in the FEIS, on page 4-63, the description
13 in general of the elements that were considered in
14 evaluating or ascertaining the adequacy of the review
15 by Utah, does that discussion include several site-
16 specific factors, does that include a comprehensive
17 list of the things that you think would be important
18 in any such --

19 WITNESS POTTER: It is a comprehensive
20 list of the things I would expect to find to be
21 important in an evaluation of a situation like this.

22 MR. CURTISS: Okay. Mr. Potter, have you
23 reviewed a memorandum of April 6, 2005, documenting
24 the results of the Staff's discussion of this issue
25 with Utah's department of radiation control?

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1 WITNESS POTTER: Yes, I have.

2 MR. CURTISS: And if I could refer you to
3 that document, I believe it is LES exhibit 104.

4 WITNESS POTTER: Yes, it is.

5 MR. CURTISS: Do you have that before you?

6 WITNESS POTTER: Yes, I do.

7 MR. CURTISS: Have you reviewed this
8 before?

9 WITNESS POTTER: Yes, I have.

10 MR. CURTISS: Would you comment, please,
11 about the thoroughness of the questions asked by the
12 Staff, and specifically as reflected in that
13 memorandum, whether in your expert judgement the Staff
14 raised the key issues you would ask, if you were
15 attempting to ascertain the nature of the review
16 conducted by the agreement state?

17 WITNESS POTTER: Yes. I believe these
18 questions go basically to the heart of the kind of
19 analysis that would be necessary to support a
20 licensing action and identify the key features that
21 would be important in making sure you had a good
22 evaluation.

23 MR. CURTISS: And could I refer you to the
24 top of -- if you would go to the attachment, which has
25 at the top of page 1, telephone summary?

1 WITNESS POTTER: I have it.

2 MR. CURTISS: If you could refer to the
3 top of page 2, which is the last section responding to
4 question number 2 of the Staff. Do you see where I
5 am?

6 WITNESS POTTER: I do.

7 MR. CURTISS: Did you understand, in its
8 answer to question one there, just before question
9 two, that there are no volume restrictions in the
10 Envirocare license on the disposal of DU?

11 WITNESS POTTER: Yes, I do.

12 MR. CURTISS: In looking at this
13 memorandum, is there anything further in this
14 memorandum relative to the nature of the review that
15 was conducted, that you think ought to be highlighted?

16 WITNESS POTTER: Well, specifically my
17 interpretation would be that the key features
18 necessary to provide adequate protection in a
19 situation like this would be primarily protection
20 against transport of groundwater to places where
21 people could use it.

22 And there are a number of questions here
23 that go to that, that go to how the Utah staff have
24 evaluated, and what conclusions they had reached.
25 For example, let's see, question number three, NRC

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1 Staff asked DRC to provide further information on its
2 position that on-site residential and agricultural
3 intruder pathway doses for the Envirocare site are
4 unrealistic.

5 And the DRC staff stated that on-site
6 residential under farming scenarios at the Envirocare
7 facility are unrealistic for several reasons.

8 First, the site conditions of low
9 precipitation, five to six inches a year, and high
10 evapotranspiration rates, approximately 40 to 50
11 inches per year.

12 And then that, combined with a lack of
13 suitable irrigation water, and the fact that the soil
14 is extremely saline, and then again the County has
15 been designated -- that part of the County has been
16 designated as heavy industry and hazardous waste
17 zones, which bars any residential and/or farming uses.

18 The low -- the combination of low
19 precipitation and high evapotranspiration rates means
20 that very little water and very little --
21 consequently, very little dissolved uranium would be
22 transported from the cell and that transport to any
23 groundwater would take a very long period of time.

24 And the groundwater then is not useable in
25 any case. In this kind of situation it's a little

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1 difficult to make -- we see general statements of
2 concentration related doses and quantity related doses
3 in reading various things.

4 But it's difficult to make those
5 distinctions real plainly for all situations. In this
6 particular kind of situation, for example, where over
7 the period of reasonable evaluation, reasonable period
8 of evaluation such as 1,000 years, radionuclides would
9 not be transported to groundwater at all.

10 That finding would be independent of
11 quantity of waste or concentration of radioactive
12 material in the waste unless it's somehow caused the
13 -- increasing the quantity somehow greatly increased
14 the closeness or the -- reduce the distance between
15 the waste and the aquifers such that it almost
16 disappeared.

17 So, in that sense, the conclusion that
18 groundwater impacts are non-existent would be
19 independent of the quantity and concentration of the
20 waste.

21 That seemed to be a major issue that the
22 Commission was going to. Similarly --

23 JUDGE ABRAMSON: Can you tell us what
24 factors caused that to be non-existent? Is it the
25 distance or is the --

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1 WITNESS POTTER: Basically it's
2 infiltration rate. And infiltration rate is a
3 function of both rainfall rate, which is low there,
4 and evapotranspiration rate, which is high there.

5 JUDGE ABRAMSON: Right.

6 WITNESS POTTER: Which means that you
7 would have very little water percolating through the
8 waste.

9 JUDGE ABRAMSON: Okay.

10 WITNESS POTTER: And so, it would take a
11 long time for the water to reach the water table.
12 Radionuclides in the water would be retarded by some
13 fairly substantial magnitude.

14 JUDGE ABRAMSON: Physical properties that
15 filter it or --

16 WITNESS POTTER: Absorption and so on.
17 And so, the time for radionuclides to reach the waste
18 would also be even greater.

19 JUDGE ABRAMSON: Is there a diffusion
20 property that takes place as they go down so that it's
21 not just -- it either goes --

22 WITNESS POTTER: With these kinds of
23 process at these rates diffusion is practically
24 minimal.

25 JUDGE ABRAMSON: Okay.

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1 WITNESS POTTER: I was about to address a
2 second aspect of that.

3 JUDGE ABRAMSON: Excuse me.

4 WITNESS POTTER: There are other pathways
5 or scenarios that one might conceptualize that could
6 involve exposure to these materials having to do with
7 penetration through the cap and direct exposure to the
8 radioactive materials.

9 And those pathways are invariably a
10 function of concentration of radionuclides in the
11 material in the fairly close proximity to the person
12 who is exposed.

13 So, again, in that situation quantity is
14 not a part of the picture. It doesn't really enter
15 the picture. And I would also say that site specific
16 consideration of intruder scenarios would be in
17 important.

18 For example, in a situation like this I
19 would expect it reasonable to assume that an intruder
20 would spend very little time in contact with the
21 material.

22 An intruder probably wouldn't even be
23 there. I think that concludes my answer.

24 MR. CURTISS: Thank you. And thank you,
25 Judge. Mr. Krich, could I ask you whether you became

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1 aware at some point that Envirocare had actually
2 accepted depleted uranium for disposal at its Utah
3 site?

4 WITNESS KRICH: Yes, I did.

5 MR. CURTISS: And if I could direct your
6 attention to Exhibit 103.

7 WITNESS KRICH: Yes, I have it.

8 MR. CURTISS: And, can you describe what
9 this letter entails? Are you familiar with it, first
10 of all?

11 WITNESS KRICH: I am.

12 MR. CURTISS: And, based upon this letter,
13 were you led to believe that Envirocare has actually
14 accepted depleted uranium at its site in Clive, Utah?

15 WITNESS KRICH: Yes, in fact, I had
16 visited the site earlier from this letter and had
17 received this information at that time and then
18 afterwards received this letter.

19 MR. CURTISS: And where does it say that
20 in this letter?

21 WITNESS KRICH: That I had visited?

22 MR. CURTISS: No, that they accept
23 depleted uranium.

24 WITNESS KRICH: Oh, I'm sorry. If
25 Envirocare were to -- let's see, the last sentence of

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1 the first paragraph.

2 MR. CURTISS: And would you read that,
3 please?

4 WITNESS KRICH: Envirocare has previously
5 received and disposed of depleted U308 in this manner
6 in our facility in Clive, Utah. And the manner that
7 they are referring to is in the sentence above.

8 It says, we would dispose of this material
9 at our facility using the shallow land burial method
10 in accordance with our regulatory authorization in a
11 cell with a cap, i.e., a class A disposal cell.

12 MR. CURTISS: And, would it be a fair
13 conclusion to draw from the statement made in this
14 letter by the site operator and the earlier statements
15 made by the Department of Radiation Control, that they
16 could accept depleted uranium from the NEF without any
17 limits on the volume under their current license?

18 WITNESS KRICH: Yes, that was the clear
19 understanding between us and Envirocare.

20 MR. CURTISS: Thank you. Let me return to
21 you, Mr. Potter. Pursuant to the Board's order of
22 yesterday, there were certain revised testimony
23 admitted back into this proceeding that Dr. Makhijani
24 has presented on the Envirocare commenting on the
25 Envirocare site, excuse me, commenting on a regulatory

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1 review conducted by the Department of Radiation
2 Control. Are you familiar with his views on this
3 subject?

4 WITNESS POTTER: Yes, I am.

5 MR. CURTISS: And, do you have them there
6 before you?

7 WITNESS POTTER: Which exhibit is that?

8 MR. CURTISS: Well, at this point we have,
9 as the Board suggested, taken the October 18th filing
10 where there was additional material inserted on page
11 17 having to do with the likely unacceptability of the
12 Envirocare site.

13 That testimony hasn't been reintroduced
14 yet. But my understanding is that, pursuant to the
15 Board's order, that statement will be included. And
16 I'd like to ask you about that on that supposition.

17 CHAIR BOLLWERK: It might be possible, I
18 don't know if you have an extra copy of the testimony.
19 Maybe that would be the easiest -- the cleanest way to
20 do it.

21 MR. CURTISS: I think the page reference
22 here may be off. So, I would like to take the time to
23 --

24 CHAIR BOLLWERK: If Mr. Lovejoy could do
25 that, I would appreciate it.

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1 WITNESS POTTER: We have a copy. I think
2 I have it. It's a paragraph that begins, the likely
3 unacceptability of the Envirocare site.

4 MR. CURTISS: Maybe we could give the
5 revised rebuttal testimony that will be offered and
6 admitted on this subject because it appears, I
7 believe, at the bottom of page seven, at the bottom of
8 page 15 now.

9 MS. CLARK: Is this the testimony with --

10 CHAIR BOLLWERK: It's in accordance with
11 the Board's order of --

12 MR. CURTISS: Yes, it should have sentence
13 three inserted as well as a paragraph.

14 WITNESS POTTER: Yes, I have it.

15 MR. CURTISS: If you could --

16 CHAIR BOLLWERK: Let's go ahead and just
17 pass it. We won't admit it. We won't identify it for
18 the record, but I appreciate you making it available.

19 MR. CURTISS: And I'm confident this
20 comports with the Board's order. In particular, I see
21 at the bottom of page 15. Mr. Potter, could you refer
22 to the bottom of page 15 of this testimony?

23 WITNESS POTTER: I have it.

24 MR. CURTISS: And, since this is now to be
25 introduced, do you see the paragraph beginning with

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1 the likely unacceptability of Envirocare site for
2 disposal is further strengthened? Do you see that
3 paragraph?

4 WITNESS POTTER: I do.

5 MR. CURTISS: Have you -- if you haven't
6 seen this before, take a minute to review it.

7 WITNESS POTTER: I've seen it and I've
8 reviewed it.

9 MR. CURTISS: Okay. Based upon your
10 knowledge of the review conducted by the Utah DRC, do
11 you have a view about the points made in this
12 testimony by Dr. Makhijani?

13 WITNESS POTTER: Yes, I do. I believe
14 that they're a later analyses that come to different
15 conclusions, question an earlier exhibit, the April
16 6th, 2005 telephone summary, question four.

17 MR. CURTISS: You're referring to Exhibit
18 104 now?

19 WITNESS POTTER: Yes.

20 MR. CURTISS: And the question and answer
21 you're referring to has to do with the updated
22 performance assessment studies?

23 WITNESS POTTER: That's right.

24 MR. CURTISS: And please be more specific.
25 What are you referring to in the testimony of Dr.

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1 Makhijani that appears to be outdated?

2 WITNESS POTTER: The paragraph in Dr.
3 Makhijani's testimony relates to limits on the
4 concentration of depleted uranium and discusses an
5 evaluation of an intruder agriculture scenario from
6 which concentration limits were derived and so on,
7 another one, intruder construction scenario.

8 These were from a 1990 analysis. And, in
9 question four, the NRC Staff asked of the Utah DRC
10 staff. The DRC staff responded that the 1990 reports
11 were used in initial licensing work for Envirocare.

12 And there are more updated reports from
13 approximately 1997 to 2000.

14 MR. CURTISS: Okay. And, would it be
15 unusual for there to be updated performance assessment
16 reports that take into account a better understanding
17 of a site or a period of time?

18 WITNESS POTTER: Yes, a better
19 understanding of the site and perhaps interest in the
20 possibility of disposing of different kinds of waste
21 that they were not interested in initially.

22 Or facilities typically change over
23 periods of time. And licenses are amended, and so on.

24 MR. CURTISS: Okay. Mr. Potter, if I
25 could shift gears for just a moment, are you aware of

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1 any other environmental evaluations that have been
2 undertaken of the disposal of depleted uranium and
3 near surface disposal facilities?

4 WITNESS POTTER: Yes. There is an
5 evaluation performed as part of the DOE PEIS,
6 Programmatic Environmental Impact Statement.

7 MR. CURTISS: And, have you reviewed that
8 analysis?

9 WITNESS POTTER: I have.

10 MR. CURTISS: And, if you could, look at
11 Exhibit 18, if you would.

12 WITNESS POTTER: Yes.

13 (Pause.)

14 WITNESS POTTER: Is that Exhibit 18?

15 MR. CURTISS: Yes. Do you have it there
16 before you, Mr. Potter?

17 WITNESS POTTER: I'm working on it. I
18 have it.

19 MR. CURTISS: And, do you recognize this
20 exhibit?

21 WITNESS POTTER: Yes, I do.

22 MR. CURTISS: And what is it?

23 WITNESS POTTER: This is volume one, the
24 main text of the -- actually, it looks like excerpts
25 from the final programmatic Environmental Impact

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1 Statement for Alternative Strategies for the Long-Term
2 Management and Use of Depleted Uranium Hexafluoride,
3 April 1999.

4 MR. CURTISS: Yes. And is this also
5 referred to as Appendix I of the PEIS? Is that what
6 you have there before you?

7 WITNESS POTTER: There appear to be some
8 additional pages. But, it appears to contain all of
9 Appendix I.

10 MR. CURTISS: Okay. And, have you
11 reviewed Appendix I of the PEIS that DOE performed?

12 WITNESS POTTER: I have.

13 MR. CURTISS: Do you know what volumes of
14 depleted uranium they evaluated?

15 WITNESS POTTER: They're larger than what
16 were evaluated in the LES case. The figures I have
17 are 945,000 barrels of oxide ungrouted and 1,980,000
18 barrels -- this would be 55 gallon barrels -- of oxide
19 as grouted.

20 MR. CURTISS: So, in so far as the volumes
21 that were examined in Appendix I, the point that you
22 made earlier was they clearly bound the volumes that
23 Mr. Krich earlier testified or addressed in the
24 application?

25 WITNESS POTTER: That's true. And I think

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1 it would be fair to conclude that the masses of
2 uranium involved are also proportionately higher.

3 MR. CURTISS: And, do you know what types
4 of sites were evaluated by DOE in this PEIS and in
5 Appendix I?

6 WITNESS POTTER: For the shallow land
7 disposal there was an evaluation of what they call a
8 wet site and a dry site.

9 MR. CURTISS: And do you consider the
10 evaluation of the dry site to be representative or
11 bounding, not just from a volume standpoint but of the
12 types of material that -- the types of issues that you
13 would see at a dry site?

14 WITNESS POTTER: I would judge from the
15 information in Appendix I that the analysis was
16 reasonable and the conclusions appear reasonable to
17 me.

18 MR. CURTISS: And, what are the -- one
19 final question. What are the principal findings of
20 the PEIS relative to the impacts of the dry site?

21 WITNESS POTTER: Let's see

22 MR. CURTISS: Maybe I could refer you to
23 page I-19.

24 WITNESS POTTER: Yes, I'm looking at it
25 now.

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1 MR. CURTISS: As a point of reference. Do
2 you have that page before you?

3 WITNESS POTTER: I have the page.

4 MR. CURTISS: At the bottom is there a
5 paragraph wet or dry environmental study?

6 WITNESS POTTER: Right. Essentially no
7 impacts would be expect in a dry setting for more than
8 1,000 years because of the low water and filtration
9 rate, and greater depth to the water table, dry versus
10 wet.

11 MR. CURTISS: It's I-19 of LES Exhibit 18.

12 WITNESS POTTER: The bottom of the page.

13 MR. CURTISS: Yes. I have no further
14 questions of this witness.

15 JUDGE ABRAMSON: Mr. Potter, I have a
16 question. In looking at the generic dry site examined
17 by the DOE and the PEIS, how would you compare its
18 characteristics to those characteristics that you know
19 of for the Envirocare site?

20 (No verbal response.)

21 JUDGE ABRAMSON: Would you say that it's
22 got more rainfall, less rainfall, more
23 evapotranspiration, less, other parameters? Or is it
24 comparable or not? Is it more conservative or less?

25 WITNESS POTTER: Fairly comparable,

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1 particularly from the standpoint of outcome. From the
2 standpoint of outcome you can see from the results
3 that even a well on the edge of the disposal facility,
4 at the edge of the disposal facility, they got zero
5 dose from it through groundwater pathways.

6 JUDGE ABRAMSON: Okay. And how about the
7 parameters of the study itself? Is there enough
8 detail for you to compare the two sites?

9 WITNESS POTTER: The parameter discussions
10 are kind of mixed or kind of scattered through the
11 PEIS.

12 JUDGE ABRAMSON: Okay.

13 WITNESS POTTER: It's a little hard to
14 compare everything. But I do recall that they also
15 assumed a low rate of rainfall and a high
16 evapotranspiration rate, which is the key to this
17 analysis.

18 JUDGE ABRAMSON: Yes, it sounds --

19 WITNESS POTTER: They never got
20 radioactive material to the groundwater.

21 JUDGE ABRAMSON: So, did they tell you in
22 the PEIS what the rainfall rate was and what the
23 evapotranspiration rate was and how deep the nearest
24 aquifer was?

25 WITNESS POTTER: I was actually looking

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1 for that in Appendix I earlier today and was not able
2 to lay my hands on it. But I have seen in my, at some
3 point along the line --

4 JUDGE ABRAMSON: Better not to speculate.

5 WITNESS POTTER: -- a report or a paper
6 that describes this study that included information
7 along those lines.

8 JUDGE ABRAMSON: Okay. Well, it's not at
9 issue here. I just wondered if the two were
10 comparable or not. And what you're telling us is that
11 the outcome is comparable.

12 WITNESS POTTER: Yes, and there's only one
13 way you get that outcome.

14 JUDGE ABRAMSON: Low rainfall, high
15 evapotranspiration, deep aquifer.

16 WITNESS POTTER: Low infiltration rate.

17 JUDGE ABRAMSON: And a deep aquifer.

18 WITNESS POTTER: That's where you get it.

19 MR. CURTISS: Perhaps just for purposes of
20 reference, following up on Judge Abramson's question,
21 do you have I-72 there, page I-72 in the Appendix?

22 WITNESS POTTER: I do.

23 MR. CURTISS: The first paragraph under
24 that, the section at the top, radiological impacts,
25 refers to the dry setting there. Do you see where

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1 that is?

2 WITNESS POTTER: I see.

3 MR. CURTISS: And that sentence -- could
4 you read the sentence that begins in a dry setting?

5 WITNESS POTTER: It would take more than
6 10,000 years for uranium and its decay products to
7 reach groundwater because of low water infiltration
8 rate.

9 JUDGE ABRAMSON: That's from the PEIS?

10 WITNESS POTTER: That's page --

11 MR. CURTISS: I-72 of Appendix I, which is
12 Exhibit 18 of the larger DOE PEIS, which was
13 introduced earlier in the proceeding.

14 JUDGE ABRAMSON: I understand.

15 CHAIR BOLLWERK: Any other questions from
16 the Board.

17 MR. CURTISS: No further questions from
18 me, sir.

19 CHAIR BOLLWERK: All right, let me turn to
20 the Staff and see if they have any questions.

21 MS. CLARK: I have no questions for this
22 panel.

23 CHAIR BOLLWERK: All right. Then, Mr.
24 Lovejoy, I believe this is your opportunity.

25 (Pause.)

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EXAMINATION BY MR. LOVEJOY OF

THOMAS POTTER

ROD KRICH

MR. LOVEJOY: Mr. Potter, since we had our deposition, or your deposition, what additional work have you done in this case?

WITNESS POTTER: I've done some additional evaluation of the studies that were mentioned in my direct testimony and some additional studies as well.

I had at the time of the deposition read studies and, I wouldn't say thoroughly evaluated them, but acquainted myself with them.

MR. LOVEJOY: Okay. Did you commit this work to paper?

WITNESS POTTER: I don't believe so. There's an exhibit. I think it was before the deposition, though. I think there was one of our exhibits.

I do not remember the exact date of the exhibit. Well, that was after the deposition, having to do with quantities of waste and weather. That's the only thing.

MR. LOVEJOY: Okay. So you haven't, for example, looked at any analyses done of the Envirocare site since the deposition?

1 WITNESS POTTER: I have actually reviewed

2 --

3 MR. LOVEJOY: Other than LES Exhibit 104.

4 WITNESS POTTER: Right. No, no, there
5 were two exhibits involving the 1990 analysis that I
6 looked at as well.

7 MR. LOVEJOY: Were those --

8 WITNESS POTTER: I think they're --

9 CHAIR BOLLWERK: I believe those are your
10 exhibits.

11 MR. LOVEJOY: The Bayer et al report.

12 WITNESS POTTER: It sounds right. I
13 believe they are the reports that were referenced in
14 the discussion we just had on the 1990 evaluations.

15 MR. LOVEJOY: And it's your understanding
16 that some analyses of the Envirocare site have been
17 performed since those 1990 reports by the Utah
18 authorities, is that right?

19 WITNESS POTTER: That's my understanding.

20 MR. LOVEJOY: Okay. And, have you seen
21 them?

22 WITNESS POTTER: No, I have not.

23 MR. LOVEJOY: Okay. Is it your
24 understanding -- well, do you know what time frame
25 those Utah analyses cover?

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1 WITNESS POTTER: I don't know exactly.

2 MR. LOVEJOY: Do you know what release
3 scenarios or dose scenarios were studied?

4 WITNESS POTTER: In general from drawing
5 conclusions from the April 6th telephone summary
6 between NRC and Utah you can make some inferences
7 about what -- at least some pathways that were ruled
8 out as not realistic.

9 MR. LOVEJOY: What scenarios were
10 examined?

11 WITNESS POTTER: I couldn't say entirely.

12 (Pause.)

13 WITNESS POTTER: They clearly evaluated
14 transport to groundwater and concluded that -- and
15 then based on that and on the salinity in the
16 groundwater concluded the groundwater related pathways
17 would not be complete or would not be in effect there.

18 And I don't know what other explicit
19 analysis was included in the Utah Staff assessment.

20 CHAIR BOLLWERK: This is LES exhibit,
21 what, just for the record?

22 MR. LOVEJOY: Well, we're talking about
23 some analyses that the witness has not seen. But the
24 memo he's referring to is LES Exhibit 104.

25 CHAIR BOLLWERK: So, 104? Okay, that's

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1 fine.

2 (Pause.)

3 MR. LOVEJOY: Do you know whether any
4 scenarios involving possibly human intrusion in the
5 area were investigated by Utah?

6 WITNESS POTTER: No, I don't.

7 MR. LOVEJOY: Are you studying the memo?
8 Do you want to check that anymore?

9 WITNESS KRICH: No, we're not studying the
10 memo. We just want to find the right question, Mr.
11 Lovejoy.

12 WITNESS POTTER: I interpret that that's
13 going to be a strong -- that any dose scenario related
14 to other pathways would be strong functions of the
15 design of the protective cover and that the
16 consequences from those kinds of pathways could
17 basically be engineered.

18 MR. LOVEJOY: The consequences from those
19 pathways could be engineered?

20 WITNESS POTTER: Yes.

21 MR. LOVEJOY: How do you mean?

22 WITNESS POTTER: Either the cover is --
23 you design the cover for the -- as you do, for
24 example, for a mill tailings pile cover. You design
25 the cover to achieve your performance objective.

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1 MR. LOVEJOY: What kind of cover did the
2 Utah authorities assume in this examination they
3 undertook?

4 WITNESS POTTER: I don't know. I didn't
5 pursue the details of it.

6 MR. LOVEJOY: How long are you assuming a
7 cover can be expected to last?

8 WITNESS POTTER: Well mill tailings, 10
9 CFR 40, Appendix A requires covered design -- has a
10 cover design period of -- or a cover life period of
11 1,000 years, at least 1,000 years, a minimum of 200
12 years.

13 I would presume they would be able to do
14 at least as well as that.

15 MR. LOVEJOY: So, mill tailings for --
16 it's your testimony that mill tailings are required to
17 have covers over the disposal area?

