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RULEMAKINGS AND
ADJUDICATIONS STAFF

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 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

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

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

Q3. Please summarize your educational and professional qualifications.

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

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

A4. Yes.

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

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

Q6. What is the purpose of your testimony?

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

B. **Thomas S. LaGuardia ("TSL")**

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

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

Q8. Please describe your current responsibilities.

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

Q9. Please summarize your educational and professional qualifications.

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

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

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

A10. Yes.

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

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

Q12. What is the purpose of your testimony?

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

II. REGULATORY BACKGROUND – APPLICABLE NRC REQUIREMENTS

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

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

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

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

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

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

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

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

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

> on (1) a contingency factor that is too low; (2) a low estimate of the cost of capital; (3) an incorrect assumption that the costs are for low-level waste only; and (4) the lack of any relevant estimate of the cost of converting and disposing of depleted uranium, given it does not rely upon the three examples – the 1993 CEC estimate, the LLNL report, and the UDS contract – cited in its application.
>
> LES has presented additional estimates for the costs of deconversion, transportation, and disposal of depleted uranium for purposes of the decommissioning and funding plan required by 42 USC 2243 and 10 CFR 30.35, 40.36, and 70.25. *See* LES Response to RAI dated January 7, 2005. Such presentations are insufficient because they contain no factual bases or documented support for the amounts of the following particular current LES estimates, i.e., $2.69/kgU for conversion, $1.14/kgU for disposal, $0.85/kgU for transportation, and a total of $5.85/kgU including contingency, and cannot be the basis for financial assurance.

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

A15. (RMK, TSL) No.

Q16. Please state the basis for your conclusion.

A16. (RMK) LES has committed to apply a 25 percent contingency specifically in response to an NRC Staff request for additional information ("RAI") in this proceeding. *See* LES Exhibit 83 (SAR), at Table 10.1-14; LES Exhibit 84, Attach. 1 at 2, 6; Staff Exhibit 37 (Safety Evaluation Report), at 10-10. The Staff's RAI, which directed LES to "provide a contingency factor of 25 percent for [depleted UF_6] tails disposition," expressly reflects the Staff's continuing position, as stated in NUREG-1757, that the addition of a 25 percent contingency provides an adequate level of assurance with respect to unforeseen cost increases that are within the scope of the identified activities.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Q23. Does this conclude your testimony?

A23. (RMK, TSL) Yes.

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RESUME

Rod M. Krich
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Lisle, IL 60532
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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 ofthe Chief Section oftlie 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 I OCFR5O.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 IOCFR5O.59 safety evaluation process used throughout the nuclear organization, development of the initial Updated Final Safety Analysis Report for Limerick Generating Station, and served as the Company's Primary Representative to the BWR Owners' Group.

1986 to 1988

Virginia Power Company

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

1981 to 1986

Consumers Power Company

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

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

1974 to 1981 General Atomic Company

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

RELATED EXPERIENCE

University of Illinois

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

PUBLICATIONS

General Atomic Company

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

University of Illinois

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

MEMBERSHIPS

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

REFERENCES

Furnished upon request

THOMAS S. LaGUARDIA, PE, CCE

President

SPECIAL QUALIFICATIONS:

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

EDUCATION:

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

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

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

PROFESSIONAL CERTIFICATION:

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

Certified Cost Engineer, AACE 1679

EXPERIENCE:

TLG Services, Inc.
President
1982 to Present

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

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

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

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

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

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

Nuclear Energy Services, Inc.
1974 - 1982

General Manager, Waste Management Services
1979 -1982

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

Group Manager, Engineering Support Services
1977 - 1979

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

Quality Assurance Manager
1975 - 1977

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

Manager of Plant Systems Engineering
1973-1975

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

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

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

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

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

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

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

COMMITTEES:

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

PUBLICATIONS: See attached sample listing.

EXPERT
TESTIMONY: Upon request

LaGuardia, T.S., et al.:

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

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

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

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

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

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

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

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

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

LaGuardia, T.S.:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	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 LAGUARDIA ON BEHALF OF LOUISIANA ENERGY SERVICES, L.P. REGARDING THE ADEQUACY OF THE CONTINGENCY FACTOR APPLIED BY LES TO ITS COST ESTIMATE FOR DEPLETED URANIUM DISPOSITIONING" in the captioned proceeding has been served on the following parties indicated by ** for overnight delivery via Federal Express this 15th day of September 2005. All other parties have been served by U.S. First Class mail this 15th day of September 2005.

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

Commissioner Jeffrey S. Merrifield
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Office of the Secretary**
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U.S. Nuclear Regulatory Commission
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Commissioner Peter B. Lyons
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September 15, 2005

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Re: In the Matter of LOUISIANA ENERGY SERVICES, L.P. (National Enrichment Facility) Docket No. 70-3103-ML

Dear Administrative Judges:

Enclosed for filing in the above-referenced docket is the "Prefiled Direct Testimony of Rod Krich and Thomas LaGuardia on behalf of Louisiana Energy Services, L.P. Regarding the Adequacy of the Contingency Factor Applied by LES to its Cost Estimate for Depleted Uranium Dispositioning."

Yours sincerely,

James R. Curtiss

Enclosure
cc: Service List