18 WITNESS POTTER: Yes.

19 MR. LOVEJOY: Can you describe the kind of
20 cover that a mill tailing site is supposed to have?

21 WITNESS POTTER: The requirement is
22 criterion six in 10 CFR 40 Appendix A. I don't have
23 that right in front of me. The words 1,000 years and
24 a minimum of 200 years, though, I recall from that
25 criterion.

1 (Pause.)

2 MR. LOVEJOY: In the study that the Utah
3 authorities were relying on in reporting as they did
4 in LES Exhibit 104, what was the source term?

5 WITNESS POTTER: I don't know exactly what
6 source term they used. But, in order to conclude --
7 in order to support a conclusion that the source we
8 are proposing to put in it would be acceptable, they
9 must have evaluated some comparable source.

10 MR. LOVEJOY: Would that be a large
11 quantity of depleted uranium from enrichment
12 facilities?

13 WITNESS POTTER: I would expect so.

14 MR. LOVEJOY: What would you call an
15 appropriate large quantity of depleted uranium from an
16 enrichment facility appropriate to support the results
17 of this study?

18 WITNESS POTTER: I should say, maybe not
19 require so much a large quantity but would need to
20 support the notion that their conclusions about not
21 protecting groundwater, for example, or that one
22 primarily, would be met.

23 They may be able to do that without an
24 evaluation of a large quantity necessarily because, as
25 I mentioned, quantity in this kind of situation

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1 quantity is not necessarily -- or a conclusion that
2 you're not going to reach the water table can be found
3 independent of quantity.

4 MR. LOVEJOY: Is it your testimony that
5 that would be the case if the period in issue was
6 longer than 1,000 years?

7 WITNESS POTTER: Not unless sit was hugely
8 longer, I would guess.

9 MR. LOVEJOY: Well, if it went out to the,
10 let's say, the time of peak dose?

11 WITNESS POTTER: I would not consider
12 evaluations far beyond 1,000 years to be meaningful
13 from the regulatory standpoint.

14 JUDGE ABRAMSON: Mr. Potter, there is a
15 basic physics involved here. And that is that there's
16 no radiation exposure to anybody by groundwater until
17 the penetration front reaches the aquifer.

18 And that takes so many X years. And the
19 X is a function of the rainfall and the permeability
20 of the soil and the evapotranspiration and that --

21 WITNESS POTTER: That's right. And that
22 appears to be the case in both the Envirocare and the
23 DOE PEIS analysis.

24 JUDGE ABRAMSON: And, on the other
25 pathways the time for exposure is a function of when

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1 the engineered barriers fail? Is that too simplistic?

2 WITNESS POTTER: If it's within 1,000
3 years or something along those lines, or somebody digs
4 into a piece of it or something like that.

5 JUDGE ABRAMSON: That's another story,
6 right? But, assuming that it's even beyond 1,000
7 years, if you had an engineered barrier that would go
8 10,000 years, that would also drive things, right?

9 WITNESS POTTER: Yes.

10 JUDGE ABRAMSON: Okay. So we're really
11 talking about -- one more question. You mentioned
12 that you didn't think it was quantity dependent. This
13 is, I think, the penetration into the groundwater or
14 the surface problem is a one dimensional problem if
15 there's enough stuff generated so it looks like a
16 plain of source material, a horizontal plain both at
17 the bottom and at the top.

18 If there's a single cell it may become
19 more than a one dimensional problem. Is that right?

20 (No verbal response.)

21 JUDGE ABRAMSON: Do you understand what
22 I'm saying?

23 (No verbal response.)

24 JUDGE ABRAMSON: In other words, if it's
25 a single or if it's a tiny little source then things

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1 may go out radially as opposed to going one
2 dimensional.

3 WITNESS POTTER: Generally, though, these
4 are evaluated on a one dimensional basis.

5 JUDGE ABRAMSON: Okay. And one you get
6 enough that it's evaluateable on a one dimensional
7 basis, then it doesn't matter how big the volume is
8 occupied.

9 WITNESS POTTER: That's right.

10 JUDGE ABRAMSON: It's still a one
11 dimensional problem.

12 WITNESS POTTER: That's right. And that's
13 one of those little quirks about trying to make
14 general statements about volume and concentration
15 related doses.

16 It's true if you have a small source and
17 you do a multi-dimensional analysis and allow for
18 lateral transport during vertical advection, then
19 quantity matters.

20 But, generally speaking, we assume an
21 aerial source and do a one dimensional analysis. And
22 the conclusion is independent.

23 JUDGE ABRAMSON: To give me a ballpark
24 figure, give the Board a ballpark figure, scope idea
25 what this amounts to, if you had 50,000 metric tons of

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1 waste that you were going to dispose of in a shallow
2 land burial, what would be the rough surface area that
3 that would occupy by the time you go the cells?

4 (No verbal response.)

5 JUDGE ABRAMSON: I know I'm asking you for
6 somewhat --

7 WITNESS POTTER: That would be smaller
8 than ours. I think it would be several acres or
9 something on that order.

10 WITNESS KRICH: For how much material?

11 JUDGE ABRAMSON: Let's say 50,000 tons.

12 WITNESS POTTER: That would be a third of
13 ours.

14 WITNESS KRICH: Yes, about a third of
15 ours. We estimate that for all our materials about 72
16 acres.

17 JUDGE ABRAMSON: Seventy acres for all
18 110,000 tons.

19 WITNESS KRICH: The 110, yes.

20 JUDGE ABRAMSON: Okay, so 70 acres. So
21 you've got something like less than a couple tons per
22 acre, is that right?

23 WITNESS KRICH: I thought it came out to
24 about a ton per acre is what the -- it depends on the
25 --

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1 JUDGE ABRAMSON: Yes, it depends on
2 whether you're --

3 WITNESS POTTER: It's less than that.

4 JUDGE ABRAMSON: But 110 over 70, the
5 number is about one and a half. Sorry. Thank you.
6 But I think it's helpful to get a feel for this.

7 WITNESS KRICH: That was for the tail
8 spin, I'm sorry. I'm mixing the acreage here.

9 JUDGE ABRAMSON: So, have I got it right
10 or have I got it wrong?

11 WITNESS KRICH: I think so, yes.

12 JUDGE ABRAMSON: Okay. Thank you.

13 (Pause.)

14 JUDGE ABRAMSON: I'm done, thank you.

15 MR. LOVEJOY: Mr. Potter, do you know what
16 time frame is being used in examining the performance
17 of, say, the Yucca Mountain repository?

18 WITNESS POTTER: I think it was initially
19 ten thousand years. And I think it's under some
20 review.

21 MR. LOVEJOY: And what is the time frame
22 that was used in analyzing the performance of the
23 waste isolation pilot plant?

24 WITNESS POTTER: I believe that was 10,000
25 years as well.

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1 MR. LOVEJOY: Do you know what time frame
2 the Nuclear Regulatory Commission used in having a
3 contractor study deep disposal in the Claibourne case?

4 WITNESS POTTER: I do not recall.

5 MR. LOVEJOY: Did you look at any of the
6 studies?

7 WITNESS POTTER: Yes, the Claibourne. My
8 recollection, now you're talking about the mine
9 disposal analysis.

10 MR. LOVEJOY: Yes.

11 WITNESS POTTER: I remember that they
12 included --

13 MR. LOVEJOY: Well -- yes.

14 WITNESS POTTER: I believe that analysis
15 did not have a cut-off, is my recollection.

16 MR. LOVEJOY: Okay.

17 WITNESS POTTER: I don't know what the
18 basis for the assumption was.

19 MR. LOVEJOY: Would you look at -- do you
20 have the NIRS/PC exhibits near you?

21 (No verbal response.)

22 MR. LOVEJOY: I'm going to ask you a
23 question about number 128.

24 (Pause.)

25 MR. LOVEJOY: It wasn't in the first three

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1 notebooks we looked at.

2 JUDGE ABRAMSON: What are we looking at?

3 MR. LOVEJOY: It's the Kozak report, Your
4 Honor, Exhibit 128.

5 WITNESS POTTER: Yes, I've seen this.

6 MR. LOVEJOY: Yes. I just have a question
7 about the answer to which I think shows up on page 14.
8 Table 14 shows intruder construction doses at the time
9 of secular equilibrium, two times ten to the six
10 years. Is that the time frame that applied here?

11 WITNESS POTTER: Yes.

12 MR. LOVEJOY: And, in your judgment,
13 that's not regulatorily meaningful?

14 WITNESS POTTER: It's not regulatory
15 practice in general for uranium. It certainly
16 conflicts with 10CFR 40, Appendix A, and is not
17 consistent with 10CFR subpart E.

18 MR. LOVEJOY: Excuse me.

19 WITNESS POTTER: Both of which deal with
20 situations in which uranium is the predominant -- or
21 I should say uranium products are the -- naturally
22 occurring materials are the predominant focus.

23 I'm not sure I accept all these numbers in
24 the Kozak report. But I see there are some obvious
25 contradictions. But I accept the general point that

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1 if you went out to two million years you would
2 calculate for the same exposure assumption.

3 You would calculate much higher doses. I
4 agree with that.

5 MR. LOVEJOY: Yes. And, in 10CFR part 61,
6 subpart C, what's the time limit?

7 WITNESS POTTER: There is no time limit.

8 MR. LOVEJOY: Okay. Do you have a problem
9 with that?

10 WITNESS POTTER: No.

11 MR. LOVEJOY: So you accept that?

12 WITNESS POTTER: I accept that.

13 (Pause.)

14 JUDGE ABRAMSON: Let's pick this up for a
15 second. If we took one of these dry sites we're
16 talking about where the downward transportation is
17 slow but where there is at some point an aquifer, and
18 if there were no changes in the geologic or weather
19 conditions, by two million years out the front would
20 have reached this or it would never reach it.

21 Does it actually get to a stagnant
22 situation and balance between the downward penetration
23 and the evapotranspiration?

24 WITNESS POTTER: It --

25 JUDGE ABRAMSON: Assuming today's --

1 WITNESS POTTER: -- evaluated the two
2 million year scenario.

3 JUDGE ABRAMSON: Well, I guess my question
4 is a little more simple than that. My question is,
5 we've got a downward force, a downward penetration
6 that's caused by the rainfall and whatever the
7 rainfall picks up.

8 And then we have an upward transportation
9 cost by evapotranspiration. At some level, do those
10 two balance out? Or does it just keep moving
11 downward, the front?

12 WITNESS POTTER: I don't see, given the
13 constancy of the situation --

14 JUDGE ABRAMSON: Yes, we're making an
15 enormous assumption here.

16 WITNESS POTTER: Right. The
17 evapotranspiration is actually a function of water
18 behavior before it ever reaches the waste. It happens
19 -- that's something that happens in the near surface.

20 JUDGE ABRAMSON: Okay.

21 WITNESS POTTER: So really what that
22 controls is the rate of water addition to the waste.

23 JUDGE ABRAMSON: I see. So, once it
24 reaches the waste it just keeps going.

25 WITNESS POTTER: Right.

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1 JUDGE ABRAMSON: So, it's just a question
2 of --

3 WITNESS POTTER: That's our presumption.

4 JUDGE ABRAMSON: Okay. But that's what
5 I'm trying to understand. And I realize that nobody
6 -- and I think I must say, having now looked at the
7 DOE's revised standards for Yucca Mountain, this is
8 the first time I've seen a government agency say you
9 guys are out of your mind, you can't possibly compute
10 that sort of thing for those time frames.

11 And it's the first objective scientific
12 view I've ever seen of that. And I'm glad to see it
13 from a government agency finally. That said --

14 WITNESS POTTER: Yes.

15 JUDGE ABRAMSON: Going out, what you're
16 saying is that if we took no change in the conditions,
17 in the physical conditions, eventually this front
18 would reach the aquifer.

19 WITNESS POTTER: That's conceivable.

20 JUDGE ABRAMSON: And then eventually you'd
21 reach some sort of steady state condition between
22 what's coming in and what's getting carried out.

23 WITNESS POTTER: Right.

24 JUDGE ABRAMSON: And so we'd reach some --
25 yes, okay.

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1 WITNESS POTTER: And I believe it's --
2 well, I'll stop there.

3 JUDGE ABRAMSON: Okay. Thank you.

4 (Pause.)

5 CHAIR BOLLWERK: Is there a question
6 pending?

7 JUDGE ABRAMSON: No, I got my question
8 answered.

9 MR. LOVEJOY: The panel is conferring, I
10 didn't want to interrupt.

11 JUDGE ABRAMSON: Okay.

12 WITNESS KRICH: No, we're just waiting on
13 your question.

14 MR. LOVEJOY: Okay. Mr. Potter, in the
15 studies that Utah did, how did they model erosion of
16 the surface?

17 WITNESS POTTER: I'm not sure. I didn't
18 review the studies, as I said. And the accounts that
19 I read of reviews of those studies did not address
20 that.

21 But, as I say, that's one of those aspects
22 that is controllable by design. And my presumption
23 was that that would be controlled by design.

24 MR. LOVEJOY: How would you control
25 erosion by design?

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1 WITNESS POTTER: By adding erosion
2 controlling materials as part of your cover.

3 MR. LOVEJOY: How long would they last?

4 WITNESS POTTER: I think it would be
5 reasonable to expect that they would last through our
6 period of evaluation of 1,000 years.

7 MR. LOVEJOY: Have you reviewed, apart
8 from the memo of the conference call, any other
9 second-hand reports discussing the analyses of the
10 Envirocare site?

11 WITNESS POTTER: I don't believe so. None
12 come to mind. I may have heard -- I seem to recall
13 hearing a paper some five or six years ago having to
14 do with an evaluation of the Envirocare site. But
15 it's dim.

16 MR. LOVEJOY: Okay. Well, let's see.

17 JUDGE ABRAMSON: Do you know how many
18 acres are on the Envirocare site, approximately?

19 WITNESS POTTER: Well, there are a couple
20 of different cells. And I don't really know the area,
21 the dimensions of those cells. There's also a very
22 large mill tailings disposal immediately adjacent to
23 the Envirocare site.

24 The website has an aerial photograph where
25 you can kind of see the whole picture. I know I've

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1 found two conflicting figures about the volume of the
2 mill tailings facility.

3 The website says 20 million cubic yards.
4 And one of the 1990 reports in the NIRS exhibit
5 mentions two million cubic yards. I'm not sure what
6 the correct figure is.

7 But they're both very large. Either one is
8 very large.

9 MR. LOVEJOY: Let me shift a little bit of
10 a background and then we'll come back to these points,
11 I'm sure. Mr. Krich, is your understanding as
12 licensing manager for LES that LES has to demonstrate
13 a plausible strategy for tails disposition, right?

14 WITNESS KRICH: What I understand is my
15 responsibility is to determine a plausible strategy,
16 which needs to be more than mere speculation but does
17 not involve contracts.

18 And then, based on that plausible strategy
19 estimate a cost.

20 MR. LOVEJOY: And your strategy has to be
21 both technically and environmentally acceptable, does
22 it not?

23 WITNESS KRICH: My strategy has to be
24 plausible.

25 MR. LOVEJOY: Does your strategy have to

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1 be environmentally acceptable?

2 WITNESS KRICH: It certainly has to be
3 something that can be done.

4 MR. LOVEJOY: Does it have to be something
5 that can be done in conformity with the environmental
6 regulations of the Nuclear Regulatory Commission
7 applicable to disposal of radioactive waste?

8 WITNESS KRICH: Well, it would have to be
9 done in accordance with whatever the regulations are
10 at that point in time. But the regulations are
11 subject to change.

12 MR. LOVEJOY: Are you assuming that for
13 your --

14 WITNESS KRICH: So that's the reason why
15 when we look at a plausible strategy we look at
16 something that's plausible, regulatorily plausible.
17 It doesn't have to meet -- that doesn't say anything
18 about the regulations at a single point in time.

19 MR. LOVEJOY: You're not counting on a
20 change in regulations, are you?

21 WITNESS KRICH: I think the regulations
22 change all the time, Mr. Lovejoy, for various reasons.

23 MR. LOVEJOY: Do you have your deposition?

24 WITNESS KRICH: No.

25 MR. LOVEJOY: I'm looking at page 60 of

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1 the recent deposition. And the question was at the
2 top of the page. Do you have that?

3 WITNESS KRICH: Yes, I do.

4 MR. LOVEJOY: The question is well, as you
5 use the term plausible strategy does it include the
6 notions that it's technically and environmentally
7 acceptable?

8 And you're recorded as answering, again,
9 I guess I would have to go back to the fact that if
10 the option, the plausible strategy that we've
11 identified to develop our cost estimates meets NRC
12 regulations, then by association it certainly would
13 have to be technically and environmentally acceptable.

14 Otherwise it wouldn't be acceptable to the
15 NRC. Was that your testimony?

16 WITNESS KRICH: That is part of my
17 testimony, yes. I think I also went on to talk about
18 the plausibility or the lack of plausibility of
19 shooting the waste to the moon.

20 MR. LOVEJOY: Well I think we can postpone
21 testimony about shooting it to the moon.

22 WITNESS KRICH: Right.

23 CHAIR BOLLWERK: What Exhibit number is
24 this, just out of --

25 MR. LOVEJOY: This is out of the

1 deposition, Your Honor.

2 CHAIR BOLLWERK: Oh, deposition. It has
3 been marked or it hasn't?

4 MR. LOVEJOY: Extracts from is have been
5 marked.

6 CHAIR BOLLWERK: Maybe this one hasn't, I
7 don't know.

8 MR. LOVEJOY: Let me get to the number.

9 WITNESS KRICH: I'm referring to the
10 testimony, Mr. Lovejoy, on page 62.

11 MR. LOVEJOY: It's Exhibit 243, for
12 identification.

13

14

15

16

17 MR. LOVEJOY: I will offer it into
18 evidence. It's a transcript of the deposition.

19 CHAIR BOLLWERK: All right. It's listed
20 here as designated portions. Is that one of the
21 designated portions or are we now looking at the whole
22 transcript?

23 MR. LOVEJOY: Well I was looking at the
24 whole transcript. I'd be glad to put the whole
25 transcript in evidence. We haven't copied the entire

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1 thing, we just copied the relevant portions.

2 CHAIR BOLLWERK: If the portions work it's
3 fine with me. It's a question of whether whatever you
4 pre-marked as 243 has got the portions you want in it,
5 that's all.

6 MR. LOVEJOY: May I have permission to
7 check during the break?

8 CHAIR BOLLWERK: Sure, not a problem.

9 MR. LOVEJOY: Would you look at page 56,
10 Mr. Krich, and the question again is were you asked
11 this question and did you give this answer. And the
12 text says in order to carry out what you called a
13 plausible disposal strategy, would it be necessary for
14 the Commission to change any of the regulations in 10
15 CFR Part 61.

16 The answer is recorded as this. Mr.
17 Krich, as I think I just described, what we used to
18 meet -- to show that we do have a plausible strategy
19 does not require any changes to the regulations.

20 That's not to say that that imposes a
21 limit on the meaning of plausible strategy. But what
22 we have chosen to consider as plausible strategy does
23 not require any changes to the regulations with regard
24 to the disposal of class A low level radioactive
25 waste. Was that your testimony?

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1 MR. CURTISS: Mr. Chairman, before the
2 witness answers, if -- I understand where this is
3 going. I'd like to raise an objection. The fact of
4 the matter here I think here that in a variety of
5 different ways Counsel for NIRS is asking this witness
6 about the license ability of a plausible strategy,
7 coming at it collaterally through does it have to meet
8 regulatory requirements, does it have to meet public
9 health and safety requirements.

10 This issue was raised for the Board's
11 consideration in a motion where we sought -- LES
12 sought to strike the testimony relative to licensing
13 issues of the type that he's asking for here.

14 And if I recall this correctly, and I
15 don't have the date of the Board's order, but I do
16 believe I recall it correctly that the Board ruled
17 that question about what a plausible strategy consists
18 of are matters to be addressed in the proposed
19 findings of fact and conclusions of law, and on that
20 basis address the issue of the license ability
21 question.

22 I think this witness is being asked to
23 address the license ability of a plausible strategy,
24 and that's inherently a policy question, as the Board
25 pointed out, so I'd object to this line of

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1 questioning.

2 MR. LOVEJOY: I am not asking him -- we're
3 not going to go into license ability. We're examining
4 the impacts of near surface disposal, and they have to
5 be examined with respect to a particular standard,
6 that's all.

7 CHAIR BOLLWERK: All right. I'm going to
8 let the questioning go on for at least another couple
9 questions. But if we're headed in the direction Mr.
10 Curtiss is suggesting, we don't really need to go
11 there.

12 I think those are questions that can be
13 dealt with in another way.

14 MR. CURTISS: Thank you, Mr. Chairman.

15 MR. LOVEJOY: So in stating that you
16 believe LES has a plausible strategy, Mr. Krich,
17 you're assuming that the depleted uranium will be
18 classified as class A low level waste, are you not?

19 WITNESS KRICH: I don't think I'm assuming
20 that. I think that the Board reaffirmed that on
21 Monday. If I heard the English that was spoken by the
22 Board I understood that to mean that the decision is
23 that the depleted uranium byproduct is class A waste.
24 Am I missing something?

25 JUDGE ABRAMSON: The Commission said it's

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1 class A.

2 CHAIR BOLLWERK: There's a statement in
3 the Commission order that says DU is class A waste, if
4 I remember correctly.

5 MR. CURTISS: And based upon that I think
6 I'd object again. It's fair for this witness to
7 assume the law, if that's the nature of the question.
8 He can assume that the DU is class A waste because
9 that's exactly what the Commission ruled as a legal
10 matter.

11 So I don't think he needs to pursue it
12 further if it is a correct assumption because it's
13 exactly what the Commission ruled.

14 MR. LOVEJOY: Well, if I may, what the
15 Commission ruled was that the regs call it class A and
16 the NEPA analysis to support that judgment has not
17 been made.

18 And they in effect requested that this
19 hearing go forward without making a classification
20 determination. And that's the status that we're in
21 now.

22 JUDGE ABRAMSON: Well, perhaps -- we
23 appreciate that. Let's get down to what this is all
24 about, because I think that we've continued to hear
25 from the beginning of this proceeding arguments about

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1 what's plausible and what's not.

2 But in the end what we need to know is
3 what's the cost of doing something, because we need to
4 come up with a decommissioning funding rate. And
5 what's at issue here, it seems to me, to cut through
6 all this, is what's the cost of doing it in shallow
7 land burial, and what's the cost of doing it some
8 other way.

9 And which is -- which are we going to wind
10 up with? And I think that we've been advised that we
11 need to address which we're going to wind up doing it
12 as, which means that at some point somebody needs to
13 address whether or not it can be disposed of in
14 shallow burial -- is that right?

15 CHAIR BOLLWERK: Correct.

16 JUDGE ABRAMSON: Yes. But I don't think
17 it benefits anybody to hammer on whether it's
18 plausible or not. Let's get right down to what we're
19 going to do with it.

20 MR. LOVEJOY: Okay, well I'm going to kind
21 of for the moment bypass the discussion of class A,
22 which covered a whole lot of our deposition. It's
23 inevitable that it's going to be mentioned here and
24 there.

25 JUDGE ABRAMSON: Yes, now that's okay.

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1 MR. LOVEJOY: This formed a considerable
2 amount of the description of the strategy. But --

3 JUDGE ABRAMSON: The issue here is, it
4 seems to me, under the regs, what method of disposal
5 are we going to have to use, and that means whether it
6 -- which category it falls in in -- was it 6155.

7 MR. LOVEJOY: Partway.

8 JUDGE ABRAMSON: Right.

9 MR. LOVEJOY: IT talks about the
10 performance standards in Part 61.

11 JUDGE ABRAMSON: Right. So does it --
12 which performance standards can it meet? And that's
13 what we need to discuss.

14 MR. LOVEJOY: Okay. So talking about
15 possible strategies, Mr. Krich, I believe you
16 discussed in the deposition that you had looked at the
17 Hanford private site, Envirocare site, the Barnwell
18 site, and WCS. Is that correct?

19 WITNESS KRICH: I believe that the
20 application states that we considered all the existing
21 licensed low level radioactive waste facilities in the
22 country.

23 MR. LOVEJOY: Okay. And right now under
24 the Northwest Compact, I believe it is, the Hanford
25 private disposal site can't accept out of compact

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1 waste. Is that right?

2 WITNESS KRICH: Not exactly. In fact they
3 are receiving waste from New Mexico, low level
4 radioactive waste from New Mexico. That's going on as
5 we speak.

6 And in fact that was discussed at the
7 Rocky Mountain compact meeting that I went to last
8 March.

9 MR. LOVEJOY: But to receive waste from --
10 depleted uranium from an enrichment plant they would
11 have to get special permission from the Northwest
12 Compact, would they not?

13 WITNESS KRICH: I don't know if it's
14 special permission, but certainly there's a well
15 established procedure for one state to send its -- for
16 New Mexico to send its low level radioactive waste to
17 Hanford.

18 In fact, again, that was discussed at
19 length at the Rocky Mountain compact meeting in March.

20 MR. LOVEJOY: Okay. Now as for Barnwell,
21 I think you testified in the deposition that the
22 continued operation of that site is up for
23 speculation, right?

24 WITNESS KRICH: I think that was your
25 statement.

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1 MR. LOVEJOY: And did you agree with that?

2 WITNESS KRICH: No. I think what I said
3 was that as to my knowledge, I lived in South Carolina
4 for about three years. And the Barnwell site
5 announced that it was going to close, I think, three
6 times during that period and did not close.

7 MR. LOVEJOY: Would you look at page 43 of
8 your deposition, Mr. Krich?

9 WITNESS KRICH: Well I'm looking at page
10 44, Mr. Lovejoy.

11 MR. LOVEJOY: Well, let me ask you about
12 43.

13 WITNESS KRICH: Okay. And then we'll move
14 on to 44.

15 MR. LOVEJOY: Were you asked this
16 question? Do you know whether the environmental South
17 Carolina disposal site would be available to receive
18 depleted uranium from the NEF in the time frame that
19 it's being produced?

20 The answer is recorded as follows, at
21 there time that we prepared the license application
22 the Barnwell site was able to receive depleted
23 uranium. In terms of the continued operation of the
24 Barnwell site, that's up for speculation. Was that
25 your testimony?

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1 WITNESS KRICH: Yes, and then I went on to
2 say that --

3 MR. CURTISS: Forty-three?

4 WITNESS KRICH: I went on to say, on page
5 44 --

6 MR. CURTISS: Just a minute, excuse me.
7 In the excerpts that we have in that exhibit there is
8 not a page 43 that I have here. It's -- this excerpt
9 is identified as Exhibit 243.

10 CHAIR BOLLWERK: Right. I think the
11 problem identified before, it may well be that all the
12 portions were not excerpted.

13 MR. LOVEJOY: I just intended to use the
14 full deposition on cross.

15 CHAIR BOLLWERK: Okay.

16 MR. CURTISS: Then we'd appreciate copies
17 being made available. It's cross examination and
18 they're required to provide copies to the parties. I
19 only have the excerpts that were identified in Exhibit
20 243, which begin on page 45, after page 19.

21 MR. LOVEJOY: I assume that Counsel who
22 attended the deposition had a copy of it. It's not
23 necessary in my understanding to make an Exhibit of a
24 deposition when you're cross examining a witness.

25 CHAIR BOLLWERK: Who has --

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1 MR. LOVEJOY: Mr. Krich has a copy.

2 CHAIR BOLLWERK: He has a copy? As long
3 as, again, the witness has a copy, it would -- you
4 know, it's cross examination material. We -- the
5 general practice is we do try to mark these things so
6 they become part of the record, but --

7 MR. CURTISS: And it's, I think, helpful
8 for Counsel on cross exam exhibits to have copies of
9 them so we can see what's being read and respond to
10 the line of questioning.

11 CHAIR BOLLWERK: Right. Normally when you
12 proffer something to a witness it's marked for
13 identification, and -- so everybody has a copy, but
14 --

15 MR. CURTISS: We can come back to this
16 question if he can provide copies of the exhibits, but
17 I don't have any idea what he's reading from in the
18 materials that he is purporting to read from.

19 MR. LOVEJOY: It's Mr. Krich's deposition
20 of August 30th that you attended.

21 MR. CURTISS: I understand that. I don't
22 have a copy of that here, but -- and the Board's made
23 it very clear that on cross exam exhibits copies are
24 to be provided if they're going to be used for that
25 purpose, to all the parties and the Board.

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1 JUDGE ABRAMSON: Why don't we finish with
2 this question and then let's try to adhere to that
3 going forward. Does that make sense to you, Judge
4 Bollwerk?

5 CHAIR BOLLWERK: I think so. If you could
6 -- except you can't obviously share a copy. I guess
7 we don't have a copy, right?

8 MR. CURTISS: There appear to be only two
9 copies, one for the witness one for Counsel.

10 CHAIR BOLLWERK: Right.

11 MR. CURTISS: And if we wish to redirect
12 on this subject or to understand the context of the
13 question, I'd like to have a copy of the pages that
14 he's referring to.

15 And I do not have the full deposition
16 here. I have what he excerpted under Exhibit 243. But
17 he can ask this question --

18 CHAIR BOLLWERK: All right.

19 MR. CURTISS: And the context, if I do
20 recall the question, I don't appreciate it if this be
21 the end of questions on material that's not provided
22 to us.

23 MR. LOVEJOY: Well as explanation, the
24 excerpted portions of the deposition were intended to
25 be offered as the witness's testimony --

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1 CHAIR BOLLWERK: Correct.

2 MR. LOVEJOY: -- in this case.

3 CHAIR BOLLWERK: Correct.

4 MR. LOVEJOY: Not cross examination
5 material. Well let me --

6 WITNESS KRICH: I'd like to finish my
7 answer.

8 MR. LOVEJOY: Please.

9 WITNESS KRICH: So on the next page, on
10 page 44 of this deposition, which unfortunately I'm
11 sorry that nobody has, it says -- you said to me has
12 there been any announcement that will close as of
13 something like 2008.

14 And I said Mr. Lovejoy, I lived in South
15 Carolina and worked there for a number of years.
16 During that time Barnwell announced the closure about
17 three times.

18 Barnwell, to my knowledge, is still
19 operating. So these statements done mean a lot. I
20 think my testimony now is pretty consistent with what
21 I said then.

22 MR. LOVEJOY: Okay. Your Honor, we've
23 been going about two hours now --

24 CHAIR BOLLWERK: All right. Want to take
25 a break? Absolutely.

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1 MR. LOVEJOY: If it's convenient. I'm
2 going to start a new section and --

3 CHAIR BOLLWERK: That will be fine. I
4 appreciate you bring it to our attention. Thank you.

5 MR. LOVEJOY: Thank you.

6 CHAIR BOLLWERK: All right. We'll take a
7 ten minute break.

8 (Whereupon, the above-entitled matter
9 went off the record at 3:26 p.m. and
10 went back on the record at 3:40 p.m.)

11 CHAIR BOLLWERK: All right. I think all
12 the principals are here so why don't we
13 go ahead and get started. You said you
14 had a different subject?

15 MR. LOVEJOY: Maybe I could speed it up a
16 little.

17 CHAIR BOLLWERK: All right.

18 JUDGE ABRAMSON: Yes. I wanted to suggest
19 -- are we back on the record?

20 CHAIR BOLLWERK: Yes.

21 JUDGE ABRAMSON: I wanted to suggest to
22 the parties that since what's really -- what we're
23 really trying to determine here is whether or not this
24 DU is amenable to disposal in shallow land burial, and
25 the concomitant cost, or whether it needs to be buried

1 by some other method and the concomitant cost, and
2 that will involve the environmental aspects of it as
3 well, if we can, to the maximum extent that you all
4 can focus on that it will certainly help speed it up,
5 so -- I don't want to rule out other matters, but it
6 seems to me that's focus of we're going.

7 If I'm wrong, Mr. Lovejoy, please don't
8 hesitate to let me know.

9 MR. LOVEJOY: Thank you, Your Honor. I
10 think we can take your guidance. Do you have NIRS/PC
11 Exhibit 133 near you, Mr. Krich and Mr. Potter?
12 Either one of you can answer these questions, really.

13 WITNESS KRICH: One thirty-three?

14 MR. LOVEJOY: One thirty-three.

15 WITNESS KRICH: Yes, I have it. It's the
16 Environmental Report, or excerpt from the
17 Environmental Report.

18 MR. LOVEJOY: It's an excerpt from the ER
19 section 4.13. Mr. Krich, you reviewed the ER
20 discussion on waste disposal impacts before it was
21 published, correct?

22 WITNESS KRICH: This was prepared under my
23 direction.

24 MR. LOVEJOY: And the discussion in
25 4.13.3.1.5 concerns the environmental impacts of

1 disposal, does it not?

2 JUDGE ABRAMSON: What's the page at the
3 bottom?

4 MR. LOVEJOY: It's 4.13.13.

5 JUDGE ABRAMSON: Thank you.

6 CHAIR BOLLWERK: Thank you.

7 MR. LOVEJOY: Well it starts on 4.13.12,
8 but --

9 JUDGE ABRAMSON: Okay, we got it.

10 MR. LOVEJOY: It's substance is goes -- is
11 on 13.

12 JUDGE ABRAMSON: Thank you.

13 WITNESS KRICH: Could you repeat the
14 question, please?

15 MR. LOVEJOY: The discussion in 4.13.3.1.5
16 concerns environmental impacts of disposal, right?

17 WITNESS KRICH: The section you're looking
18 at is 4.13.3.1.5.

19 MR. LOVEJOY: Yes.

20 WITNESS KRICH: And that's entitled
21 potential impacts of each disposal option.

22 MR. LOVEJOY: Yes.

23 WITNESS KRICH: So if I could finish, it
24 discusses impacts here, but impacts are discussed, I
25 think, throughout most of this section.

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1 MR. LOVEJOY: And looking at the top of
2 page 4.13.13, it says that there would be potentially
3 large impacts to human health and groundwater quality
4 within a thousand years after failure of a facility in
5 a wet setting, right?

6 WITNESS KRICH: If you're referring to the
7 sentence that says the maximum dose to an individual
8 assumed to live at the edge of the disposal site and
9 use the contaminated water was estimated to be about
10 1.1 millisievert per year, 110 milligram per year,
11 which would exceed the 0.25 millisievert per year, or
12 25 milligram per year limit specified in 10 CFR 61,
13 and DOE order.

14 MR. LOVEJOY: That would be a violation of
15 10 CFR Part 61, right?

16 WITNESS KRICH: Well, as I think I
17 testified during the deposition, we're -- at this
18 point we were talking about maximums. So that in
19 other words it was assuming somebody was at the edge
20 of the disposal site drinking directly from the well
21 to determine a maximum level.

22 If that was the case they would receive a
23 dose that would be in excess of the Part 61 limit.

24 WITNESS POTTER: Could I chime in? I
25 would point out that this is for the wet site.

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1 WITNESS KRICH: Yes. The other part is
2 that this is for a wet sight.

3 MR. LOVEJOY: At the deposition, Mr.
4 Krich, I think you testified that you thought that
5 this did not include -- this modeling did not include
6 transport. Is that still your understanding?

7 WITNESS KRICH: To the extent beyond the
8 transport obviously that contaminated the water, it
9 would not, no. In other words, we discussed earlier
10 -- Mr. Potter discussed -- Dr. Potter discussed
11 earlier -- not Dr. Potter, Mr. Potter discussed
12 earlier that there are various ways to be exposed --
13 potentially exposed.

14 One would be from the top, one would be
15 from the contaminated water. And all those involve
16 different transport mechanisms. So the obvious --
17 obviously the water was -- the uranium or the
18 contamination is being transported to the well water.

19 But beyond that I don't know that this
20 amount will calculate at other -- in other words what
21 I'm saying is it was a -- may have been a forced model
22 in that it assumed everything went to one location
23 instead of being -- instead of looking at transport --
24 the normal transport model which would have it going
25 in various locations.

1 MR. LOVEJOY: And if also says on that
2 same page, actually in the same paragraph that
3 possible exposures on the order of 0.1 sievert per
4 year, 10 rems per year could occur for shallow earthen
5 structures and vaults if the cover material were to
6 erode and expose the uranium material. Does it not?

7 WITNESS KRICH: If you're reading the
8 sentence possible exposures on the order of .1 sievert
9 per year could occur for shallow earthen structures
10 and vaults if the cover material was to erode, is that
11 what you're reading?

12 MR. LOVEJOY: That's where I'm reading.

13 WITNESS KRICH: Okay. If you look up at
14 the top where it says potential adverse impacts, it
15 says -- and that's for this section, it says for all
16 disposal options, potentially large impacts to human
17 health and groundwater quality would occur within
18 1,000 years after failure of the facility, and at what
19 setting.

20 Whereas essentially no impacts would occur
21 from a dry setting in the same time frame. So the
22 remainder of the discussion in this section has to do
23 with the wet setting.

24 MR. LOVEJOY: Is it your testimony that
25 the erosion doses only occur in a wet setting?

1 WITNESS KRICH: No.

2 MR. LOVEJOY: It's not your testimony that
3 the DOE analysis showed that erosion doses only
4 occurred in a wet setting, isn't it?

5 WITNESS KRICH: Mr. Lovejoy, what I'm
6 talking about -- you've taken me to a paragraph in the
7 application. The paragraph that you're reading from
8 starts -- says that this discussion is for a wet
9 setting, and that none of the impacts that are
10 discussed in this paragraph would occur for a dry
11 setting over the same time period.

12 So I'm only reading what's in this
13 paragraph.

14 MR. LOVEJOY: So you are saying that the
15 exposure, the doses from erosion would only occur in
16 a wet setting?

17 WITNESS KRICH: No. There's exposure, but
18 I guess what I'm saying is there's essentially no
19 impacts. If we're looking at adverse impacts, and
20 that's what the title of this paragraph is, potential
21 adverse impacts, what this is saying is there's no
22 adverse impacts.

23 There's going to be impacts, but
24 apparently they don't -- based on what we put here
25 this did not cover adverse impacts for dry settings.

1 This is similar to the testimony that Mr. Potter just
2 gave.

3 MR. LOVEJOY: Okay. Well I'm --

4 JUDGE ABRAMSON: Let me -- let's pick this
5 up. Let's read the whole last sentence. And I'll
6 read it just to get it in the record right. It says
7 possible exposures of the order of 1 sievert per year
8 --

9 JUDGE KELBER: Let's do it right, 0.1
10 sievert per year.

11 JUDGE ABRAMSON: Okay, I'm sorry, 0.1
12 could occur for shallow earthen structures and vaults
13 if the cover material were to erode and expose uranium
14 material.

15 However, this would not arise until
16 several thousand years later, and such exposure could
17 be eliminated by adding new cover material to the top
18 of the waste area.

19 Now the question is this doesn't sound to
20 me like it's water erosion. It's just removal of the
21 cover.

22 WITNESS KRICH: Right.

23 JUDGE ABRAMSON: And does that -- would
24 that matter whether it's dry or wet? Is the principle
25 the same for any --

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1 WITNESS KRICH: Yes, Judge, the principle
2 is the same.

3 JUDGE ABRAMSON: Okay.

4 WITNESS KRICH: But I guess what I was
5 going to, and not to belabor the point, is the second
6 part of here, which is what Mr. Potter talked about.
7 This is an issue that can be engineered.

8 So the main part or the main thrust of
9 this paragraph, because I was involved in the
10 preparation of this, really was the first part talking
11 about the wet setting.

12 JUDGE ABRAMSON: The first part being --
13 talking about things that could occur within 1,000
14 years, and this saying that these are things well 00
15 what did I say?

16 What did it say? This would not arise
17 until several thousand years later. So the exposure
18 from the surface is, at least as I read this sentence,
19 several thousand years later whereas the underwater --
20 the exposure from water below is within 1,000 years.

21 WITNESS KRICH: Would occur within 1,000
22 years, exactly.

23 JUDGE ABRAMSON: Okay.

24 WITNESS KRICH: And that's really what we
25 were intending to get across here was what's going on

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1 in less than 1,000 years and comparing it to something
2 that was further out in time.

3 JUDGE ABRAMSON: Okay, thank you.

4 MR. LOVEJOY: Let's just complete the
5 circuit here. Do you have LES Exhibit 18?

6 WITNESS KRICH: Exhibit 18?

7 MR. LOVEJOY: Yes.

8 WITNESS KRICH: Appendix I?

9 MR. LOVEJOY: The whole -- well I was
10 going to ask you to look first at page 5-85.

11 WITNESS KRICH: I don't see that in the --

12 JUDGE ABRAMSON: Exhibit 18.

13 WITNESS KRICH: It's not in this copy.

14 MR. LOVEJOY: It's not in your copy of --
15 5-85?

16 WITNESS KRICH: No. We had some extras in
17 case -- they might help. Why don't you hand one to
18 the witness please? The discussion of post closure
19 impact starts on page 5-85.

20 I'll just call your attention to some text
21 on page 5-86, which appears to be the source of the
22 information in the ER. And I'll ask you if that isn't,
23 so.

24 The text here on page 5-86 at the bottom
25 paragraph says in addition to possible exposures

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1 resulting from the use of contaminated groundwater,
2 health impacts could result if a person inadvertently
3 intruded or if the cover material, i.e. soil, above
4 the disposal facility eroded away.

5 The radiation dose was estimated to be as
6 high as ten rems per year for a hypothetical future
7 resident living on the disposal in such a case. See
8 Appendix I, section I.4. Did I read that right?

9 WITNESS KRICH: I'm sorry?

10 MR. LOVEJOY: Did I read that right?

11 WITNESS KRICH: I'd like to look at
12 Appendix I.

13 JUDGE ABRAMSON: You might observe,
14 Counselor, while you're going off to look at Appendix
15 I, that the balance of that paragraph seems to go to
16 the other points that were made in that last sentence
17 of the ER paragraph we were looking at.

18 It talks about the cover -- if it erodes
19 away it could easily be mitigated by adding new
20 material and about things not happening for several
21 thousand years. So it seems to be --

22 MR. LOVEJOY: It's the source of the
23 information contained in the ER.

24 JUDGE ABRAMSON: It seems to be.

25 MR. LOVEJOY: Yes.

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1 JUDGE ABRAMSON: Or if it's not the source
2 it's certainly --

3 MR. LOVEJOY: Very similar.

4 JUDGE ABRAMSON: -- substantively the
5 same.

6 MR. LOVEJOY: Yes. Did you want --

7 MR. CURTISS: While we're looking at this
8 exhibit I need some clarification from the Board and
9 the context of the question that's being pursued here.

10 I take it the line of questioning here
11 goes to the issue of the dose estimates for the wet
12 and dry sites. And the line of questioning here, I've
13 been patient about objecting to.

14 But if I understand the Board's ruling
15 today on the footnote 52 issues, which include the
16 question of whether NIRS/PC have waived the
17 opportunity challenged adequacy of the estimates -- of
18 the dose estimates for wet and dry disposal sites, the
19 Board granted that motion earlier today.

20 And I think in the discussion that has
21 occurred in the past several questions and before the
22 break about the evaluation period, 1,000 years, 10,000
23 years, and now on this specific issue of the dose
24 estimates for the wet and dry sites, that's squarely
25 a matter that the Board, in ruling on the footnote 52

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1 motion, addressed.

2 And on that basis I would object that
3 that's beyond the scope of the issue that the Board
4 permitted to be litigated pursuant to their ruling on
5 footnote 52.

6 JUDGE ABRAMSON: It seems to me the
7 question is whether or not he's challenging these
8 numbers or whether he's just bringing them into
9 evidence.

10 And so I'll ask you, is it your intent to
11 challenge these numbers?

12 MR. LOVEJOY: I am not challenging these
13 numbers that I'm asking about, no.

14 CHAIR BOLLWERK: All right. I haven't
15 heard what I would consider a challenge yet, but I'll
16 admit I don't know where --

17 JUDGE ABRAMSON: What he said is the
18 numbers can't be challenged.

19 CHAIR BOLLWERK: Right.

20 JUDGE ABRAMSON: They may turn out to be
21 relevant to our inquiry about whether this disposal is
22 appropriate or not.

23 MR. CURTISS: All right. In that context,
24 I think, if he's referring to exhibits where he's
25 asking the witnesses just to read the description of

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1 he wet and dry doses -- dose estimates for wet and dry
2 sites I should say, and the witness or Counsel wants
3 to read those into the record, but I think the line of
4 questioning here really goes to can you explain these
5 results.

6 And it is tantamount to -- or coming close
7 to a challenge to the dose estimates for the wet and
8 dry sites.

9 JUDGE ABRAMSON: Carry on.

10 MR. LOVEJOY: Thank you. And did you want
11 to check Appendix I, Mr. Krich?

12 WITNESS KRICH: Yes. So if I go to the
13 section that's associated with the statement you just
14 read about the dose to an intruder, it says that this
15 section provides a summary of the potential
16 environmental impacts associated with the post-closure
17 phase of the disposal options.

18 The post closure phase considers the
19 potential environmental impacts that would occur in
20 the future, well beyond the time that any engineered
21 disposal facility would be expected to function as
22 designed.

23 Post-closure impacts are evaluated because
24 no matter how well designed, all disposal facilities
25 would be expected to release material to the

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1 environment eventually, a condition referred to as
2 failure.

3 And then they go on to say how long that
4 they've assumed in the analyses, and how long these
5 disposal facilities are expected to last before
6 failure, and then the postulated failure and analysis
7 that they did.

8 So these doses, and again I think the
9 Judge pointed out that this coincides pretty much with
10 what we had put in our application, reflect an
11 analysis of what they considered to be failure after
12 it had served it's purpose.

13 MR. LOVEJOY: And at some point the
14 engineered disposal facility would cease to function
15 as designed. Is that right?

16 WITNESS KRICH: I think I read post-
17 closure impacts are evaluated because no matter how
18 well designed, all disposal facilities would be
19 expected to release material to the environment
20 eventually, a condition referred to as failure.

21 MR. LOVEJOY: And for example, you've
22 talked about an engineered cover. And you can't
23 expect that to perform more than 1,000 years, can you?

24 WITNESS KRICH: I think that Mr. Potter
25 testified that the current regulatory standards are

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1 for a cover to perform it's function for at least
2 1,000 years.

3 WITNESS POTTER: I wouldn't suggest that
4 that guarantees failure at $t = 1,000$, though.

5 MR. LOVEJOY: Right.

6 WITNESS KRICH: Especially in a setting
7 like this.

8 MR. LOVEJOY: And Mr. Potter, is it not
9 inconsistent with the approach of 10 CFR Part 61 to
10 assume that people will come by after 1,000 years or
11 2,000 years and put a new cover on the disposal site.

12 WITNESS POTTER: Is it inconsistent?

13 MR. LOVEJOY: Yes.

14 WITNESS POTTER: I would say that's not
15 inconsistent, no.

16 MR. LOVEJOY: Do you have Part 61 nearby?

17 WITNESS POTTER: Yes, I do.

18 MR. LOVEJOY: Would you look at 61.44,
19 please?

20 WITNESS POTTER: Yes.

21 MR. LOVEJOY: Just check me as I read it.
22 To me what this rule says is that the disposal
23 facility must be sighted, designed, used, operated,
24 and closed to achieve long-term stability of the
25 disposal site and to eliminate to the extent

1 practicable the need for ongoing active maintenance of
2 the disposal following closure so that only
3 surveillance, monitoring, or minor custodial care are
4 required. Is that the assumption of a disposal site?

5 WITNESS POTTER: I seem to have lost my --

6 WITNESS KRICH: What Exhibit is that, Part
7 61 in?

8 MR. LOVEJOY: I think LES marked it.

9 JUDGE ABRAMSON: Why don't we accept for
10 the moment that that's what it says in the reg. And
11 let's talk about what's minor custodial maintenance,
12 or whatever it was.

13 And your comment, I suppose, is that
14 coming by once every thousand years to restore the cap
15 is more than minor?

16 MR. LOVEJOY: It's not minor.

17 JUDGE ABRAMSON: Okay.

18 JUDGE KELBER: Excuse me. Logically, why
19 would one monitor if one isn't going to do anything?
20 Monitoring is for the purpose of triggering actions.
21 That's why we have smoke detectors.

22 MR. LOVEJOY: This is a good concept. And
23 I suppose though, that sometimes one monitors things
24 that one can't do anything about.

25 JUDGE KELBER: Does one?

1 JUDGE ABRAMSON: Well, let's take the
2 following premise and see if we can move forward.
3 What we're hearing is this thing is okay for 1,000
4 years.

5 And what's being -- what I think -- what
6 I'm surmising you want to put at issue here is whether
7 1,000 years is good enough. Is that correct?

8 MR. LOVEJOY: It certainly is an issue
9 because this stuff is radioactive for --

10 JUDGE ABRAMSON: No, I understand that.
11 And I understand the perspective that you're worried
12 about daughter products as radiation peaks --

13 MR. LOVEJOY: Exactly.

14 JUDGE ABRAMSON: -- many tens of thousands
15 of years out. So I understand that's the issue, and
16 it seems to me all of understand what's proposed for
17 this kind of a disposal site. Mr. Curtiss?

18 MR. CURTISS: Well, I'm still puzzled as
19 to how, in view of the Board's ruling, the line of
20 questioning here focuses on the evaluation period.
21 The witness testified that there is no specified
22 period in Part 61.

23 He thinks 1,000 is appropriate. And there
24 is no required period in Part 61. And I think the
25 line of questioning suggests there ought to be a

1 longer period.

2 And if that were the case it would
3 demonstrate that the dose evaluation -- the dose it
4 much higher. And I won't persist in raising the
5 objection, but I do believe this is exactly the kind
6 of challenge to the dose evaluation suggesting a
7 longer truncation period, or evaluation period, that
8 the Board ruled on in footnote 52.

9 JUDGE ABRAMSON: Well, let --

10 MR. CURTISS: I just want to record the
11 objection for the record.

12 JUDGE ABRAMSON: Yes, let's talk about it
13 for a minute.

14 MR. CURTISS: Please.

15 JUDGE ABRAMSON: Because it seems to me
16 that the dose calculation is it's X, and that's good
17 for 1,000 years. And after that we're not making any
18 predictions.

19 Isn't that what the dose calculation is?
20 And we did that because we thought 1,000 years is
21 enough. It seems to me that's what this PEIS analysis
22 of dose did.

23 Now I don't hear, and correct me if I'm
24 wrong, I don't hear NIRS/PC challenging that
25 calculation. More, if anything, they're challenging

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1 how we ought to interpret the rule, which I think
2 NIRS/PC suggests is silent on the period for which it
3 should be examined, that it does not say it's 1,000.

4 It does not prescribe a period. That
5 doesn't -- and it seems to me that as lawyers we're
6 happy to hear you argue what the meaning of that
7 regulation is.

8 And we should hear that from you. But
9 that's not a challenge to the calculation, it's a
10 challenge to how we read the rule.

11 JUDGE KELBER: That conjunction -- Mr.
12 Potter, you earlier mentioned mill tailings.

13 WITNESS POTTER: Yes.

14 JUDGE KELBER: Mill tailings contain
15 radiogenic elements, do they not?

16 WITNESS POTTER: Yes, they do.

17 JUDGE KELBER: Was there any consideration
18 given in the -- either the legislation or the rule
19 that -- the applicable rule, to periods exceeding
20 1,000 years?

21 WITNESS POTTER: The rule specifies 1,000
22 years.

23 JUDGE KELBER: The rule --

24 WITNESS POTTER: I'm not sure about
25 considerations leading up to the rule.

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1 JUDGE KELBER: Well, I'm sure the rule is
2 consistent with the legislation.

3 WITNESS POTTER: But -- yes, I'm sure of
4 that. And I can further point out that thorium 230,
5 the major nuclide at the top of the chain there, has
6 an 80,000 year half-life.

7 So clearly the radiogenic properties
8 extend well beyond the thousand years specified in
9 Appendix A of 10 CFR 40.

10 JUDGE KELBER: So there is at least one
11 regulatory president.

12 WITNESS POTTER: Yes, and a second is we
13 have uranium fuel cycle facilities and other,
14 actually, source material facilities that have
15 processed uranium and thorium, and have residual
16 radioactive material left on site.

17 And we are in the process of
18 decommissioning those. And there is a specification
19 in 10 CFR 20 subpart E.

20 JUDGE KELBER: Part 20?

21 WITNESS POTTER: 10 CFR 20 subpart E.
22 That's the radiological --

23 JUDGE KELBER: Yes.

24 WITNESS POTTER: -- material for
25 decommissioning. This specifies a 1,000 year period

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1 of evaluation.

2 JUDGE ABRAMSON: Since the Commission
3 seems to be undertaking what ought to be done here,
4 and they've asked us to look at it, it's useful to
5 hear what this rule tells us about time periods.

6 WITNESS POTTER: In another regulatory
7 setting with another agency I think DOE is also taking
8 the position of using 1,000 years, at least in it's
9 evaluations, DEIS.

10 MR. LOVEJOY: Mr. Krich, you have Appendix
11 I in front of you. Let me just ask you if it doesn't
12 say page I 70.

13 WITNESS KRICH: What exhibit again is
14 that?

15 MR. LOVEJOY: Well, it's LES Exhibit 18.

16 WITNESS KRICH: It says in addition to the
17 possible exposures -- I'm down at the bottom of I 70,
18 and resulting from use of contaminated groundwater
19 radiological impacts could be caused by external
20 radiation and inhalation of contaminated dust
21 particles if all the cover materials above the
22 disposal site were removed, if containers of U308 or
23 UO2 disintegrated, this scenario could be caused by
24 natural forces of erosion over long periods of time or
25 by human intervention, i.e. digging, to bring the

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1 waste to the surface.

2 The associated external radiation dose
3 could be as high as ten rems per year for an
4 individual living on the disposal site. Is that
5 consistent with the previous passages you've read
6 about erosion and exposures arising from it?

7 Then it goes on to say, however, the
8 exposure would not occur until several thousand years
9 after closure of the shallow earthen structure or
10 vault disposal facility, and would be quite unlikely
11 for mine disposals because the mine would be located
12 at depth, so on, so forth.

13 Detailed analyses were not conducted, so
14 on and so forth. Okay. So that's consistent I think
15 with what Mr. Potter's testified to.

16 MR. LOVEJOY: Okay. Do you have 10 CFR
17 Part 61 right over there?

18 WITNESS KRICH: Yes, I have Part 61.

19 MR. LOVEJOY: Would you look in 61.7 A 5.

20 WITNESS KRICH: Could you repeat that
21 numbering?

22 MR. LOVEJOY: It's 61.7 A 5.

23 WITNESS KRICH: Yes.

24 MR. LOVEJOY: Okay. Does it say then
25 there, where site conditions prevent deeper disposal

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1 intruder barriers such as concrete covers may be used.

2 The effective life of these intruder
3 barriers should be 500 years.

4 WITNESS KRICH: Is there a question there?

5 MR. LOVEJOY: Is that what that says about
6 the effective life of intruder barriers?

7 WITNESS KRICH: No -- well it says what it
8 says. This doesn't cover all intruder barriers.

9 MR. LOVEJOY: Do you know how long, under
10 Part 61, monitoring is required to be conducted?

11 WITNESS KRICH: I'd have to go back and
12 check the rule.

13 MR. LOVEJOY: Okay. Get to that in a
14 minute. Okay. Do you have NIRS/PC Exhibit 170
15 nearby?

16 WITNESS KRICH: You're referring to the
17 report that's been superseded?

18 MR. LOVEJOY: I'm referring to NIRS/PC
19 Exhibit 170.

20 WITNESS KRICH: Yes. This is the report
21 that the DRC Staff has been superseded.

22 MR. LOVEJOY: Okay. Well let's look at
23 it. Maybe we can still learn something from it. Have
24 you reviewed this, Mr. Krich?

25 WITNESS KRICH: I have not.

1 MR. LOVEJOY: Have you, Mr. Potter?

2 WITNESS POTTER: Yes, I have.

3 MR. LOVEJOY: How recently?

4 WITNESS POTTER: Within the past 24 hours.

5 MR. LOVEJOY: Okay. Well of course either
6 one of you can answer these questions. I'm looking at
7 page ES 1. And it says that the purpose of the report
8 is to -- paragraph two.

9 WITNESS POTTER: Can you -- what part of
10 the report are we in here?

11 MR. LOVEJOY: Do you have ES 1 now?

12 WITNESS POTTER: Yes, I do.

13 MR. LOVEJOY: It says -- does it not say
14 that the purpose of this report is to identify limits
15 on radionuclide concentrations in the wastes proposed
16 for disposal to ensure that radiological doses to
17 persons who might be exposed do not exceed prescribed
18 regulatory limits.

19 It that your understanding of the purpose
20 of this report?

21 WITNESS POTTER: That's right.

22 MR. LOVEJOY: And that's what the report
23 did, isn't it?

24 WITNESS POTTER: For that -- for the
25 context in which it was performed, that's correct.

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1 MR. LOVEJOY: And the approach it took is
2 described on page ES 4. I'll ask you if you don't
3 agree. It says on ES 4 that exposure pathway doses
4 based on assumed one picocurie per gram radionuclide
5 concentrations in the waste were calculated for each
6 of the exposure pathways shown in table E1.

7 Is that how you understand the process of
8 the report?

9 WITNESS POTTER: Yes.

10 MR. LOVEJOY: And table E1 is over on the
11 next page showing the pathways used in dose
12 assessments, right?

13 WITNESS POTTER: Right.

14 MR. LOVEJOY: And I'm looking at page 3-3,
15 and do you understand from this discussion under
16 protection of the general population that the authors
17 assumed that one of the rules for their analysis was
18 that a member of the public could not receive a dose
19 of more than 25 milligrams per year. Is that right?
20 To the whole body.

21 WITNESS POTTER: You're reading under
22 3.2.1, disposal facility performance objectives?

23 MR. LOVEJOY: Yes, on page 3-3.

24 WITNESS POTTER: That's right. The
25 section entitled protection of the general population,

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1 that's right.

2 MR. LOVEJOY: Okay. Did you have anything
3 to criticize about the methodology of this report when
4 you read it?

5 WITNESS POTTER: I have to say I didn't
6 conduct a detailed review of this report. I did
7 notice the site and the various conceptualizations
8 and, for example, noticed the clear contradiction
9 between an assumption that groundwater would be used
10 for an agricultural pathway in this report, as opposed
11 to the obvious elimination of that and a whole series
12 pathways because of high salinity groundwater in the
13 -- apparently in the later reports.

14 But -- yes, I didn't -- beyond that,
15 that's pretty much the extent of it.

16 MR. LOVEJOY: Okay. Well apart from that
17 variation between this one and the post 1990 studies
18 that you were told about, do you think that the Baird
19 report is based on sound scientific analysis?

20 WITNESS POTTER: Well, I wouldn't say --
21 I wouldn't criticize the report as being based on
22 unsound analysis because they made some conservative
23 assumptions in representing or in conceptualizing the
24 site or the behavior of people that might be exposed
25 to it.

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1 I would not necessarily agree with those
2 conceptualizations. But for the purposes of this --
3 this report had particular purposes in mind. And a
4 report that involves simplifications, conservative
5 simplifications in the conceptual analysis may have
6 been a perfectly reasonable way to approach the whole
7 problem.

8 MR. LOVEJOY: So you think it was a
9 conservative analysis?

10 WITNESS POTTER: Well, it would certainly
11 be conservative to assume that people are using high
12 salinity groundwater as drinking water and water for
13 agricultural purposes and that kind of thing.

14 MR. LOVEJOY: I'm looking at page 5-1, and
15 it says that the authors first modeled several release
16 pathways calculating the dose that would be received
17 from waste in a concentration -- radionuclide
18 concentration of one picocurie per gram.

19 Is that how you understand the analysis
20 was done?

21 WITNESS POTTER: That's my understanding.

22 MR. LOVEJOY: And based on the dose
23 received from one picocurie per gram, they then
24 calculated radionuclide concentration limits for waste
25 that would deliver a dose just below 25 milligrams,

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1 right?

2 WITNESS POTTER: That's my understanding.

3 MR. LOVEJOY: And I think it's on page 5-

4 13 that we see the maximum doses to off-site

5 recipients calculated for various isotopes assuming

6 one picocurie per gram. Is that right?

7 WITNESS POTTER: Let's see. Off-site

8 maximum individual, is that the one you were pointing

9 to specifically?

10 MR. LOVEJOY: There is that column, yes.

11 WITNESS POTTER: Yes, I see it.

12 MR. LOVEJOY: Okay. And over on page 5-

13 14, based on those doses, the authors develop

14 concentration limits limited by the 25 milligram

15 dose. Is that right? Are those shown in 5-14?

16 WITNESS POTTER: I'm not quite sure how

17 those numbers were derived, but let's see -- it looks

18 like it, yes.

19 MR. LOVEJOY: And what is the

20 concentration limit for U 238?

21 WITNESS POTTER: Seven hundred and ten

22 picocuries per gram.

23 MR. LOVEJOY: And U 238 is the dominant

24 isotope in depleted uranium when it's been placed, is

25 it not?

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1 WITNESS POTTER: That's correct.

2 MR. LOVEJOY: Okay. And would the
3 depleted uranium from the National Enrichment Facility
4 be in excess of that limit?

5 WITNESS POTTER: Yes, it would. I would
6 not suggest though that the limit would necessarily
7 apply to that. This analysis -- I would not
8 necessarily suggest -- I would not suggest that that
9 limit would apply to that material.

10 MR. LOVEJOY: You mean legally speaking?

11 WITNESS POTTER: As -- technically
12 speaking. This analysis is 1990. There are
13 simplifying assumptions in it of which I've only
14 identified one.

15 There are other assumptions that may be
16 equally simplified, given the one, so I would not
17 hurry to leap to say that this is the final word on
18 the subject.

19 WITNESS KRICH: Especially since the Staff
20 -- the DRC Staff, the Department of Radiation
21 Protection Staff stated that the 1990 reports were
22 used for initial licensing, and that there are more
23 updated reports from approximately 1997 to 2000.

24 So it might be informative to look at
25 those.

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1 JUDGE ABRAMSON: Do we have that report
2 available, the updated report?

3 WITNESS POTTER: I have not seen those.

4 WITNESS KRICH: Haven't seen the report
5 itself.

6 JUDGE ABRAMSON: Has Staff tried to get a
7 copy of that report?

8 MS. CLARK: One moment, I'll check.

9 (Pause.)

10 MS. CLARK: We didn't request these
11 underlying reports because in our conversations with
12 the State the State assured us that they did not --
13 would not change their conclusion, that disposal --
14 depleted uranium is acceptable without limitation.

15 JUDGE ABRAMSON: Well, I mean that raises
16 an obvious question, doesn't it? If this table from
17 1990 says that depleted uranium exceeds -- gives a
18 number for depleted uranium, and if it exceeds that
19 number then something must have changed between then
20 and now to make it acceptable.

21 I understand, Mr. Krich, is it right that
22 we have been -- or you have been advised that they've
23 taken depleted uranium at that site?

24 WITNESS KRICH: Yes. The Senior Vice
25 President at the site in his letter said that they

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1 have disposed of depleted uranium at the site. And in
2 fact --

3 JUDGE ABRAMSON: And is there anything
4 unusual about that depleted uranium, or is it mostly
5 235?

6 WITNESS KRICH: Mostly 235 -- 238, I'm
7 sorry, yes.

8 MS. CLARK: Well, Your Honor, if I could
9 explain.

10 JUDGE ABRAMSON: Yes, kindly do.

11 MS. CLARK: It is our understanding that
12 in fact the dose limits were not changed because of
13 subsequent analysis, that it was actually based on
14 this 1990 analysis that the State determined that the
15 pathways, intruder and agriculture, and intruder --
16 and off-site individuals, those pathways were not
17 viable.

18 And therefore in the licensing
19 determination the State determined, based on this
20 evaluation, that there need not be a quantity limit.

21 MR. LOVEJOY: They just dropped some
22 scenarios.

23 JUDGE ABRAMSON: Okay. If they did, they
24 did.

25 MR. LOVEJOY: Well --

1 JUDGE ABRAMSON: I mean I guess that's
2 what we need to verify somehow. But what you're
3 telling us is they're taking it at that site. And --

4 MS. CLARK: Without quantity limitation.

5 JUDGE ABRAMSON: And they've advised you
6 that they can continue to take it in unlimited -- or
7 that they can take it in unlimited quantities. And
8 Mr. Lovejoy's suggesting that this report would tell
9 us that this was an evaluation of the potential
10 impacts, that if you follow the evaluation of
11 potential impacts DU would not qualify under the
12 standard that they set, but that the State didn't --
13 State's established a criteria that was different from
14 this. Is that right?

15 MS. CLARK: Well, what the report
16 represents is an all pathway analysis. And so the
17 report did all pathways and determined limits assuming
18 that all pathways were viable.

19 JUDGE ABRAMSON: I see. And then --

20 MS. CLARK: And in the report they said
21 you have to take into account site specific
22 considerations here. There is a page in which the --
23 in the report where they say there's a number of
24 factors that need to be taken into account here.

25 They were not -- that's what they were

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1 changed to do, to give complete information to the
2 State, which of course is the regulatory authority,
3 and then makes the determination.

4 WITNESS KRICH: And then, Judge, if you
5 looked at question three from the telephone summary
6 between the NRC Staff and the Department of Radiation
7 Control Staff, they said that on-site residential
8 and/or farming scenarios at the Envirocare facility
9 are unrealistic for several reasons.

10 And then they go on to explain why those
11 pathways were eliminated.

12 JUDGE ABRAMSON: Okay. And that's what
13 results in making the number below this 710?

14 WITNESS KRICH: That's one understanding.

15 JUDGE ABRAMSON: I see, okay.

16 JUDGE KELBER: Mr. Krich, to your
17 knowledge, does the State monitor the Envirocare site?

18 WITNESS KRICH: Very much so, yes.

19 JUDGE KELBER: They monitor it?

20 WITNESS KRICH: Yes.

21 JUDGE KELBER: Would you agree that -- I'm
22 going to read a statement about monitoring, and I'd
23 like to know whether you agree with it. To monitor a
24 scene is to observe signals indicating a significant
25 change in condition.

1 The purpose of discovering a significant
2 change is to enable a decision as to whether or not
3 remedial actions should be made. Would you agree with
4 that statement?

5 WITNESS KRICH: Yes, sir. There's no
6 point in monitoring if you don't plan on deciding
7 whether to do something about it.

8 JUDGE KELBER: Yes. I think that's why I
9 have smoke detectors in the house.

10 MR. LOVEJOY: I'd like to mark another
11 exhibit.

12 CHAIR BOLLWERK: Do you want to mark 170,
13 by the way, since we've --

14 MR. LOVEJOY: I think it would be a good
15 idea. I'm sorry.

16 CHAIR BOLLWERK: All right. Let's go
17 ahead and mark Exhibit 170, the Baird report dated
18 June, 1990, and mark for identification.

19 (Whereupon, the above-
20 referenced to document was
21 marked as NIRS/PC Exhibit No.
22 170 for identification.)

23 MR. LOVEJOY: And we offer the exhibit in
24 evidence.

25 CHAIR BOLLWERK: Exhibit 170 has been

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1 motioned to have it admitted into evidence. Any
2 objections?

3 (No verbal response.)

4 CHAIR BOLLWERK: No? There being no
5 objections it's admitted into evidence.

6 (The document referred to,
7 having been previously marked
8 for identification as NIRS/PC
9 Exhibit No. 170 was received in
10 evidence.)

11 MR. LOVEJOY: And now I need to know what
12 the next number would be.

13 CHAIR BOLLWERK: The next number would be
14 273, I believe.

15 MR. LOVEJOY: Thank you.

16 (Pause.)

17 MR. LOVEJOY: I'd like the witnesses just
18 to look at this and tell me whether they've reviewed
19 this before.

20 WITNESS KRICH: I have reviewed this
21 document before.

22 MR. LOVEJOY: That was yes?

23 WITNESS KRICH: That was -- I have
24 reviewed it before, yes.

25 MR. LOVEJOY: Thank you. And Mr. Potter,

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1 did you review this?

2 WITNESS POTTER: I have.

3 MR. LOVEJOY: Did you review this in
4 connection with your work on this case?

5 WITNESS POTTER: I believe so, yes.

6 MR. LOVEJOY: Over on page 8, the text is
7 headed results of Envirocare discussions. And it
8 talks about an amendment to their license. And it
9 says the new Amendment 11 added provisions to the RML,
10 which I take to be radioactive materials license,
11 authorizing construction and operation of a new class
12 A disposal cell to which isotope specific LRLs, which
13 I think is -- is it radioactive limitations of some
14 kind?

15 WITNESS KRICH: Stated on the previous
16 page.

17 MR. LOVEJOY: License receipt limits, I
18 think, referred to on page 6.

19 CHAIR BOLLWERK: I take it you want to go
20 ahead and mark this for identification for the record,
21 right? Could you just give it a brief summary?

22 MR. LOVEJOY: Yes. I'm sorry, I should
23 have said -- shall I? This is a paper from Oakridge
24 National Laboratory entitled Evaluation of the
25 Acceptability of Potential Depleted Uranium

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1 Hexafluoride Conversion Products at the Envirocare
2 Disposal Site, by Croft, Hightower, and Rannic, ORNLTM
3 2,355 in December 2000.

4 CHAIR BOLLWERK: All right. Then Exhibit
5 273 is the next number, as described by Counsel is
6 marked for identification.

7 (Whereupon, the above-
8 referenced to document was
9 marked as NIRS/PC Exhibit No.
10 273 for identification.)

11 MR. LOVEJOY: So this describes on page 8
12 the new class A disposal cell, doesn't it? It says
13 the new Amendment 11 added provisions to the RML
14 authorizing construction and operation of a new class
15 A disposal cell to which isotope specific license
16 receipt limits do not apply.

17 Thus the limitation that eh isotope
18 specific LRLs contained in the RML Amendment 10 would
19 have been posed on the disposal of DU in the
20 Envirocare LARW cell has been eliminated for the class
21 A cell.

22 Is that your understanding of he process
23 that took place there?

24 WITNESS KRICH: I can only say it says
25 what it says. I wasn't involved in this effort.

1 MR. LOVEJOY: Okay. So you didn't give
2 this any consideration in your --

3 WITNESS KRICH: No, Mr. Lovejoy. That's
4 not what I said. I wasn't involved during this effort
5 by Mr. Croft and his other et al, so I have to accept
6 what it says here.

7 MR. LOVEJOY: Okay. You are aware of
8 course that Amendment 19 of the license has been
9 superseded by Amendment 20. And in the most recent
10 amendment isotopic concentrations for listed nuclides
11 have been eliminated. The new amendment refers to
12 class A limits.

13 WITNESS KRICH: Yes.

14 MR. LOVEJOY: You're aware of that? When
15 you reviewed this in connection with this case, did
16 you notice the language on page 13 in the paragraph
17 starting it was noted?

18 And I will read it to you. It was noted
19 that the performance assessment for Envirocare's class
20 A disposal cell license amendment, Envirocare 2000,
21 was based on a spectrum of low level waste typical of
22 wastes accepted at other commercial low level waste
23 disposal sites, and the potentially large amount of DU
24 product now being considered for disposal was not
25 encompassed in this spectrum of waste.

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1 WITNESS KRICH: Is there a question here?

2 MR. LOVEJOY: Did you notice that when you
3 reviewed it in connection with this matter?

4 WITNESS KRICH: When I read this document
5 I read that part of it, yes.

6 MR. LOVEJOY: Did you give that any weight
7 in your evaluation of Envirocare as a disposal site?

8 WITNESS KRICH: Well, Mr. Lovejoy, you
9 have to understand the purpose of this report. And
10 this report was a carry-on to a previous report, and
11 so they were looking at closing out a number of items,
12 or addressing a number of items.

13 Furthermore, these people are from
14 Oakridge. They are not the state regulator. And so
15 what they have to say about something is their
16 personal opinion, but it doesn't carry any regulatory
17 weight.

18 MR. LOVEJOY: But in any event, you
19 learned from this document that the performance
20 assessments used in qualifying the class A disposal
21 cell did not include large quantities of depleted
22 uranium?

23 WITNESS KRICH: I did not learn that from
24 this document. What I learned is that that's what
25 these people, at least in their research, found. That

1 doesn't mean that that's necessary the case, nor does
2 it mean that the regulator hasn't done something else.

3 JUDGE KELBER: Mr. Krich, continuing on
4 from this paragraph there's another paragraph called
5 issues resolution --

6 WITNESS KRICH: Right.

7 JUDGE KELBER: And I -- would you read the
8 last sentence in that paragraph?

9 WITNESS KRICH: Right. Thank you, Judge.
10 That's what I was referring to earlier, where the
11 purpose of the report was to address a number of open
12 issues.

13 This issue will presumably be resolved
14 between the State of Utah and Envirocare if and when
15 disposal of the DU product at Envirocare is imminent,
16 although the issue could be raised by the governor --
17 by the generator of the DU product.

18 And in fact, to my understanding, that's
19 in fact what occurred.

20 MR. LOVEJOY: Well has there been an
21 assessment of the performance at the Envirocare site
22 using an inventory, a source term, that consists of a
23 large amount of depleted uranium product since this
24 report was done?

25 WITNESS KRICH: Well, the information that

1 I have is -- again, I have to go back to the
2 conversation and the summary of the conversation
3 between the NRC Staff and the Utah Department of
4 Radiation Control, which regulates the Envirocare
5 site.

6 And the conclusion here was that there was
7 -- that the site could accept, within their waste
8 acceptance criteria, the amounts of depleted uranium
9 that would be generated by the National Enrichment
10 Facility. That's clear in the summary.

11 MR. LOVEJOY: You're talking about the
12 summary of the phone call?

13 WITNESS KRICH: Yes.

14 MR. LOVEJOY: Do you know whether any
15 examination of the issue, any performance assessment,
16 any environmental analysis was done after this one?

17 WITNESS KRICH: After this one what?

18 MR. LOVEJOY: After this report was
19 written?

20 WITNESS KRICH: Which report are you
21 referring to?

22 MR. LOVEJOY: This 2000 report by
23 Oakridge.

24 WITNESS KRICH: No, I don't know for a
25 fact what was done. But I do know this phone call

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1 occurred in 2005, so I have to assume that the people
2 at the other end of the line in Utah were basing their
3 responses to the NRC on evaluations that they were
4 aware of.

5 WITNESS POTTER: I think there's, if I
6 could chime in, there's also an NRC Staff question and
7 a DRC Staff response. They're asked to clarify the --
8 asked how DRC obtained limits if there were no
9 receptor to use or consume the water.

10 DRC clarified the response and indicated
11 the limits relate to the state's anti-degradation
12 policy decision made in 1990. The decision meant that
13 even though there were no uses for the groundwater,
14 eventual groundwater discharges. The Great Salt Lake
15 would not be allowed to further degrade water quality.

16 I interpret that to mean that they did not
17 simply -- no longer evaluate, but they supplemented
18 their evaluation. They didn't stop their evaluation
19 when they limited the exposure pathways.

20 But they also evaluated potential impacts
21 on groundwater quality.

22 MR. LOVEJOY: Mr. Krich, you looked at the
23 LES Exhibit 104, the report on the conference call.
24 And did you notice that it said in the answer to
25 question four that the DRC Staff reported that the

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1 1990 reports were used in initial licensing work for
2 Envirocare and that there are more updated reports
3 from approximately 1997 through 2000? Did you notice
4 that?

5 WITNESS KRICH: Yes. In fact I think, Mr.
6 Lovejoy, that's what I just directed you to when I was
7 saying that this 1990 report had been superseded and
8 that we ought to look at more recent reports.

9 MR. LOVEJOY: And this Oakridge report of
10 the performance assessment for the class A disposal
11 cell says that that was done in 2000. And this report
12 itself was done in 2000, right?

13 WITNESS KRICH: No.

14 MR. LOVEJOY: December, 2000.

15 WITNESS KRICH: What this says was that
16 the report was issued in 2000. The report was most
17 likely done, having been involved in writing reports
18 like these for the Government, the report was most
19 likely done at some other time.

20 MR. LOVEJOY: This follows up, this
21 Oakridge December, 2000 report, you said follows up on
22 a previous report. Is that right?

23 WITNESS KRICH: That's correct.

24 MR. LOVEJOY: And is that the report
25 entitled Assessment of Preferred Depleted Uranium

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1 Disposal Forums which is NIRS/PC Exhibit 257, which
2 I'll identify for the record.

3 (Whereupon, the above-
4 referenced to document was
5 marked as NIRS/PC Exhibit No.
6 257 for identification.)

7 MR. LOVEJOY:

8 It's a report published in June 2000 of
9 the Oakridge National Laboratory Chemical Technology
10 Division, called Assessment of Preferred Depleted
11 Uranium Disposal Forums by Croft and others.

12 CHAIR BOLLWERK: All right. NIRS/PC
13 Exhibit 257 as -- I'm just checking to make sure I
14 have my second list -- we haven't done that --

15 MR. LOVEJOY: I'm checking if that's the
16 right report.

17 CHAIR BOLLWERK: NIRS/PC 257 as described
18 by Counsel is identified for the record, marked for
19 identification.

20 WITNESS KRICH: Is there a question here?

21 MR. LOVEJOY: The question I think was
22 whether Exhibit 273 isn't a follow on report from the
23 June 2000 report, Exhibit 257.

24 WITNESS KRICH: Yes. That's what it
25 appears to be a follow on to.

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1 MR. LOVEJOY: Okay. So the December 2000
2 report was prepared after the June 2000 report, right?

3 WITNESS KRICH: That would be prepared
4 between June and December.

5 MR. LOVEJOY: Okay.

6 WITNESS KRICH: When it was published in
7 December.

8 MR. LOVEJOY: And as far --

9 WITNESS KRICH: And in fact this June date
10 for this report is the publish date. This report
11 could have been prepared, of course, earlier than
12 that.

13 MR. LOVEJOY: And we have no more recent
14 word on analysis of the performance of the Envirocare
15 site more recent than Exhibit 273, which says that the
16 class A cell was licensed based on an analysis that
17 did not include a large amount of DU product now being
18 considered for disposal.

19 WITNESS KRICH: No, that's not true. We
20 do have more recent word. It's -- in one place, for
21 example, it's summarized in the notes of telecom
22 between the NRC Staff and the Utah Department of
23 Radiation Control who regulates the site.

24 MR. LOVEJOY: That's where they said that
25 the updated reports were done in '97 through 2000,

1 right?

2 WITNESS KRICH: Yes.

3 MR. LOVEJOY: And you don't know of any
4 analysis after 2000?

5 WITNESS KRICH: I don't really know.
6 There may be but I'm not aware of this. But like I
7 explained, the fact that this report was published in
8 December of 2000 doesn't mean that this is done before
9 or after the analyses that the Department of Radiation
10 Control is referring to.

11 JUDGE ABRAMSON: It did say DRC Staff will
12 provide a list of these reports in the future
13 electronic mail. Did the Staff ever get the list?

14 MS. CLARK: No, we did not.

15 JUDGE ABRAMSON: Did you follow it up?

16 MS. CLARK: No. As I think we'll explain
17 later in our testimony, we believe that the limits
18 were established based on the 1990 assessment. So we
19 think that is the relevant assessment.

20 MR. LOVEJOY: Before I forget I should
21 offer for introduction Exhibits 273, 257, and 170 for
22 admission into the record.

23 CHAIR BOLLWERK: Okay. Hold on one
24 second. All right. Motion has been made that Exhibits
25 -- let's see, 170, I believe, has already been

1 admitted. 257 and --

2 JUDGE ABRAMSON: What were the numbers?

3 MR. LOVEJOY: It was 170, 257, and 273.

4 And 170 apparently is in.

5 CHAIR BOLLWERK: That's right.

6 MR. LOVEJOY: Two fifty-seven and 273 are
7 the two Oakridge reports.

8 CHAIR BOLLWERK: Okay. Motion has been
9 made that Exhibits 257 and 273, these are NIRS/PC
10 exhibits, be admitted into evidence. Any objections?

11 (No verbal response.)

12 CHAIR BOLLWERK: Hearing none, then
13 NIRS/PC Exhibits 273 and 257 are admitted into
14 evidence.

15 (The document referred to,
16 having been previously marked
17 for identification as NIRS/PC
18 Exhibit Nos. 273 and 257 were
19 admitted in evidence.)

20 MR. LOVEJOY: Mr. Potter, you stated, in
21 the deposition, that depleted uranium is not required
22 to be, or should not be disposed of in a geologic
23 repository because the specific activity of typical
24 transuranic waste is many times higher than the
25 specific activity of depleted uranium.

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1 Actually I think you said that in your
2 direct testimony here, right?

3 WITNESS POTTER: I think you are
4 paraphrasing a little bit.

5 MR. LOVEJOY: I am.

6 WITNESS POTTER: But, okay. I wouldn't
7 say that -- I think I would like to see my words.

8 MR. LOVEJOY: Do you have your testimony
9 there, by my notes this was in answer 23 of your
10 direct testimony.

11 WITNESS POTTER: Yes, I'm there. You are
12 talking about question 23?

13 MR. LOVEJOY: Well, I tried to capsule
14 it, but I asked you whether you were claiming that
15 depleted uranium need not be disposed in the geologic
16 repository because the specific activity of typical
17 transuranic waste is many times higher than the
18 specific activity of depleted uranium.

19 WITNESS POTTER: I think I'm responding to
20 a different question there. The question you seem to
21 be asking, if I understand it correctly, is simply on
22 the basis of specific activity, should depleted
23 uranium be required to be in the geologic repository,
24 or -- I think I'm missing a little something different
25 in your question.

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1 I can cut to the chase.

2 MR. LOVEJOY: Yes.

3 WITNESS POTTER: I believe that depleted
4 uranium can qualify for disposal under 10CFR Part 61,
5 and consequently it can be disposed of, we should be
6 able to demonstrate that, and dispose of it there,
7 dispose of it in that way.

8 It could be disposed of in a geologic
9 formation, but I don't think it need be, based simply
10 on the specific activity.

11 MR. LOVEJOY: Have you examined the
12 analysis that the NRC did when it issued Part 61 with
13 respect to uranium and transuranics?

14 WITNESS POTTER: Yes, I reviewed those in
15 general, yes.

16 MR. LOVEJOY: Did you review those, that
17 history in connection with this proceeding?

18 WITNESS POTTER: I refreshed myself to
19 some extent. I wouldn't say I conducted a complete
20 and comprehensive review, but I did refresh myself.

21 MR. LOVEJOY: There was modeling
22 conducted, though, wasn't there?

23 WITNESS POTTER: Yes, there was.

24 MR. LOVEJOY: And some of the modeling
25 involved uranium, didn't it?

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1 WITNESS POTTER: Yes, it did.

2 (Pause.)

3 MR. LOVEJOY: I'm going to mark copies of
4 volumes 1 and 2 of the EISs that were issued, in
5 draft, for Part 61.

6 CHAIR BOLLWERK: These are new exhibit
7 numbers?

8 MR. LOVEJOY: They would be 274 and 275.

9 MS. CLARK: Well, since they were Admitted
10 in the previous proceeding, shouldn't we rely on those
11 exhibit numbers?

12 CHAIR BOLLWERK: If they were that --

13 MS. CLARK: The Draft Environmental Impact
14 Statement was.

15 MR. LOVEJOY: Both 1 And 2? This is with
16 respect to Part 61 now.

17 MS. CLARK: I'm sorry, I apologize, I
18 thought you were talking about --

19 MR. LOVEJOY: I'm told we need to take one
20 quick look at NIRS/PC 168, just to make sure we
21 haven't already --

22 (Pause.)

23 MR. LOVEJOY: It is 168?

24 CHAIR BOLLWERK: Yes, it is listed as a
25 Draft Environmental Impact assessment for 10CFR volume

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1 4. Now, maybe that is not what you are --

2 MR. LOVEJOY: That is different.

3 CHAIR BOLLWERK: Different?

4 MR. LOVEJOY: Yes.

5 CHAIR BOLLWERK: Okay. Thank you, I just
6 wanted to make sure we are --

7 MR. LOVEJOY: Should we take a five minute
8 break at this point?

9 CHAIR BOLLWERK: Surely we can do that.
10 It has been about an hour and a half, so why don't we
11 take a five minute break, and we will distribute these
12 and come back.

13 (Whereupon, the above-entitled matter
14 went off the record at 4:50 p.m. and went
15 back on the record at 4:58 p.m.)

16 CHAIR BOLLWERK: Let's go back on the
17 record please.

18 We have taken a brief break to deal with
19 some paperwork. We now have two exhibits that have
20 been, I guess, requests for it to be marked for
21 identification.

22 Exhibit 274 which is volume I of the DEIS
23 part 61.

24 (Whereupon, the above-
25 referenced to document was

1 marked as NIRS/PC Exhibit No.
2 274 for identification.)

3 CHAIR BOLLWERK: Volume II of the DEIS for
4 Part 61, which is 275.

5 (Whereupon, the above-
6 referenced to document was
7 marked as NIRS/PC Exhibit No.
8 275 for identification.)

9 CHAIR BOLLWERK: And let's go ahead and
10 mark those for identification. And then, I guess we
11 are there, where we need to be, then.

12 A question about the deposition, I guess
13 there were questions about excerpts versus the whole
14 deposition. Is that -- what is your preference, you
15 are going to try to put the whole thing in, or what is
16 your --

17 MR. LOVEJOY: I didn't have very much more
18 to do with the deposition in the transcript in this
19 deposition, I don't think.

20 CHAIR BOLLWERK: All right. And the
21 question was, did the excerpts -- I mean, I take it
22 that it didn't cover everything, the excerpts that you
23 gave us did not cover everything that was covered, I
24 guess, with the witness?

25 Are the parties comfortable with that,

1 would you prefer that we revise the deposition extract
2 that we were given, it was given a number which was,
3 I'm sorry, 234 and insert some more pages into it, how
4 do you want to proceed?

5 MR. CURTISS: I think for purposes of the
6 completeness of the record we will defer to you on
7 that. I think that having read the question into the
8 record, that is sufficient. And if there are no
9 further questions from excerpts that we don't have,
10 that is fine with us.

11 CHAIR BOLLWERK: I'm sorry, 233, that is
12 the number? It is 243. Right, let us go ahead, and
13 Ms. Engle can help me with this, and identify the
14 pages in the deposition, and we will check the extract
15 and see what was there, and maybe we can update it
16 with some additional pages.

17 MR. LOVEJOY: Certainly.

18 CHAIR BOLLWERK: Would that work?

19 MR. CURTISS: Absolutely.

20 CHAIR BOLLWERK: Well, we will give you
21 the pages if you can --

22 JUDGE ABRAMSON: It sounds like it was
23 only one page.

24 CHAIR BOLLWERK: It may well be, I just
25 want to check.

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1 JUDGE ABRAMSON: I think that is the only
2 thing I heard, just one page, was a question about --
3 yes, wherever it was, but let's figure out, if you two
4 can figure out what that was, and tell us, and we just
5 do --

6 CHAIR BOLLWERK: And we will check with
7 Ms. Engle and make sure. Look and see what numbers we
8 need.

9 Okay, so we have marked for
10 identification, then, 274 and 275.

11 MR. LOVEJOY: And now, do you have nearby
12 NIRS/PC exhibit 86, which I will now identify as the
13 Federal Register release, by the Nuclear Regulatory
14 Commission with the proposed rule of 10CFR Part 61,
15 and related parts 46 Federal Register 38081.

16 (Whereupon, the above-
17 referenced to document was
18 marked as NIRS/PC Exhibit No.
19 86 for identification.)

20 CHAIR BOLLWERK: You want to mark that for
21 identification, as well?

22 MR. LOVEJOY: I'd like to mark it for
23 identification.

24 CHAIR BOLLWERK: All right.

25 MR. LOVEJOY: And then I would like to

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1 offer all three in evidence.

2 CHAIR BOLLWERK: Then let's first mark for
3 identification NIRS/PC exhibit 86, which is the
4 Federal Register Notice of July 24, 1981.

5 And then a motion has been made to admit
6 into evidence NIRS/PC exhibits 86, 274, and 275.

7 MR. CURTISS: Mr. Chairman, I don't have
8 an objection to the admission of these exhibits for
9 admissible issues. But I do know, and my hunch is,
10 that given the history of the discussion of this
11 issue, and the depositions and the motions, that if
12 the point of asking the witnesses about this proposed
13 rule is to demonstrate that DU can't really be
14 classified as a class A, we would object on that
15 basis.

16 So if the exhibits are for some other
17 purpose we have no objection. But the class A issue,
18 from our perspective, has been resolved.

19 MR. LOVEJOY: Well, it is hard to discuss
20 the implications of one part of the Rule without
21 discussing the other parts of the Rule.

22 It does relate to classification, it
23 relates to calculation of disposal impacts. And I
24 think they both come out.

25 JUDGE ABRAMSON: Can we focus on the

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1 expected radioactive characteristics of the waste, and
2 how that fits within the disposal requirements, and
3 not have a dispute over whether it is class A, or --
4 we don't even need to discuss class A, we can just
5 talk about what its radiation characteristics are, and
6 how that fits into the disposal requirements.

7 Can we not? Isn't that what the
8 Commission advised us?

9 MR. CURTISS: Yes, I think the Commission
10 said it can be resolved independent of the
11 classification question. I don't disagree with that,
12 but in that context I would raise two points.

13 Number one, if that is the discussion I'm
14 not sure why we have the proposed rule, and the
15 proposed FEIS, except to demonstrate a point that has
16 been asserted, previously in this proceeding, that as
17 you look from the sequence of proposed to final, there
18 was a significant change that bears on the
19 classification question.

20 And because the classification question
21 has been set aside by the Commission, if the purpose
22 of this now is to go through the draft and final, as
23 has been done previously with our witnesses, before
24 last Wednesday's ruling, we would object on the ground
25 that the classification issue, which does involve

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1 fundamentally a regulatory determination that has been
2 made about the underlying radiological characteristics
3 of DU, we would object on that ground.

4 I'm not sure you can separate those two
5 issues out and say one is classification, and one is
6 the radiological characteristics of the waste.

7 MR. LOVEJOY: Your Honor, the modeling
8 that was done in issuing Part 61 is essentially set
9 forth in the draft EIS. They didn't redo the whole
10 treatment of the modeling in the final EIS.

11 JUDGE ABRAMSON: And the modeling
12 addresses?

13 MR. LOVEJOY: It addresses impacts. The
14 Commission made various decisions based on those
15 impacts. But it addresses impact, and it is hard to
16 separate the data about --

17 JUDGE ABRAMSON: So you are intending to
18 bring these forward to talk about the modeling that is
19 in the DEIS?

20 MR. LOVEJOY: Yes.

21 JUDGE ABRAMSON: Let's go.

22 MR. CURTISS: On that basis I only want to
23 make sure they are not used for inadmissible purposes.
24 On that basis I don't have an objection.

25 CHAIR BOLLWERK: All right.

1 MS. CLARK: Well, it seems to me that the
2 only purpose of looking at the modeling is to see if
3 we should revisit the outcome of the modeling, which
4 is the Part 61 requirements.

5 And, clearly, this isn't the place to do
6 that.

7 JUDGE ABRAMSON: Well, first of all it
8 seems to us, I think, that the Commission has advised
9 us that to the maximum extent we can consider the
10 question of whether this can or cannot be disposed of
11 by shallow land burial we should.

12 And, second, the cost of disposal is going
13 to depend on whether or not it can be disposed of
14 shallow land or not. And if the modeling goes towards
15 that, by helping us determine what the radioactive
16 characteristics of this stuff are, when it is buried,
17 and what its dose is, notwithstanding the calculations
18 that are in the DIES, which are not challengeable, we
19 should hear it.

20 MS. CLARK: Well, I believe actually that
21 the question of whether shallow land burial is
22 appropriate depends on an application of Part 61, as
23 it stands, and as it was promulgated by the
24 Commission.

25 So I think it is appropriate to consider

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1 whether the performance requirements, and the doses
2 that are set forth in Part 61 can be satisfied. And
3 I think it is also appropriate to look at the
4 classification scheme, as it is set forth in Part 61.

5 But the analysis where that was done, in
6 the environmental impact statement, was for the
7 purpose of -- for the Commission to determine what
8 those performance requirements should be.

9 And what the classification should be. So
10 at this point the only purpose I can see, of
11 revisiting that environmental impact statement is to
12 question the performance requirements, and waste
13 certification that the Commission set forth.

14 So I really think that the only thing that
15 is relevant here is the application of Part 61 as
16 written.

17 CHAIR BOLLWERK: I think that is correct
18 in the sense, you know, the Commission has said that
19 this is class A waste, but they said it is class A
20 waste with a caveat, which is there needs to be an
21 additional environmental assessment done.

22 And that is --

23 JUDGE ABRAMSON: You need to look at the
24 performance of this stuff, and see which of the
25 performance requirements it meets, and the regulation

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1 is the regulation, and that is not at issue right now.

2 CHAIR BOLLWERK: I think we are going to
3 go ahead and admit these, and we will see where this
4 takes us. I understand the concerns, and if we go
5 into areas we shouldn't, make an objection, and we
6 will rule on it at that point.

7 MR. CURTISS: And if the point of this is
8 to demonstrate, in looking at the proposed rule, that
9 matters were addressed in a particular way, whether it
10 is the depleted uranium issue, or the intruder dose
11 issue, and that the result, the final result achieved
12 in the final rule was somehow irrational, or arbitrary
13 and capricious, or in some way not defensible, we
14 would object on that ground, if it goes in this
15 direction. But that is fine with me.

16 CHAIR BOLLWERK: All right. Then we will
17 go ahead and, noting the objections that were made, we
18 are going to go ahead and admit NIRS/PC exhibits 274,
19 275, and 86.

20 (The documents referred to,
21 having been previously marked
22 for identification as NIRS/PC
23 Exhibit Nos. 274, 275, and 86
24 were admitted in evidence.)

25 CHAIR BOLLWERK: And let me just ask one

1 question. We are, again, getting some questions about
2 the schedule. I just want to see where you think you
3 are at in terms of your examination, cross examination
4 of these witnesses.

5 MR. LOVEJOY: I have hopes of finishing in
6 approximately an hour.

7 JUDGE ABRAMSON: And how much time does
8 the Staff need with this panel?

9 MS. CLARK: I don't expect any questions
10 with this panel.

11 JUDGE ABRAMSON: And, LES, you don't know
12 yet, but do you expect a lot of redirect?

13 MR. CURTISS: I don't think more than 15
14 minutes, sir.

15 JUDGE ABRAMSON: Okay. So maybe we can
16 finish with this panel today, at least.

17 CHAIR BOLLWERK: All right. Does anyone
18 want to -- then we have two other panels, the Staff
19 panel, and then Dr. Makhijani on this issue.

20 Does anyone want to give me any sense on
21 when we might potentially, tomorrow, get into the
22 contingency factor? That is what -- we are
23 interested, is afternoon, is that too early, is that
24 too late?

25 MR. CURTISS: Your suggestion is to

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1 complete this panel this evening, including redirect,
2 so we can dismiss this panel. We would then call the
3 Staff witnesses, I take it?

4 CHAIR BOLLWERK: That is correct.

5 MR. CURTISS: So I think the timing
6 depends on Mr. Lovejoy, relative to that panel.

7 CHAIR BOLLWERK: Do you see the same
8 amount of cross examination, more or less, for the
9 Staff panel?

10 MR. LOVEJOY: Same order of magnitude.

11 CHAIR BOLLWERK: So we have been at it
12 about four hours, approximately?

13 MS. CLARK: I would also anticipate
14 surrebuttal on disposal issues, and I think that could
15 take a fair amount of time, maybe perhaps an hour at
16 the most.

17 CHAIR BOLLWERK: All right.

18 JUDGE ABRAMSON: We may want to start the
19 Staff panel tonight, too.

20 CHAIR BOLLWERK: We could do that.

21 JUDGE ABRAMSON: Well, let's get on with
22 this and see where we are. But it sounds to me, from
23 what you are saying, if we are going to finish
24 tomorrow we had better start the Staff panel tonight.

25 CHAIR BOLLWERK: Let me just ask, in terms

1 of the contingency factor, given what happened with
2 transportation today, is that going to be more on that
3 nature, or more on this? Because we did that in about
4 an hour and a half, I think.

5 MR. CURTISS: I think the issues are
6 pretty straightforward from the Applicant's
7 perspective.

8 MS. CLARK: Before we go any further I
9 just wanted to make a correction to something I said
10 on the record earlier today. We were talking about
11 the additional analysis from Envirocare, and I stated
12 that we had not received anything.

13 Well, we have not received the documents,
14 but we did receive a bibliography from Envirocare that
15 lists hydrogeologic reports, and another one that
16 lists performance assessment related modeling reports.

17 JUDGE ABRAMSON: This is a response you
18 got that was promised by that letter?

19 MS. CLARK: I don't know. It was not
20 actually received by the Staff involved in this
21 environmental analysis. So I'm not sure, I'm not
22 sure. Apparently we didn't specifically ask for the
23 reports.

24 And I know that this information was
25 provided to an individual who is not actually involved

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1 in this particular environmental analysis. So I'm not
2 sure of the context in which they were provided.

3 CHAIR BOLLWERK: Well, there are two
4 questions. First, does it relate to this case, I
5 guess, and I guess you are saying it does. And then we
6 need, obviously, to get it to the other parties, that
7 would be the, at a minimum the list, whether the
8 actual items are there.

9 MS. CLARK: Yes, I can make copies for
10 everybody.

11 CHAIR BOLLWERK: All right. Any other
12 procedural matters at this point?

13 (No response.)

14 CHAIR BOLLWERK: All right, then let's go
15 ahead and we will move forward with cross examination.

16 WITNESS KRICH: Judge, if I could just
17 fill out the answer to one of the questions we just
18 answered, towards the end?

19 CHAIR BOLLWERK: All right.

20 WITNESS KRICH: We were looking at the
21 superseded 1990 report. It was exhibit 170. And we
22 were looking at table, on page 5-14, I believe. Is
23 that right, Mr. Lovejoy?

24 MR. LOVEJOY: I didn't quite hear it.

25 WITNESS KRICH: Page 5-14.

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1 MR. LOVEJOY: Exhibit 170.

2 JUDGE ABRAMSON: That is the 1990 report?

3 MR. LOVEJOY: Yes.

4 WITNESS KRICH: Yes. And you were asking
5 about 238 concentration limits specified on this
6 table, as 7.1 times ten to the second. Is that
7 correct?

8 MR. LOVEJOY: That was the question, yes.

9 WITNESS KRICH: Yes. I just wanted to
10 make sure that you were aware that as stated in the
11 meeting telephone summary of April 6th of this year,
12 that those limits, and I have the amendment, actually
13 here, the license amendment, but the limit over time
14 had been raised for uranium 238 up to 3.3 times ten to
15 the fifth mic picocuries per gram.

16 And that eventually that limit was
17 eliminated altogether.

18 JUDGE KELBER: So, excuse me, there is no
19 limit now?

20 WITNESS KRICH: That is correct, sir.

21 JUDGE KELBER: Thank you.

22 CHAIR BOLLWERK: All right, ready for the
23 cross examination on that? All right, Mr. Lovejoy?

24 MR. LOVEJOY: Mr. Potter, I was asking you
25 about 10CFR Part 61, and is it -- and you said you

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1 reviewed some of the history of the promulgation of
2 that Rule, remember?

3 WITNESS POTTER: Yes.

4 MR. LOVEJOY: And is it true that the
5 Commission used a modeling approach in assessing the
6 impact of various methods of disposal of low level
7 waste, what they call low level waste in that EIS?

8 WITNESS POTTER: Yes, they did.

9 MR. LOVEJOY: And do you have volume II of
10 the Draft Environmental Impact Statement in front of
11 you?

12 WITNESS POTTER: Yes.

13 MR. LOVEJOY: I'm looking at page 4-7.

14 WITNESS POTTER: Four dash which?

15 MR. LOVEJOY: Four dash seven. And the
16 question is, simply, are the scenarios that the
17 Commission used described here on 4-7, the intruder
18 construction scenario, and the intruder agriculture
19 scenario?

20 WITNESS POTTER: Yes, the scenarios are
21 described. They are there.

22 MR. LOVEJOY: And over on page 4-65 I see
23 a reference to a dose rate which was selected in
24 applying the intruder scenarios. I see the discussion
25 in the middle paragraph on that page of 500 millirem

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1 a year, general dose limitation guideline.

2 Was that, by your understanding, used in
3 the modeling?

4 WITNESS POTTER: Yes, that is my
5 understanding.

6 MR. LOVEJOY: Okay, and toward the bottom
7 of that page it says, NRC selected 100 years as the
8 preferred institutional control period. Was that
9 another element of the modeling?

10 WITNESS POTTER: Yes.

11 MR. LOVEJOY: And that was, actually,
12 adopted in the Final Rule, was it not, a requirement
13 of the limitation --

14 WITNESS POTTER: I believe that is
15 correct.

16 MR. LOVEJOY: -- limitation to an
17 assumption of 100 years institutional control?

18 WITNESS POTTER: I believe that is
19 correct, yes.

20 MR. LOVEJOY: So that would be
21 inconsistent with assuming that someone comes by and
22 puts a new cover on that disposal site, wouldn't it,
23 after 100 years?

24 WITNESS POTTER: Not necessarily.

25 MR. LOVEJOY: Really? Okay. Who can you

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1 assume is going to come by and put a new cover on your
2 disposal site, after the institutional control period
3 is expired?

4 WITNESS POTTER: Well, in the hypothetical
5 case that the cover somehow disappeared, there would
6 be a large concrete monument there that would
7 certainly draw attention.

8 But the point of the matter is the setting
9 of this site is such that it is basically dedicated
10 for operations of this kind. And the anticipation is
11 that it will continue to be that.

12 WITNESS KRICH: I think what Mr. Potter is
13 referring to is, again, in the summary of the telecon
14 between the NRC staff and the DRC. Question 3 states,
15 the answer to question 3 states that Twell county has
16 designated this part of the county as heavy industrial
17 and hazardous waste zones, which bars any such
18 residential or farming uses.

19 MR. LOVEJOY: And so is it your
20 assumption, or is one free to assume, in assessing the
21 performance of the disposal site in that county, that
22 their zoning regulations are going to be in effect
23 for, say, a million years?

24 WITNESS POTTER: I would not suggest that
25 those particular regulations would stay in effect for

1 long periods of time. However, the facilities that
2 are there will continue to be there, the mill tailings
3 disposal site is not going to disappear any time soon.

4 It will be a site that is likely to
5 receive attention for a long period of time.

6 MR. LOVEJOY: Actually has that site been
7 used for hunting and recreation purposes, that general
8 area of the Envirocare site?

9 WITNESS POTTER: I believe I have seen
10 some reference to occasional uses in that regard. I
11 do know that there is no population, I have read that
12 there is no population anywhere near the site.

13 MR. LOVEJOY: Well, it is a fenced-off
14 industrial area now, isn't it?

15 WITNESS KRICH: The entire county --I mean
16 for like 15 miles.

17 MR. LOVEJOY: Anyway, using the modeling
18 that they did, getting back to the EIS and the Federal
19 Register release -- well, I'm looking here, it says it
20 at the bottom of page 7-5, the Commission ranked
21 wastes, classified them in fact, according to the
22 standpoint of the potential inadvertent intruder. Is
23 that right?

24 WITNESS POTTER: What page, again, please?

25 MR. LOVEJOY: The bottom of 7-5.

1 WITNESS POTTER: I have it.

2 MR. LOVEJOY: Okay.

3 MR. CURTISS: Mr. Chairman, I'm going to
4 renew the objection, because I'm precisely clear where
5 this is going, and I'm going to ask, in a sort of
6 unusual request, that NIRS/PC exhibit 182, which I
7 believe everybody has a copy of, but has not been
8 introduced, which is a -- it attaches a memo.

9 But addresses the purpose of the
10 questioning that is occurring right now. And if
11 copies are available, it is clear that in focusing now
12 on the DEIS, and I will wait until everybody has
13 copies of it.

14 JUDGE ABRAMSON: Is it 182?

15 MR. CURTISS: It is NIRS/PC 182 which
16 includes a cover memo from counsel that is now asking
17 these question to Arjun and Brice, which I assume mean
18 Arjun Makhijani and Brice Smith.

19 And it is clear, in paragraph 2 of that
20 memo, and I will read it. As I understand it, this is
21 Lindsay Lovejoy speaking, in the DEIS and FEIS should
22 explain this, any waste that would expose the intruder
23 to more than 500 millirem at the 500 year point was
24 classed as greater than class C.

25 The trouble is that the final version of

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1 10CFR Part 61 also removed DU from the classification
2 system. So under 10CFR Part 61 apparently you can
3 dispose of depleted uranium near the surface, which of
4 course is the argument that LES has been making.

5 But it goes on and says, and gives the
6 intruders a dangerous dose, but not of the rated
7 nucleates. That is irrational, i.e., arbitrary and
8 capricious, thus illegal.

9 It would help us in judicial review to
10 have in the record that under an intrusion scenario,
11 which is exactly the line of questioning that is being
12 propounded here, the intruder would have a dose in
13 excess of the 500 millirem limit that NRC based its
14 classifications upon.

15 Now, I have been patient in not raising
16 this objection. But as I noted when these exhibits
17 were introduced, this is a collateral offered to
18 challenge the regulation based upon what was said in
19 the DEIS, on the intruder dose issue, and the 500
20 millirem limit.

21 And what was subsequently done in the
22 FEIS, for the purpose of demonstrating that the
23 rulemaking, and this underlying FEIS and DEIS as a
24 basis for that, is arbitrary and capricious for
25 purposes of judicial challenge.

1 And I think it is transparently obvious
2 here what is going on. And on that basis I object,
3 again, to the line of questioning. It doesn't have
4 anything to do with modeling, whether you call it
5 modeling or not, you can label this discussion
6 modeling, but that explanation is exactly what is
7 going on here, and I object to it.

8 CHAIR BOLLWERK: All right. Mr. Lovejoy?

9 MR. LOVEJOY: Well, counsel has refreshed
10 my recollection about this memo from quite a while
11 ago. I'm going to be going through the DEIS to bring
12 out the data about the releases and the impact on an
13 intruder from the disposal of uranium as analyzed in
14 the EIS.

15 That is the issue, it is the impact of
16 near surface disposal of depleted uranium in large
17 amounts. There is no ulterior strategy involved,
18 except to get the impacts out.

19 JUDGE ABRAMSON: The impacts from which
20 EIS, from the --

21 MR. LOVEJOY: From the draft EIS.

22 JUDGE ABRAMSON: The Part 61 draft EIS?

23 MR. LOVEJOY: Part 61, yes.

24 MR. CURTISS: As I said, at the outset, if
25 we are going to talk about what the regulatory

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1 requirements are, I'm puzzled that we have the DEIS
2 here, and a press release on it, when this panel has
3 testified, Mr. Potter, earlier that there is no
4 intruder dose limit in the final regulation.

5 And I suspect at some point we are going
6 to get the final EIS, and we are going to be asked,
7 this panel is going to be asked the question, the
8 predicate for which is being laid here, that the FEIS,
9 and proposed Part 61 had a 500 millirem intruder dose
10 in it, and a decision not to carry that over is
11 inherently arbitrary and capricious, and would provide
12 a basis for challenging, I assume, the regulation.

13 I mean, it is transparently obvious, this
14 is a road map to the questions that are being asked
15 here. And the draft EIS, and what was done at that
16 point is irrelevant. The ostensible explanation is it
17 provides context for the modeling issue, as it was
18 developed in the final EIS, and the final rule.

19 But that, in my judgement, is a
20 disingenuous cover for what has been described here,
21 in NIRS/PC exhibit 182. And I object to the line of
22 questioning that is heading exactly down that path.

23 MR. LOVEJOY: This is the Commission's own
24 EIS, it shows the impacts on an intruder of exposure
25 to depleted uranium when it is buried in the near

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1 surface site.

2 JUDGE ABRAMSON: This is a draft, does the
3 final not have it?

4 MR. LOVEJOY: The final does not have the
5 full EIS, they didn't repeat the whole EIS treatment,
6 it just appears as the draft.

7 JUDGE ABRAMSON: Did they adopt things
8 that were in the draft, in the final?

9 MR. LOVEJOY: Yes, they essentially
10 followed it.

11 JUDGE ABRAMSON: Why don't we start with
12 the final, then, and to the extent that the final
13 incorporates things in the draft, we can refer back to
14 them. But let's start with the final.

15 We are interested in what the final EIS
16 says, and what the regs say, and how those impact our
17 decision, and the Commission's decision. So let's
18 focus on that.

19 And if you need, if as you are going
20 through the final you find that it -- you can show us
21 where it incorporates analysis that was done in the
22 draft, then let's go back to the draft if it helps us
23 understand what the final says.

24 CHAIR BOLLWERK: That works for me. Would
25 it work for you, Mr. Curtiss?

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1 MR. CURTISS: No objection to that
2 approach. I suggest that when the draft was
3 introduced, I think that is exactly the right
4 approach.

5 CHAIR BOLLWERK: All right.

6 MR. CURTISS: Because it reflects the
7 final regulatory requirements, and that is what the
8 focus ought to be.

9 CHAIR BOLLWERK: All right. Anything the
10 Staff wants to say about this?

11 MS. CLARK: Not at this time.

12 JUDGE ABRAMSON: I can't imagine you won't
13 pipe up when you have something to say.

14 MS. CLARK: I don't know how clear I will
15 be later on this evening.

16 CHAIR BOLLWERK: Do you, for any reason,
17 want 182 marked, since you brought it up?

18 MR. CURTISS: Yes, I do. And I would move
19 it into evidence.

20 CHAIR BOLLWERK: All right. The way I
21 have it described is a memo to S White staff attorney
22 from S. T. Etter, or do I have the wrong 182?

23 MR. CURTISS: I think that is the
24 description reflected in the list of exhibits.

25 CHAIR BOLLWERK: Right. There is an

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1 attachment to it, I take it.

2 MR. CURTISS: It is the cover note that is
3 of particular interest, and it ought to be labeled as
4 such.

5 CHAIR BOLLWERK: So the description needs
6 to be revised, arguably. Is there a basis for the
7 description? I see, okay.

8 MR. CURTISS: And it makes no difference
9 to me whether the attachment is in. The cover memo is
10 the only --

11 JUDGE ABRAMSON: But I'm sure that NIRS/PC
12 wants the attachment in.

13 MR. CURTISS: That is fine, too. I think
14 we all understand what is going on, so just so long as
15 the record is clear about where this was headed.

16 CHAIR BOLLWERK: All right. We will leave
17 the name as it is, that is the way it was described.

18 MR. CURTISS: With the cover letter.

19 CHAIR BOLLWERK: With the cover letter,
20 right. So we are going to identify it, for the
21 record, NIRS/PC exhibit 182, which is a memo to S.
22 White, Staff attorney from S. T. Etter, April 1996,
23 which includes a cover letter and attachment, I'm not
24 sure which comes -- which is first. But that is
25 marked for identification.

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1 (Whereupon, the above-
2 referenced to document was
3 marked as NIRS/PC Exhibit No.
4 182 for identification.)

5 CHAIR BOLLWERK: Then you asked that it be
6 admitted into evidence?

7 MR. CURTISS: Yes, the most important one
8 is the first one, and I would move it into evidence.

9 CHAIR BOLLWERK: All right. And any
10 objections?

11 (No response.)

12 CHAIR BOLLWERK: Then hearing none we
13 will, NIRS/PC 182 is accepted into evidence.

14 (The document referred to,
15 having been previously marked
16 for identification as NIRS/PC
17 Exhibit No. 182 was admitted in
18 evidence.)

19 MR. LOVEJOY: Well, we have an extract
20 here from the final EIS, volume I, which has been
21 marked as exhibit 169. I'm not sure that this
22 contains the reference describing how the final EIS
23 was substantially briefer than the draft, because they
24 didn't want to simply repeat the modeling.

25 JUDGE ABRAMSON: Well, as you go through

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1 presentation, your cross examination, and your direct,
2 with your witness, on what the FEIS says, and what
3 Part 61 says, to the extent you need to go back to the
4 DEIS, let's do it.

5 MR. LOVEJOY: Okay. Mr. Potter, when you
6 reviewed the history of Part 61 did you observe that
7 the draft EIS contained the detailed modeling
8 underlying the Rule?

9 WITNESS POTTER: Yes, I did.

10 MR. LOVEJOY: And is that NIRS/PC exhibit
11 275, volume II of that?

12 WITNESS POTTER: Yes.

13 MR. LOVEJOY: And in the final EIS they
14 did not repeat all of the modeling that underlay the
15 Rule, is that right?

16 WITNESS POTTER: That is correct. There
17 were some revisions in the final.

18 MR. LOVEJOY: In the final Rule?

19 WITNESS POTTER: Right.

20 MR. LOVEJOY: Based upon modeling
21 contained in volume II, exhibit 275, did the
22 Commission determine, in this draft, to classify
23 depleted uranium as generally unacceptable for near-
24 surface disposal?

25 And you can look at page 7-7, table 7.1,

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1 if I may assist you.

2 MR. CURTISS: Are we starting with the
3 final and working back, or are we still on the draft?
4 I was a little bit confused about where we are,
5 because now we are going through the same discussion
6 about classification that is addressed in the exhibit
7 that just went in.

8 And I understood the Board to say let's
9 start with the final and work back, to the extent that
10 the draft is relevant at all. And I'm not even sure
11 I have seen the final yet.

12 JUDGE ABRAMSON: What is the point you
13 want to make with this, Mr. Lovejoy?

14 MR. LOVEJOY: Well, based on the modeling
15 in the draft EIS, the Commission determined that
16 depleted uranium was generally unacceptable for near-
17 surface disposal because of the intruder doses.

18 JUDGE ABRAMSON: And then, and what
19 happened in the final EIS?

20 MR. LOVEJOY: The final EIS did not
21 classify uranium.

22 JUDGE KELBER: Let's talk about this
23 model. Was this model discussed in the final? Let's
24 start with the final and work back.

25 MR. LOVEJOY: Well, the witness just did

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1 testify that the modeling was not repeated in the
2 final EIS, it was dealt with in detail in the draft
3 EIS.

4 JUDGE KELBER: Does the final state that
5 it adopts what was in the draft EIS?

6 WITNESS POTTER: No, the limits were
7 deleted from the table that was ultimately adopted in
8 the Rule.

9 JUDGE KELBER: The final does not adopt
10 material in the draft EIS that is not revised in the
11 final? In other words, the final stands alone?

12 WITNESS POTTER: Let me --

13 JUDGE KELBER: Does the final EIS stand
14 alone, or does it --

15 WITNESS POTTER: The final does not stand
16 alone. It basically refers back to work done in the
17 draft and supplements it. It changes it some.

18 JUDGE ABRAMSON: And with respect to the
19 treatment of depleted uranium, does the final speak to
20 how that is to be disposed of?

21 WITNESS POTTER: Not explicitly, but the
22 table in the -- the final environmental impact
23 statement deletes and includes some explanatory
24 information why it deletes uranium from the list of,
25 the classification list, basically.

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1 JUDGE ABRAMSON: All right, let's start
2 with that. What does the final tell us about uranium
3 and why it was deleted from something that was in the
4 draft?

5 WITNESS POTTER: There is language in both
6 the final EIS and in the statements of consideration
7 in the Rule. I don't have the final EIS in front of
8 me, I do have the statements of consideration.

9 JUDGE ABRAMSON: Do you have those
10 portions of the final EIS as an exhibit?

11 MR. LOVEJOY: I think the witness may be
12 referring to language in what has been marked as
13 NIRS/PC exhibit 169, extracts from volume I of the
14 final EIS, 10CFR Part 61.

15 JUDGE ABRAMSON: Let's see if it is there.
16 Can you help us out, Mr. Lovejoy, what page do you
17 think that is in?

18 MR. LOVEJOY: You could look at page 5-38.

19 JUDGE ABRAMSON: Let's see if that is what
20 you are referring to, Mr. Potter.

21 WITNESS POTTER: Yes, it is.

22 JUDGE ABRAMSON: And can you point us to
23 that, then?

24 WITNESS POTTER: Those two paragraphs,
25 actually. Would you like me to read them?

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1 JUDGE ABRAMSON: Well, at least point us
2 to them and we can -- yes, let's do that. Why don't
3 you read them into the record?

4 WITNESS POTTER: Uranium has also been
5 removed as a limiting element for waste
6 classification. Analysis of the data base for the
7 Part 61 EIS indicates that the types of uranium
8 bearing waste being typically disposed by NRC
9 licensees, do not present a sufficient hazard to
10 warrant limitation on the concentration of this
11 naturally occurring material.

12 Both depleted and enriched uranium
13 typically do not contain daughter products, in any
14 quantity, because of the relatively short time since
15 the uranium was refined from ore, compared to the
16 half-lives of the uranium isotopes.

17 The daughter products are disposed of,
18 primarily, as uranium mill tailings. However, NRC is
19 aware of some uranium daughter contaminated material,
20 which is typically being stored today, and which may
21 in the future be disposed as low level waste.

22 In addition there are quantities of low
23 activity waste material, which also may be sent to
24 disposal sites, and which are not covered under the
25 Atomic Energy Act, and are not subject to NRC license.

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1 Such material may be generated by rare
2 earth processing facilities, for example. This
3 material, which is primarily contaminated soil has
4 characteristics sufficiently different from other low
5 level waste streams that separate treatment is
6 warranted, and the NRC Staff intends to examine
7 specific disposal guidance for such material in the
8 near future.

9 JUDGE ABRAMSON: So, Mr. Lovejoy, it
10 sounds like the first paragraph, which is the second
11 full paragraph on page 5-38 of NIRS/PC 169, has a
12 discussion of why uranium is not classified as a
13 limiting element for waste classification in Part 61.

14 And is there something in the DEIS that
15 you want to point to, that specifically addressed this
16 point, other than -- which would help understand why
17 it was removed? Which is what they are saying here.

18 They are saying it was removed because,
19 and they give a reason.

20 MR. LOVEJOY: There might be some guidance
21 in another item that I would like to show the witness,
22 which is from appendices A through F of the draft EIS.

23 JUDGE ABRAMSON: So that would be Appendix
24 D?

25 MR. LOVEJOY: The appendixes to the draft

1 the EIS.

2 JUDGE ABRAMSON: Is that with the volume
3 two?

4 MR. LOVEJOY: This is a new exhibit. This
5 would be 276.

6 JUDGE ABRAMSON: Okay.

7 (Pause.)

8 JUDGE ABRAMSON: Oh, I see. It's a two
9 sided thing.

10 MR. LOVEJOY: I can call your attention to
11 language in the middle paragraph here, starting with
12 following conversion. It says, currently three
13 enrichment plants using the gaseous diffusion process
14 are in operation.

15 And these are located at Portsmouth, Ohio,
16 Paducah, Kentucky and Oakridge Tennessee. These
17 plants are owned and operated by the Federal
18 Government.

19 And wastes produced from plant operation
20 are not sent to commercial disposal facilities.
21 Hence, waste streams produced from uranium enrichment
22 operations are not considered further in this
23 appendix.

24 So, depleted uranium as an output from
25 enrichment plants in large quantities did not come

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1 into consideration in the issuance of part 61.

2 JUDGE ABRAMSON: And this is the
3 foundation for your proposition made to the Commission
4 that part 61 regs did not consider DU in large
5 amounts, which has led the Commission to instruct the
6 Staff to go look at whether pat 61 needs to be
7 modified to deal with that, is that correct?

8 MR. LOVEJOY: Yes, that's -- yes.

9 JUDGE ABRAMSON: Okay. So, part 61 as it
10 stands in today's -- in -- what's the right word -- in
11 today's life, in today's form --

12 JUDGE KELBER: As it stands is enough.

13 JUDGE ABRAMSON: Part 61 as it stands
14 doesn't treat depleted uranium as waste, is that
15 correct?

16 MR. LOVEJOY: Yes.

17 JUDGE ABRAMSON: As a limiting element for
18 waste classification.

19 MR. LOVEJOY: It doesn't specifically
20 identify and clarify depleted uranium. So the
21 argument is that the catch-all paragraph applies to
22 it.

23 That's what we've heard said. But, of
24 course, that is based on an analysis which didn't
25 include it.

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1 JUDGE ABRAMSON: Okay. And that we
2 understand, and that's not in front of us today.

3 MR. CURTISS: We'll stipulate what he just
4 read from the draft EIS because, in addition to it
5 being said here, the Commission in its order on page
6 16 says that part 61.55 apparently examined only
7 specific kinds of depleted uranium waste streams, the
8 types of uranium waste being typically disposed of by
9 a licensee at that time.

10 It goes on to address what this has said.
11 We can look to the Commission decision for this
12 proposition rather than the DEIS because they're the
13 authoritative body for purpose of the regulations.

14 And they've addressed exactly this
15 question. And, importantly, they've gone on to say
16 that depleted uranium doesn't contain the
17 radionuclides listed in the specified tables.

18 I think Counsel would agree with that.
19 And therefore, under a plain reading of the
20 regulation, depleted uranium is a class A waste. I
21 think it's clear that NIRS/PC disagrees with that.

22 And, to my earlier objection, the
23 Commission says that NIRS/PC's effort to use this
24 adjudicatory proceeding to modify the rule to include
25 such an exception is misdirected so forth and so on.

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1 So it's pretty clear to me what the
2 Commission has said. And they don't disagree with the
3 statements made previously about they didn't consider
4 the large quantities.

5 But they directed the Staff to look at
6 that outside of this proceeding and for us to focus on
7 the impacts question, the environmental impacts
8 question.

9 And we've drifted quite a ways away from
10 that in this discussion about the DEIS and as
11 suggested in 182, for obvious reasons.

12 CHAIR BOLLWERK: Okay. First of all, we
13 need to get this into the record.

14 MR. LOVEJOY: Is it 276?

15 CHAIR BOLLWERK: It's 276.

16 MR. LOVEJOY: We offer that in evidence.

17 CHAIR BOLLWERK: It's volume three, a
18 particular page of volume three D7 that is marked for
19 identification as described by counsel.

20 (Whereupon, the above-
21 referenced to document was
22 marked as NIRS/PC Exhibit No.
23 276 for identification.)

24 CHAIR BOLLWERK: And there's a motion been
25 made to admit it into evidence. Any objection?

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1 MR. CURTISS: No objection.

2 CHAIR BOLLWERK: I have to say that I've
3 been wondering the same thing. The Commission has very
4 clearly told us exactly what this paragraph says and
5 the reason for it.

6 I don't know why we're talking about this.
7 But, I'm not understanding something here, clearly.

8 JUDGE ABRAMSON: Well, our objective is to
9 go on and talk about whether or not DU has radioactive
10 characteristics that make it fall -- make it better
11 fall into some category.

12 JUDGE KELBER: No, no. If I read the
13 Commission's remand --

14 JUDGE ABRAMSON: The performance.

15 JUDGE KELBER: -- we are to look at the
16 question of performance of proposed disposal options
17 and, in particular, the environmental impacts of those
18 disposal options.

19 MR. CURTISS: I would submit, Judge
20 Kelber, that that's almost precisely the way we view
21 it. This is not a question of whether depleted
22 uranium was properly classified.

23 I would submit that's what this line of
24 inquiry has involved. And, as Exhibit 182 makes
25 clear, it's for purposes of challenging the regulation

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1 which the Commission specifically admonished the Board
2 and NIRS this is not the appropriate forum in which to
3 do that.

4 The issue raised by the Commission was the
5 impacts of disposal DU in near surface disposal
6 facilities. And that, taken together with the Board's
7 ruling this morning on the footnote 52 waiver, which
8 was granted I think circumscribes the focus which
9 we've drifted quite a ways away from, to the question
10 of whether the environmental report and the PEIS
11 Appendix I and any other environmental evaluations
12 appropriately bound the volumes of waste.

13 The Commission has specifically focused on
14 the volumes of waste. They said it four or five
15 times, as the Board pointed out last Monday, and
16 whether the existing environmental evaluations bound
17 those volumes of waste such as at an arid site, which
18 they also spoke to and referenced Appendix I's
19 analysis of that.

20 The discussion in the last three hours has
21 prompted me to raise numerous objections and I'm sure
22 test the patience of the Board. But, I am having a
23 difficult time connecting this line of questioning to
24 the scope of these as identified by the Commission,
25 their warning about using this hearing for purposes of

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1 challenging the regulation and the Board's ruling this
2 morning.

3 And I have, as I say, tested the Board's
4 patience I'm sure. But, for our purposes, as we now
5 have drifted into comparing the draft to the final EIS
6 and rule, it's transparently obvious that we're not
7 focused on the questions that the Board ruled this
8 morning and the Commission rule last Wednesday.

9 We ought to focus on the generic impacts
10 and whether, as the Board said this morning, the
11 existing evaluations appropriately bound. They're not
12 arguing that anything is not bound here.

13 They're off trying to challenge the
14 regulation, I would respectfully submit.

15 CHAIR BOLLWERK: All right.

16 MR. LOVEJOY: May I respond?

17 CHAIR BOLLWERK: Absolutely.

18 MR. LOVEJOY: I don't think this Board is
19 called upon or maybe not even authorized to make a
20 waste classification determination in this proceeding.

21 I think the Commission when it remanded
22 said that it hoped this proceeding could go forward to
23 completion without making a waste classification
24 determination because of the NEPA issues that are
25 still hanging over that issue.

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1 So, I'm not asking this board to make a
2 waste classification determination based on these
3 materials. It's just that these materials are the
4 Commission's Environmental Impact Statement analyzing
5 the impact of near surface disposal of many materials,
6 including uranium, excuse me, and identifying uranium
7 as inappropriate for near surface disposal.

8 That's very, very close to the issue we've
9 got.

10 JUDGE ABRAMSON: Pat 61 has some
11 performance criteria in it, right?

12 MR. LOVEJOY: Yes, it does.

13 JUDGE ABRAMSON: Ad, can we focus
14 singularly on whether DU in the quantities that are at
15 issue -- on the performance characteristics of DU in
16 the quantities at issue -- I mean, and in shallow land
17 disposal and in other to the extent that it impacts
18 cost.

19 To the extent that it impacts the FEIS our
20 focus has to be on what FEIS did. But, for the
21 purposes of establishing decommissioning cost, we need
22 to know whether it -- which performance
23 characteristics it has and what that tells us about
24 cost.

25 MR. LOVEJOY: And in connection with that

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1 directly, 10 CFR part 61 as it exists today protects
2 the intruder as well as the general member of the
3 public.

4 And, based on intruder exposure, this EIS
5 determines that uranium is not appropriate for near
6 surface disposal. It addresses the protection of the
7 intruder.

8 JUDGE ABRAMSON: And how does that fit
9 with the Commission's admonition in its most recent
10 ruling about intruder issue being a new issue? Let me
11 see if I can find that.

12 But I thought there was an admonition not
13 to address that issue.

14 MR. CURTISS: I believe it's, as we said
15 the other day, importantly addressed in footnote, I
16 believe, 38.

17 MR. LOVEJOY: Your Honor, intruder
18 protection is just another part of 10CFR part 61,
19 public does limits and the intruder limits.

20 MR. CURTISS: Many of the claims appear at
21 footnote 38 to be late attempts to challenge the
22 radiological dose analysis provided in the LES ER,
23 arguments challenging the specific groundwater, which
24 we spent about an hour on here, or intruder dose
25 conclusions set forth in the ER, the methodology upon

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1 which the dose calculations were made, and the
2 adequacy of the generic wet site and dry site dose
3 analyses should have been raised earlier.

4 We agree with the Board in so far as it
5 ruled that these aspects of NIRS/PC's contention were
6 untimely. So, if the argument is the intruder dose or
7 all the other issues in here in this footnote are
8 within the scope of the hearing, it's directly
9 contradictory, I think, to a very clear affirmation by
10 the Commission that the Board got it right, that
11 intruder dose is not at issue in this proceeding and
12 nothing else in this footnote is either.

13 Specific groundwater intruder dose
14 conclusions -- now, this has all been disguised under
15 the use of the term models so we can talk about
16 modeling.

17 But that's really the set of issues that
18 we spent three hours on this afternoon, Your Honor,
19 groundwater dose and going back and forth to Kozak and
20 Craft, and another Craft document challenging the
21 conclusion reached by the state regulator on
22 Envirocare site.

23 And now we're moving from dose into
24 intruder dose which, for good and obvious reasons in
25 his Exhibit 182, we note why that's happening. And,

1 in direct contramission of the Commission's footnote
2 here, these are not issues in this proceeding.

3 MR. LOVEJOY: The footnote, Your Honor,
4 refers to the DOE PEIS material, which we've already
5 addressed and which is not involved in these EIS
6 materials prepared by the Commission itself.

7 MR. CURTISS: I'd be more --

8 MR. LOVEJOY: There's no way to --

9 MR. CURTISS: It --

10 CHAIR BOLLWERK: Let him finish.

11 MR. LOVEJOY: There's no way that this
12 Board can make an assessment of the performance of
13 proposed methods of disposal of depleted uranium
14 without applying the intruder protection and public
15 protection requirements in 10 CFR part 61.

16 We have contended, and the Commission has
17 supported our contention that near surface disposal of
18 large amounts of depleted uranium will not comply with
19 those relevant limits with 10 CFR part 61. And those
20 are the issues before you.

21 CHAIR BOLLWERK: Okay. I think we're
22 going to take a --

23 MR. LOVEJOY: Let's finish the discussion
24 here and then --

25 CHAIR BOLLWERK: All right.

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1 MR. CURTISS: It's been so ongoing I can't
2 remember when my good friend from New Mexico started
3 the discussion in the context of the environmental
4 report of the Applicant.

5 We have that as an exhibit. He asked his
6 Applicant to walk through the analysis of the
7 radiological dose assessment in the application for
8 both what he averred was the only option, the
9 Converdne mine option, and then got into the disposal
10 option in the environmental report and has used the
11 discussion since that time as the predicate with all
12 the discussion subsequent to that to challenge and
13 undermine the approach in the environmental report.

14 That was the purpose of starting off with
15 the environmental report. And now, demonstrating
16 through these various exhibits in the last three
17 hours, that the analysis that LES has submitted in its
18 application, including its ER, which this does
19 address, is not credible. I have nothing further.

20 CHAIR BOLLWERK: All right. Anything the
21 Staff wants to say on this subject?

22 MS. CLARK: I just wanted to respond to
23 Mr. Lovejoy's statement that the Commission has
24 somehow determined that shallow land disposal is not
25 appropriate for large quantities of DU.

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1 Neither the Commission nor the Staff has
2 ever made that judgment.

3 CHAIR BOLLWERK: All right. Mr. Lovejoy,
4 I'll give you the last word, then we'll have to take
5 a brief break.

6 MR. LOVEJOY: That is the conclusion of
7 the draft EIS. No, I don't think anyone has impugned
8 the methodology or the methods of analysis in that
9 draft EIS, and it reaches a conclusion.

10 The Commission took whatever action it
11 took in connection with the final based on issues such
12 as what activities were taking place within the
13 country, which of them were regulated by the
14 Commission, which were run by DOE.

15 That's a separate issue. I'm not bringing
16 this material before this Board on the classification
17 issue. As I said, I don't believe this Board is
18 called upon to make a classification decision.

19 I'm bringing it before the Board in
20 connection with the impacts of near surface disposal
21 of depleted uranium in large quantities.

22 JUDGE KELBER: Mr. Lovejoy, are you
23 asserting that the proposed disposal of the depleted
24 uranium from the NEF facility at the Envirocare
25 facility would in fact deliver an unacceptably large

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1 intruder dose?

2 MR. LOVEJOY: I think it would, Yes, Your
3 Honor.

4 JUDGE KELBER: You're asserting that?

5 MR. LOVEJOY: Yes.

6 JUDGE KELBER: Then I suggest that it
7 would be wise if we were to examine the impacts of
8 burying this waste at the Envirocare site to see
9 whether or not that is his assertion is tenable.

10 I think that's what we're supposed to do.
11 I think in doing that the Commission has indicated it
12 would like to have that material to help it in its
13 ultimate decisions about any necessary additions to
14 61.55.

15 MS. CLARK: If I may have one brief
16 comment in response to Mr. Lovejoy, the final judgment
17 of the Commission is not contained in the
18 Environmental Impact Statement.

19 The final judgment of the Commission is
20 contained in the provisions of part 61. And the
21 Commission has clearly stated what requirements govern
22 the ultimate disposal in shallow land burial.

23 And those provisions do not prohibit the
24 disposal of depleted uranium in a shallow land
25 facility. They place certain performance

1 requirements. But they do not prohibit them.

2 MR. LOVEJOY: Well, as I said, I don't
3 believe this Board is called upon to make a
4 classification.

5 JUDGE ABRAMSON: Nor do we wish to.

6 CHAIR BOLLWERK: Right, I agree. Okay.
7 Let's take a ten minute break, approximately. We're
8 going to go talk about this.

9 JUDGE ABRAMSON: Yes, just need a couple
10 minutes.

11 CHAIR BOLLWERK: All right. And we'll
12 reconvene in the neighborhood of 6:10, 6:15 somewhere.

13 (Whereupon, the above-entitled matter
14 went off the record at 5:55 p.m. and
15 went back on the record at 6:10 p.m.)

16 CHAIR BOLLWERK: A preliminary matter,
17 we've all been given a copy, I believe of the
18 bibliography, which has several pages to it. Is this
19 something the parties are looking at?

20 Is this something you want us to do in
21 terms of the record? If you're not ready to deal with
22 it now we can -- it can come in later at some point.
23 I just want to find out what the status of it is.

24 MS. CLARK: We are not --

25 CHAIR BOLLWERK: It's a staff document.

1 MS. CLARK: We're not intending to rely on
2 it in any way. So, it's for information. We don't
3 expect to use it as an exhibit.

4 MR. LOVEJOY: We'll take a look at it and
5 see if there's anything that we would want to --

6 CHAIR BOLLWERK: All right.

7 MR. CURTISS: I think our view is it's
8 informative but fundamentally an agreement state
9 regulator has made at the regulatory decision that has
10 -- before this has sufficient basis.

11 CHAIR BOLLWERK: Okay.

12 MR. CURTISS: If this is interesting we'll
13 look at it to see if there's anything.

14 CHAIR BOLLWERK: All right. Well,
15 everyone has a copy of it. So, if it needs to come
16 into the evidentiary record, let us know. It is not
17 our intention at this point to do anything with it
18 other than giving us a copy of it.

19 I think in discussing the question that's
20 been raised about exactly the sort of scope of this
21 part of the proceeding, I'm going to go back again and
22 then let Judge Abramson speak for a couple minutes
23 about where and what the Commission has directed us to
24 do here.

25 And I think in part what we thought we

1 were going to hear, which we haven't heard any of
2 today yet, at least at this point. The Committee
3 indicated, and I'll go back to the January ruling
4 where it talked about the issue that we had actually
5 certified to the Commission.

6 It indicated at that time a more difficult
7 question, and one we need not address today, concerns
8 whether the LES material in the volumes and
9 concentrations proposed will meet the part 61
10 requirements for the near surface disposal.

11 The Commission agrees with the interveners
12 that a definitive conclusion on this and other
13 disposal method questions cannot be reached at this
14 time and may require further environmental and safety
15 analysis.

16 From our perspective what we thought we
17 were going to hear was a safety analysis with respect
18 to cost in particular as to whether the LES material
19 and the volumes and concentration proposed will meet
20 the part 61 requirements for near surface disposal.

21 I think what our feeling was when the
22 Commission sent the environmental issue back, that we
23 were then going to hear additional information about
24 whether the impacts are such that the impacts and
25 volumes and concentrations proposed, what are the

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1 environmental impacts of those particular -- the
2 volume that was involved in the LES proposal.

3 Having said that, I think what we're going
4 back to are the part 61 requirements and the guidance.
5 And I'll turn it over to Judge Abramson at this point.

6 JUDGE ABRAMSON: Yes. I guess I'd like to
7 make this as concrete as I can. And so, what I'd like
8 to hear, what I think the Board would like to hear
9 from Mr. Lovejoy what specific criteria in part 61 are
10 you focused on which may not be met or which you
11 postulate cannot be met by the DU from LES to be
12 disposed?

13 And let's talk very specifically. As I
14 look at part 61, I only see numbers in one section. If
15 there's more than that, let's get to them. But, tell
16 us which specific criteria in part 61 you're focused
17 on that may not be met or which you argue will not be
18 met. And let's focus the hearing on that.

19 JUDGE KELBER: I think we can focus it
20 more closely to subpart C, which is performance
21 requirements.

22 JUDGE ABRAMSON: Yes.

23 MR. LOVEJOY: We're going to show that
24 there's noncompliance with 61.41, which is the one
25 with numbers in it.

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1 JUDGE KELBER: Okay.

2 MR. LOVEJOY: And 42, which is the
3 parallel provision that protects intruders.

4 JUDGE KELBER: That's fine.

5 MR. LOVEJOY: Originally in the draft
6 there was a number limit in the intruder provision.
7 And I think the Commission took out the number but
8 still used the number for purposes of their
9 classification purposes.

10 So it's still kind of in the background.
11 But, the individual protection requirement, a general
12 population is the main one. Dr. Makhijani reminds me
13 that the stability of the disposal site 61.44 is also
14 pertinent.

15 JUDGE ABRAMSON: Okay. Then why don't we
16 focus on those from an environmental point of view?
17 And why don't we focus also when we're looking for
18 cost on whether or not it can meet those because that
19 will help us determine whether shallow land burial
20 cost estimate is right and, i.e., if it's not
21 plausible, we don't have a reasonable cost estimate.

22

23 So let's go down that path. And, if you
24 can confine your cross examine of this panel to
25 addressing those questions or getting something that's

1 very fundamental to those points, that will help speed
2 it up, I think.

3 MR. LOVEJOY: Okay. Do I understand from
4 the Board that the Board is not intrigued by analyses
5 of the WIPP Project, for example?

6 JUDGE ABRAMSON: Analyses of it, no,
7 unless -- well maybe not unless, except to the extent
8 that if the cost -- if it is demonstrated that the
9 cost of this facility -- that it is not feasible to
10 dispose of it in shallow land burial, then we need to
11 know the cost of disposing of it in other mechanisms.

12 MR. LOVEJOY: Right.

13 JUDGE ABRAMSON: So, it seems to me we
14 have to go down that path, at least to that extent.

15 MR. LOVEJOY: Yes, I think that is
16 relevant.

17 JUDGE ABRAMSON: But, from the challenge
18 to the EIS point of view that the LES final EIS, all
19 that's at issue is whether that's sufficient --
20 whether they took a sufficient hard look.

21 And they didn't have to look at WIPP, I
22 don't think.

23 MR. LOVEJOY: So, Mr. Potter, you do have
24 10CFR part 61 with you, don't you?

25 WITNESS POTTER: I do.

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1 MR. LOVEJOY: And, it is true, isn't it,
2 that under 61.42 individuals are protected from
3 inadvertent intrusion under the regulations?

4 WITNESS POTTER: That is correct.

5 MR. LOVEJOY: And there is a provision in
6 61.44 designed to ensure the stability of the site
7 post-closure?

8 WITNESS POTTER: That is correct.

9 MR. LOVEJOY: Are you familiar with -- oh
10 yes. I'm reminded that also there's a position in
11 61.59, is there not, specifying the period of
12 institutional control that could be assumed or could
13 be provided.

14 WITNESS POTTER: That is correct.

15 MR. LOVEJOY: And it says the period of
16 institutional control will be determined by the
17 Commission. But institutional controls may not be
18 relied upon for more than 100 years following transfer
19 of control of the disposal site to the owner, is that
20 right? There's a 100 year limit.

21 WITNESS POTTER: That's right.

22 MR. LOVEJOY: Okay. And are you familiar
23 with 10CFR part 20?

24 WITNESS POTTER: Yes.

25 MR. LOVEJOY: Is there a provision in

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1 10CFR part 20 setting a limit on operations impacts on
2 individual members of the public from the operations
3 of any licensee?

4 WITNESS POTTER: I'd have to go back and
5 revisit, but in general, yes.

6 MR. LOVEJOY: Do you recall, let me see if
7 I can refresh your recollection. Does the regulation
8 state that each licensee of this Commission shall
9 conduct operations so that the total effect of dose
10 equivalent to individual members of the public from
11 the licensed operation does not exceed 0.1 rem in a
12 year exclusive of -- and then it eliminates medical
13 operations from consideration?

14 WITNESS POTTER: I believe that's -- I'd
15 have to see the regulation for that.

16 MR. LOVEJOY: Okay. Well, maybe we better
17 dig that out.

18 CHAIR BOLLWERK: And we've said this
19 before. To mark the NRC regulations to some degree is
20 not necessary. We have lots of both copies around.
21 We don't need to put those in the record.

22 MR. LOVEJOY: Did you want to check that
23 reg?

24 WITNESS POTTER: Yes, I have it here. And
25 I'm looking.

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1 MR. LOVEJOY: At 1301.

2 WITNESS POTTER: Just a second here. Let
3 me get the context.

4 (Pause.)

5 WITNESS POTTER: Operation is the word
6 that I'm --

7 JUDGE ABRAMSON: This is operational
8 doses, is that right?

9 MR. LOVEJOY: Worker dose. It's any
10 member of the public.

11 JUDGE ABRAMSON: During operations, is
12 that right?

13 WITNESS POTTER: Maybe.

14 (Pause.)

15 WITNESS POTTER: The purpose of 10CFR 20
16 is to protect -- is to establish standards for
17 protection against ionizing radiation resulting from
18 the activities conducted under licenses issued by the
19 Nuclear Regulatory Commission.

20 It is not clear to me that that would
21 include impacts that result after termination of those
22 activities in such a situation as waste disposal.

23 In fact, waste disposal is covered by
24 separate regulations and would presumably take the
25 place of part 20 for that kind of thing.

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1 MR. LOVEJOY: Okay. So, maybe the
2 pertinent dose limitations are those in part 61.
3 Okay. Thank you for that. Let me move to -- sorry,
4 did you have something more?

5 WITNESS POTTER: I'm not sure what you're
6 inferring from my comment.

7 MR. LOVEJOY: Was it your view that the
8 limitation that I drew your attention to applied to
9 operations, not post-closure?

10 WITNESS POTTER: The operational phase of
11 the disposal facility, yes.

12 MR. LOVEJOY: Thank you. Let me move on
13 to dollars and cents. Mr. Krich, the January 7
14 letter, do you have the LES exhibits nearby?

15 (No verbal response.)

16 MR. LOVEJOY: Look at number 84.

17 (Pause.)

18 WITNESS KRICH: Yes, I have Exhibit 84.

19 MR. LOVEJOY: Okay. Now, the January 7
20 letter contains the cost estimates that LES is now
21 presenting to the Commission, correct?

22 WITNESS KRICH: This is the updated cost
23 estimate.

24 MR. LOVEJOY: Okay.

25 JUDGE ABRAMSON: It's LES --

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1 MR. LOVEJOY: LES Exhibit 84.

2 JUDGE ABRAMSON: Thank you.

3 MR. LOVEJOY: And you took into
4 consideration the Envirocare and the WCS site in
5 developing this estimate, right?

6 WITNESS KRICH: I think that -- and I
7 don't know right away which exhibit it is. But there
8 is a letter to the NRC, a subsequent letter to the NRC
9 where I explain how I -- where each one of these
10 estimates came from.

11 MR. LOVEJOY: Do you want to look for
12 that? I could show you some that may respond. But,
13 if you know --

14 WITNESS KRICH: Well, I'm sure you know
15 where it is.

16 MR. LOVEJOY: Well, would you look at
17 what's been marked NIRS/PC Exhibit 252, which is an
18 April 11, 2005 hearing file memo about a telephone
19 conference which I'll now identify for the record.

20 CHAIR BOLLWERK: Is that 252?

21 MR. LOVEJOY: It's number 252. I don't
22 believe it's been admitted.

23 CHAIR BOLLWERK: Do you want to go ahead
24 and have that marked for identification?

25 MR. LOVEJOY: Please.

1 CHAIR BOLLWERK: Exhibit 252, a memorandum
2 from Timothy Johnson to Joseph Giiter, April 11th,
3 2005. Is that the right document?

4 MR. LOVEJOY: Yes.

5 CHAIR BOLLWERK: It has been marked for
6 identification.

7 (Whereupon, the above-
8 referenced to document was
9 marked as NIRS/PC Exhibit No.
10 252 for identification.)

11 MR. LOVEJOY: Thank you. Actually, while
12 we're at it, I offer it in evidence.

13 CHAIR BOLLWERK: The motion has been made
14 that NIRS/PC Exhibit 252 be moved -- be accepted as
15 evidence. Any objections? Do you want to look at it?

16 (No verbal response.)

17 CHAIR BOLLWERK: Going, going. No
18 objections?

19 (No verbal response.)

20 CHAIR BOLLWERK: All right. Then NIRS/PC
21 Exhibit 252 is admitted into evidence.

22 (The document referred to,
23 having been previously marked
24 for identification as NIRS/PC
25 Exhibit No. 252 was admitted in

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1 evidence.)

2 JUDGE KELBER: Are we done with 84?

3 MR. LOVEJOY: We are. Thank you. Now,
4 Mr. Krich, you told NRC on March 17th, if this memo is
5 correct in looking at page three of it, that the WCS
6 estimate for disposal converts to the estimated values
7 that you've given as a cost estimate in dollars per
8 KgU, correct?

9 WITNESS KRICH: That's where it's reported
10 here. Now, there's a subsequent letter that describes
11 how this -- and that's what I was looking for.

12 MR. LOVEJOY: Okay.

13 WITNESS KRICH: But I can't remember which
14 exhibit number it is.

15 MR. O'NEILL: Is that 96?

16 MR. LOVEJOY: Yes.

17 JUDGE ABRAMSON: Clarifying information?
18 Sounds like it.

19 MR. LOVEJOY: This is LES 96.

20 JUDGE ABRAMSON: Yes, it looks like it.
21 In the back there's a page.

22 WITNESS KRICH: Yes, thank you. It's
23 Exhibit 96. And it's the attachment to the letter.
24 It's the second paragraph. It's the enclosure to the
25 letter.

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1 It's the second paragraph. So, is that
2 what you were looking for?

3 MR. LOVEJOY: If number 96 is the March 29
4 letter. Is that right?

5 WITNESS KRICH: March 29, NEF #05-016.

6 MR. LOVEJOY: Okay. Can you point out
7 where the explanation is that you're referring to?

8 WITNESS KRICH: I think I just said it's
9 the second paragraph in the enclosure.

10 MR. LOVEJOY: Under clarifying
11 information, okay.

12 (Pause.)

13 MR. LOVEJOY: Now, Exhibit 252 says that
14 LES staff indicated that the waste control specialist
15 disposal cost for uranium oxide convert to the
16 estimated values in kilograms of uranium metal.

17 And then it goes on. It says Envirocare
18 estimate for disposal was slightly less. Was that what
19 you told Commission staff?

20 WITNESS KRICH: What I told the NRC Staff
21 was that the estimate for disposal cost was based on
22 the MOA with waste control specialist, the information
23 from there, informed by information that we had from
24 Envirocare that disposal of large volumes of low level
25 radioactive waste.

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1 MR. LOVEJOY: Is the memorandum
2 inaccurate, the April 11 memorandum?

3 WITNESS KRICH: Well, I didn't tell them
4 that we would convert to uranium metal.

5 MR. LOVEJOY: Okay. Did you give the
6 Staff a figure of 30 dollars to 75 dollars per cubic
7 foot for Envirocare?

8 WITNESS KRICH: That's my recollection of
9 the phone call.

10 MR. LOVEJOY: Okay.

11 WITNESS KRICH: So, in fact, we used the
12 ■ dollars per cubic foot based on the higher end of
13 that estimate. So the 75 dollars is what we used. And
14 that's based on the phone call with Envirocare
15 previously.

16 MR. LOVEJOY: Okay. Do you have LES
17 Exhibit 103, the letter from Mr. Rafati?

18 WITNESS KRICH: Mr. Rafati?

19 MR. LOVEJOY: Rafati.

20 WITNESS KRICH: Yes.

21 MR. LOVEJOY: Before Mr. Rafati wrote this
22 letter, did someone on behalf of LES ask him to look
23 at the cost estimate in the LES application and tell
24 whether that estimate was in the range of what
25 Envirocare would charge for disposal of depleted

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1 uranium?

2 WITNESS KRICH: No. What we asked Mr.
3 Rafati was to give us, based on what was in the
4 application, whether it was bounded that those figures
5 bounded or were conservative relative to what he would
6 expect to charge for disposing of depleted uranium.

7 And, as you can see, he said that these
8 charges were, in his opinion, considered conservative.

9 MR. LOVEJOY: Okay. And yes, he reported
10 from a letter, based on the letter that the cost range
11 presented in the current LES license application is a
12 conservative estimate, correct?

13 WITNESS KRICH: It says what it says, I
14 guess. It says that the cost range presented in the
15 current LES license application is a conservative
16 estimate of what it would currently cost at standard
17 depleted U308 density to dispose of such material in
18 Envirocare's Utah facility.

19 And, as we pointed out earlier, it says
20 earlier in the letter that he currently disposes of
21 U308 at his facility. So he would have a good basis
22 upon which to make that judgment.

23 MR. LOVEJOY: Do you have Staff Exhibit 39
24 near there?

25 (Pause.)

1 WITNESS KRICH: Yes, I have Exhibit 39.

2 MR. LOVEJOY: On the third page the text
3 appears at the bottom. It says LES indicated that it
4 used the lower end estimate, referring to the range of
5 estimates that WCS provided, as its disposal cost
6 basis in the decommissioning funding plan because it
7 was similar to the cost estimate 75 dollars per cubic
8 foot provided by Envirocare for disposal of large
9 quantities of facility decommissioning waste. Is that
10 accurate?

11 WITNESS KRICH: I think I just testified
12 to that just a few minutes ago.

13 MR. LOVEJOY: Okay.

14 WITNESS KRICH: And, in fact, as I
15 testified to, I think, yesterday, the Department of
16 Energy is using a quote to them from Envirocare of, I
17 believe, ■ dollars and ■ cents per cubic foot for
18 disposal.

19 So, certainly the ■ dollars per cubic
20 foot is extremely high compared to what Envirocare is
21 charging the Department of Energy. And, in fact, in
22 talking with a decommissioning expert who is one of
23 our witnesses, his experience with disposing of large
24 quantities of low level radioactive waste at
25 Envirocare tells me that his experience -- that it

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1 runs 15 to 25 dollars per cubic foot.

2 So, again, the 80 dollars per cubic foot
3 is a very, very high estimate relative to what is
4 being charged in the market today.

5 MR. LOVEJOY: When Mr. Rafati wrote his
6 letter, LES Exhibit 103, do you remember what the cost
7 range presented in the current LES license application
8 was?

9 WITNESS KRICH: I do not remember. I did
10 bring it with me. And I left it in the -- in our
11 conference room. If somebody could get me my folders,
12 that would be helpful.

13 MR. LOVEJOY: Could you look at NIRS/PC
14 Exhibit 133, the last page of it and see if that's the
15 information?

16 (Pause.)

17 WITNESS KRICH: Yes, I'm at 133.

18 MR. LOVEJOY: Would you look at the last
19 page and tell me whether that was the information Mr.
20 Rafati had to refer to?

21 (Pause.)

22 WITNESS KRICH: Okay.

23 MR. LOVEJOY: Is that the information that
24 was in the application when Mr. Rafati wrote his
25 letter?

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1 WITNESS KRICH: Well actually, there was
2 this table and a previous table which talked about
3 disposal costs.

4 (Pause.)

5 MR. LOVEJOY: What information did those
6 tables have?

7 WITNESS KRICH: Those were the tables that
8 led up to this. This is a summary level table.

9 MR. LOVEJOY: Yes. Then this table, table
10 4.13-7 was in the application when Mr. Rafati wrote
11 his letter?

12 WITNESS KRICH: Yes.

13 MR. LOVEJOY: And it contains disposal
14 costs of a dollar 47 to 2.17 per KgU, does it not?

15 WITNESS KRICH: The 2.17, you realize,
16 represents disposal in a concrete vault. So it's not
17 applicable to Mr. Rafati's operation.

18 MR. LOVEJOY: Did Mr. Rafati tell you that
19 he wasn't including that in the opinion he expressed?

20 WITNESS KRICH: Well, that's why I
21 referred you to the other tables, Mr. Lovejoy. If you
22 go to table 4.13-5 you'll see where the 2.17 comes
23 from.

24 And Mr. Rafati had these tables because I
25 made sure he had them. And so he could see that one

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1 of the cost estimates reflected the cost for disposal
2 in the concrete vault.

3 MR. LOVEJOY: I see. But, the dollar 47,
4 even if that's the only one Mr. Rafati was referring
5 to, is still higher than the current cost estimate
6 you're offering, isn't it?

7 WITNESS KRICH: Well, I think that's the
8 basis for Mr. Rafati's statement that it was very
9 conservative. He wasn't going to tell us cost. We
10 didn't ask him for one.

11 We just asked him to judge the costs that
12 we had in our table.

13 MR. LOVEJOY: Did you ever chat with him
14 to make sure which numbers he was referring to in his
15 letter?

16 WITNESS KRICH: Yes, I talked to him.

17 MR. LOVEJOY: And what did he tell you
18 about these numbers?

19 WITNESS KRICH: They were very
20 conservative.

21 MR. LOVEJOY: Okay.

22 WITNESS KRICH: Pretty much what he said
23 in the letter. And again, to reemphasize, the 2.17 is
24 for disposal in concrete vault. And, as Mr. Rafati is
25 only class A repository, he doesn't operate a concrete

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1 vault.

2 CHAIR BOLLWERK: What class of material
3 would you put in a concrete vault if you were to use
4 that?

5 WITNESS KRICH: I think that the way
6 that's determined is if you needed to provide extra
7 protection for the pathway you would use a concrete
8 vault.

9 CHAIR BOLLWERK: So it's -- as part of --
10 it's a result of the performance analysis to determine
11 if you need to have -- provide extra protection?

12 WITNESS POTTER: It could be that or it
13 could be waste that's classified as requiring
14 stabilization, perhaps, or -- that would be B, or
15 class C, which requires an intrusion barrier.

16 WITNESS KRICH: Or depending on where your
17 waste repository is located.

18 MR. LOVEJOY: Do you have any cost
19 estimates for disposal in geologic repository or other
20 more protective method if it's determined that near
21 surface disposal will not work?

22 WITNESS KRICH: Well -- we were our job
23 here was to determine a plausible strategy, and then
24 based on that plausible strategy determine a price, a
25 cost.

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1 In looking, in doing the work that we did,
2 a geologic or deep -- I think you're referring to a
3 deep geologic repository?

4 MR. LOVEJOY: Yes.

5 WITNESS KRICH: That's not plausible
6 because it's unnecessary for our material.

7 MR. LOVEJOY: Well the question was
8 whether you have any cost estimates for that type of
9 disposal.

10 WITNESS KRICH: And as I'm trying to
11 explain, the reason we don't have a cost estimate is
12 because we based on what was plausible. Deep geologic
13 repository is not plausible for this material.

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

15 CHAIR BOLLWERK: All right. Done with the
16 cross examination at this point, then? All right.
17 Let me just see, does the Staff have anything?

18 MS. CLARK: No.

19 CHAIR BOLLWERK: All right. Mr. Curtiss,
20 do you have any redirect?

21 MR. CURTISS: I'll try to be quick and see
22 if we can't just simplify this.

23 EXAMINATION BY MR. CURTISS OF

24 ROD KRICH

25 THOMAS POTTER

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1 MR. CURTISS: Mr. Krich, you have
2 testified here and in your pre-filed testimony that
3 your estimate for the cost of disposal of U308 in the
4 manner you think is appropriate and plausible is a
5 dollar 14 Kg U. Is that correct?

6 WITNESS KRICH: Yes, sir.

7 MR. CURTISS: And that's based upon a
8 figure that you arranged that you received from WCS in
9 the range of ■ dollars to ■ dollars per cubic foot?

10 WITNESS KRICH: Yes, the ■ to ■ dollars
11 is considered as the absolutely outer bound. In fact
12 the ■ dollars is considered the outer bound of costs.

13 MR. CURTISS: Yes. And what I'd just like
14 to walk you through is why you believe that is not
15 only an estimate that has a reasonable basis, but it
16 so highly conservative that as a practical matter this
17 material could be disposed of in that manner for a lot
18 less.

19 Okay. So if I could, let's look at some
20 of the exhibits that have been presented here. If we
21 could go to -- or let's start with Exhibit 87, LES
22 Exhibit 87.

23 This is the document that includes as
24 table 2 a comparison of the LES and DOE cost estimate.

25 WITNESS KRICH: Okay.

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1 MR. CURTISS: Do you have that table
2 before you?

3 WITNESS KRICH: Table 2?

4 MR. CURTISS: Yes.

5 WITNESS KRICH: Yes, I do.

6 MR. CURTISS: And if you'd go down to the
7 -- this is a comparison, as I say, of the LES and DOE
8 estimate, go down to the disposal, the original
9 disposal line. Do you see where I am?

10 WITNESS KRICH: Yes, I do.

11 MR. CURTISS: A dollar 14 per Kg U is the
12 figure we just referred to. Is that correct?

13 WITNESS KRICH: Right.

14 MR. CURTISS: Would you, making the
15 appropriate adjustments as we talked about today for
16 disposal of CaF, would you tell me what the DOE figure
17 is for the disposal per Kg U of similar waste in a
18 similar manner?

19 WITNESS KRICH: [REDACTED] cents per
20 kilogram U.

21 MR. CURTISS: [REDACTED] cents per Kg U?

22 WITNESS KRICH: Yes.

23 MR. CURTISS: And do you know where that
24 DOE estimate was obtained, or what the basis for that
25 was?

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1 WITNESS KRICH: Sorry. As I think is
2 stated in the letter, that's a quote that UDS, Uranium
3 Disposition Service, which is a contractor to DOE is
4 charged with building the deconversion facility,
5 operating it, and operating it for five years, which
6 means that they're also responsible for disposing of
7 the depleted uranium.

8 MR. CURTISS: And that's set forth in the
9 LMI report itself, isn't it?

10 WITNESS KRICH: Yes.

11 MR. CURTISS: So that's an actual, to
12 recall the phrase that was used recently in this
13 hearing, that's an actual bid for DOE isn't it?

14 WITNESS KRICH: That was a quote, yes.

15 MR. CURTISS: A proposal, a quote for --

16 WITNESS KRICH: Yes.

17 MR. CURTISS: -- ■ cents per Kg U?

18 WITNESS KRICH: That's right.

19 MR. CURTISS: So if my arithmetic is right
20 that's about ■ times less than what you've estimated?

21 WITNESS KRICH: Yes.

22 MR. CURTISS: On that basis do you think
23 your dollar 14 per Kg U is a conservative number?

24 WITNESS KRICH: Well, I think it is, but
25 not only on that basis but on other bases that I've

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1 just described. I think it's highly conservative.

2 MR. CURTISS: Secondly, along the same
3 line, you did indicate in your testimony and as --
4 here today as well as in your direct testimony on page
5 17, answer 25 that based upon the input that you
6 received from a Mr. LaGuardia that you would expect
7 the -- based upon his actual commercial experience,
8 this is not DOE material but commercial experience,
9 his experience with the disposal of that material,
10 you've testified, indicates that at Envirocare it
11 could be disposed of for 25 dollars a Kg U. Is that
12 correct?

13 WITNESS KRICH: Mr. LaGuardia, who's an
14 expert in decommissioning, has many decommissioning
15 contracts, has said that typically the contracts with
16 Envirocare to dispose of low level radioactive waste,
17 large quantities, runs on the order of 15 to 25
18 dollars per cubic foot.

19 MR. CURTISS: And that's compared to your
20 ■ dollars per cubic foot.

21 WITNESS KRICH: That's compared to my ■
22 dollars.

23 MR. CURTISS: Which is a lot, ■ times
24 as much if you look at the 25 dollar estimate?

25 WITNESS KRICH: Yes.

1 JUDGE ABRAMSON: Excuse me just a second.
2 Did Mr. LaGuardia give you any idea what he meant by
3 large quantities? I mean is it of the order of
4 hundreds of thousands of tons, or is it --

5 WITNESS KRICH: Yes.

6 JUDGE ABRAMSON: It is that much?

7 WITNESS KRICH: We're talking about
8 reactor decommissioning, so these are -- this is a
9 large quantity of radioactive --

10 JUDGE ABRAMSON: It's comparable
11 quantities to yours? It's not materially smaller?

12 WITNESS KRICH: Hundreds of thousands of
13 tons, yes.

14 JUDGE ABRAMSON: Thousands?

15 WITNESS KRICH: Hundreds of thousands of
16 tons.

17 JUDGE ABRAMSON: Okay, thank you.

18 MR. CURTISS: And if I could then refer
19 you to Exhibit -- LES Exhibit 108. Do you have that
20 exhibit there before you?

21 WITNESS KRICH: Exhibit 108?

22 MR. CURTISS: Yes.

23 WITNESS KRICH: Yes.

24 MR. CURTISS: And towards the end of that
25 exhibit -- could you describe what this is?

1 WITNESS KRICH: This is from the -- I
2 believe this is from the Department of Energy website.

3 MR. CURTISS: Yes.

4 WITNESS KRICH: And it's an article
5 entitled Are There any Currently Operating Disposal
6 Facilities That Can Accept All the Depleted Uranium
7 Oxide That Would Be Generated From the Conversion of
8 DOE's Depleted UF6 Inventory.

9 The last sentence says that each of these
10 sites, and it's talking about a number of sites, each
11 of these sites is located in arid or semiarid desert
12 land.

13 Current estimates of disposal costs range
14 from about 250 to 1,100 dollars per cubic meter.

15 MR. CURTISS: And without needing a
16 calculator --

17 WITNESS KRICH: Please don't give me a
18 calculator.

19 MR. CURTISS: Can you confirm that the
20 translation of that number in your testimony into
21 cubic feet is seven dollars to 31 dollars per cubic
22 foot?

23 WITNESS KRICH: That's about right.

24 MR. CURTISS: Okay. So let's just review
25 the bidding here and I think we can finish up this

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1 question of how conservative and whether there's
2 commercial basis for your estimate.

3 [REDACTED] dollars per cubic foot is where you
4 start. Is that correct?

5 WITNESS KRICH: That's -- the [REDACTED] dollars
6 is incorporated in our cost estimate, yes.

7 MR. CURTISS: [REDACTED] dollars per cubic
8 foot --

9 WITNESS KRICH: Per cubic foot.

10 MR. CURTISS: -- or 14 per Kg U. The DOE
11 number for virtually identical material at the
12 Envirocare site for which they have a bid is [REDACTED] cents
13 per Kg U on an apples to apples basis.

14 WITNESS KRICH: Correct.

15 MR. CURTISS: Is that correct?

16 WITNESS KRICH: That's 2004 dollars, yes.

17 MR. CURTISS: And the publicly available
18 information from the DOE website is published, again,
19 similar disposal at a similar site, 7 dollars to 31
20 dollars per cubic foot.

21 WITNESS KRICH: Cubic foot, right.

22 MR. CURTISS: And finally, the testimony
23 that you've received -- or the input that you've
24 received, and actually the testimony would be
25 delivered when we get to this panel, Tom LaGuardia has

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1 advised you that on a commercial basis material like
2 this in similar volumes could be disposed of at about
3 25 dollars per cubic foot average?

4 WITNESS KRICH: Yes.

5 MR. CURTISS: Do you have a basis for
6 concluding that your estimate is not only conservative
7 but much higher than it really will turn out to be?

8 WITNESS KRICH: Yes, I think that -- we
9 recognize that we were way above anything that was
10 considered the going price today, and we decided to
11 stick with that number had use it in our cost
12 estimate, recognizing that it easily covered anything
13 that we would be charged for the disposal of this
14 material.

15 MR. CURTISS: In fact it appears as a
16 practical matter that not only is it a reasonable cost
17 estimate, but that is has so much headroom in it, so
18 much fat in it, that ■ dollars a cubic foot, compared
19 to what's commercially achievable today, that you
20 probably have margin of 75 cents in there compared to
21 what you're seeing today with the commercial estimates
22 and the ones that we're referred to today. Is that
23 correct?

24 WITNESS KRICH: That's correct.

25 MR. LOVEJOY: I hesitate to object, but

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1 could Mr. Curtiss please allow the witness to testify?

2 MR. CURTISS: I'm trying to move it along
3 here.

4 MR. LOVEJOY: It's moving right along.

5 MR. CURTISS: At ten until seven we'd like
6 to finish this up and establish that it's a
7 conservative number. Is your number conservative, Mr.
8 Krich?

9 WITNESS KRICH: My number's conservative,
10 and probably reflects the headroom of about 75 cents
11 if not more.

12 MR. CURTISS: All right. I don't have any
13 further questions.

14 CHAIR BOLLWERK: All right. Anything from
15 the Staff?

16 MS. CLARK: No.

17 CHAIR BOLLWERK: Mr. Lovejoy?

18 MR. LOVEJOY: Well just a couple.

19 EXAMINATION BY MR. LOVEJOY OF

20 ROD KRICH

21 THOMAS POTTER

22 MR. LOVEJOY: Would a dollar 14 be highly
23 conservative if the presentations in this case show
24 that deep disposal is necessary to comply with 10 CFR
25 Part 61?

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1 WITNESS KRICH: I guess I explained
2 earlier I have no basis for judgment because that's
3 not considered a plausible strategy.

4 MR. LOVEJOY: Okay. Do you know the
5 quantities involved in the quotation or bid or
6 whatever it was that UDS got?

7 WITNESS KRICH: The figure, the total
8 figure, is in the LMI report. And it is the --
9 basically the DOE inventory, which is greater than our
10 inventory.

11 I don't remember the number off the top of
12 my head, but it's significantly larger.

13 MR. LOVEJOY: Okay. The quotation that
14 Mr. LaGuardia reported at Envirocare was for disposal
15 of reactor decommissioning waste, wasn't it?

16 WITNESS KRICH: It was for -- yes, low
17 level radioactive waste.

18 MR. LOVEJOY: It's not material that's
19 dangerous for hundreds of thousands of years, is it?

20 WITNESS KRICH: Some of it is.

21 MR. LOVEJOY: Just a moment. In your
22 disposal operations as you anticipate them to be
23 conducted in your surface disposal, would 55 gallon
24 drums be used?

25 WITNESS KRICH: The scenario -- and you

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1 know, what will actually be used is probably up to the
2 disposal operator, but for the purposes of the cost
3 we, as we've said many times in the last couple of
4 days, the scenario is that deconverted uranium
5 hexafluoride would then -- the uranium oxide would
6 then be loaded into 55 gallon drums and put in ISO
7 containers and shipped to the disposal site.

8 MR. LOVEJOY: Do you plan to have grout
9 added?

10 WITNESS KRICH: We're done the analysis
11 with grout and ungrouted as Mr. Potter testified to
12 earlier.

13 MR. LOVEJOY: And when you grout the
14 waste, the volume increases, right?

15 WITNESS KRICH: Yes. I believe Mr. Potter
16 testified to that earlier today.

17 MR. LOVEJOY: Have you -- and to express
18 the actual cost of that kind of disposal, don't you
19 have to increase the Dollars per Kg U?

20 WITNESS KRICH: The figure that we have
21 from WCS as well as from Envirocare reflects the
22 additional space. In other words they understand that
23 this material would be grouted.

24 MR. LOVEJOY: The quotations that you've
25 used -- the calculation that leads to a dollar 14 per

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1 Kg U is on the assumption of grouting?

2 WITNESS KRICH: The assumption that this
3 material would be either grouted or ungrouted. But it
4 covers both possibilities.

5 JUDGE ABRAMSON: Let me ask a simpler
6 question. Maybe it's a little more obvious than it
7 seems. At ■ dollars a cubic foot how many cubic feet
8 -- or how many kilograms are in a cubic foot, does
9 that reduce exactly to a dollar 14 per Kg U if you
10 just take the density of uranium and convert it to
11 cubic feet?

12 WITNESS KRICH: The figure that we got
13 both from Envirocare and from WCS was based on we
14 deliver the U308 to them in 55 gal drums. They may
15 grout it. Most likely they'll grout it.

16 JUDGE ABRAMSON: They might grout it?

17 WITNESS KRICH: They'll grout it --

18 JUDGE ABRAMSON: But it's based on the
19 cubic feet of what you deliver?

20 WITNESS KRICH: We deliver to them, yes,
21 but most likely they'll turn around and grout it.

22 JUDGE ABRAMSON: So they would modify,
23 they would add grout to your containers, or they would
24 do something else.

25 WITNESS KRICH: Yes, Judge, the grouting

1 goes on at the disposal site.

2 JUDGE ABRAMSON: But the [REDACTED] dollars a
3 cubic foot is based on how many cubic feet there are
4 in a drum which would have some void?

5 WITNESS KRICH: What we deliver to them,
6 yes.

7 MR. LOVEJOY: How many cubic feet in a
8 drum?

9 WITNESS KRICH: You know, I just didn't
10 bring that figure with me today, I'm sorry.

11 JUDGE KELBER: fifty-five gallons?

12 WITNESS KRICH: Fifty-five gallons, yes.

13 JUDGE ABRAMSON: You can convert gallons
14 to cubic feet. It used to be something like --

15 WITNESS KRICH: Is it approximately 7
16 cubic feet?

17 JUDGE ABRAMSON: About 7 cubic feet.

18 MR. LOVEJOY: Okay. That's all.

19 CHAIR BOLLWERK: That's it? Anything
20 further from Mr. Curtiss, from the Staff?

21 MS. CLARK: No.

22 CHAIR BOLLWERK: All right. At this
23 point, gentlemen I thank you for -- let me just --
24 anything from the Board members, I'm sorry.

25 (No verbal response.)

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1 CHAIR BOLLWERK: No? All right. At this
2 point then gentlemen, I thank you for your testimony
3 and your service to the Board on this issue. And I'm
4 sure, Mr. Krich, we'll be seeing you again. Thank you
5 very much.

6 WITNESS KRICH: Thank you.

7 MR. CURTISS: They -- depending upon the
8 testimony --

9 CHAIR BOLLWERK: May be coming back for
10 rebuttal --

11 JUDGE ABRAMSON: You both will be
12 available tomorrow for --

13 WITNESS KRICH: Right.

14 CHAIR BOLLWERK: All right. Let me raise
15 a couple points. The Staff said that they had some --
16 in the nature of surrebuttal they want to do with
17 their witnesses?

18 MS. CLARK: Yes.

19 CHAIR BOLLWERK: How long will that take?

20 MS. CLARK: It's difficult for me to say,
21 approximately maybe 45 minutes.

22 CHAIR BOLLWERK: Surrebuttal --

23 MS. CLARK: Are you considering doing it
24 today?

25 JUDGE ABRAMSON: Yes.

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1 CHAIR BOLLWERK: Well, that's what we're
2 thinking about, or --

3 JUDGE ABRAMSON: We're trying to figure
4 out how to move this along. A, stay later, and B
5 start early, or A or B. And I'm in favor of both.

6 MS. CLARK: Well, just from my standpoint
7 it's been a very long day. And I do think that you
8 would get a better presentation if we resume tomorrow
9 morning.

10 At this point I'm not sure that I'm
11 capable of making a very effective presentation at
12 this point.

13 CHAIR BOLLWERK: Okay. We can --

14 JUDGE ABRAMSON: Start early tomorrow
15 then.

16 CHAIR BOLLWERK: Let me ask a second
17 question. The -- given what we have left, what you
18 all know of your cases, what's the likelihood we're
19 going to get finished tomorrow if we go until the --
20 well, we can go -- we're doing it until seven o'clock
21 now.

22 JUDGE ABRAMSON: Start early and go late.
23 I mean --

24 MS. CLARK: Finish contingency also?

25 JUDGE ABRAMSON: Everything.

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1 CHAIR BOLLWERK: Everything. Originally
2 this was supposed to be four days. If it isn't it
3 isn't.

4 JUDGE ABRAMSON: It's supposed to be three
5 to four days.

6 MS. CLARK: Right.

7 JUDGE ABRAMSON: Right?

8 MS. CLARK: I think it's possible, but I'm
9 not entirely comfortable. Maybe Mr. Lovejoy has a
10 better sense.

11 JUDGE ABRAMSON: It depends on -- it
12 really depends on how it goes with your panel, doesn't
13 it?

14 MR. LOVEJOY: Well, and Dr. Makhijani.

15 JUDGE ABRAMSON: Yes.

16 MS. CLARK: Yes.

17 MR. LOVEJOY: We will.

18 JUDGE ABRAMSON: You will?

19 MR. CURTISS: I know at least the
20 questions will be brief with Dr. Makhijani. So I can
21 say that we'll try to complete that in no more than an
22 hour.

23 JUDGE ABRAMSON: Well, perhaps we can
24 focus the questions on the Staff tomorrow, and you can
25 compress your rebuttal. And we can focus the

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1 questions to the issues we've tried to narrow to late
2 this afternoon.

3 So, Mr. Lovejoy, if you can focus your
4 questions of the Staff to getting at the meat, maybe
5 we can speed this along. I would propose we start
6 very early tomorrow morning, since the Staff doesn't
7 seem prepared to start now.

8 CHAIR BOLLWERK: We announced nine
9 o'clock, but this is a closed session. So basically
10 this is everybody here.

11 JUDGE ABRAMSON: Oh, no, no. That's not
12 early enough.

13 CHAIR BOLLWERK: All right.

14 JUDGE ABRAMSON: No, seriously.

15 CHAIR BOLLWERK: Let me take a five minute
16 recess and have a discussion.

17 (Whereupon, the above-entitled matter
18 went off the record at 6:55 p.m. and
19 went back on the record at 7:00 p.m.)

20 CHAIR BOLLWERK: Very briefly we can go
21 back on the record. The concern I want to just touch
22 upon, given what Ms. Engle raised with us is a
23 question of our Staff being here.

24 It looks like we could start at 8:00 and
25 we would have the administrative Staff here to go

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1 ahead and get everybody up. That was one of the
2 things we were concerned about.

3 So let's go ahead and try for eight
4 o'clock tomorrow morning. And we'll start a little
5 earlier. And we'll shoot to try to get this done by
6 the close of business tomorrow.

7 It may not work, but we will do the best
8 to keep within the four days that we talked about. I
9 don't know what people's plane flights are, etcetera,
10 but many people want to leave here by Friday so we'll
11 try to push it forward.

12 At this point any questions from any of
13 the parties in terms of procedure?

14 MR. CURTISS: No, sir.

15 CHAIR BOLLWERK: All right. Then why
16 don't we go ahead -- we'll try to -- we'll reconvene
17 tomorrow morning at eight o'clock. We'll start with
18 the Staff.

19 And actually it does have a benefit as I
20 mentioned before, having all the testimony in the same
21 transcript is also better generally for Appellate and
22 other purposes.

23 So all right, we'll start then again at
24 eight o'clock in the morning. I appreciate everyone
25 staying so late tonight. We'll start a little early

1 in the morning, but hopefully we will get everyone on
2 their way by COB tomorrow. Thank you very much.

3 (Whereupon, at 7:05 p.m., the above-
4 entitled matter was adjourned, to be reconvened on
5 Thursday, October 27th, at 8:00 a.m.)

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