

February 24, 2005

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

NRC STAFF PRE-FILED MANDATORY HEARING TESTIMONY  
CONCERNING ELECTRICAL CABINET FIRES

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

A.1. My name is Rex G. Wescott. My occupation is Senior Fire Protection Engineer, and I am employed by the U.S. Nuclear Regulatory Commission. A statement of my professional qualifications is attached.

Q.2. Please describe your professional responsibilities with regard to the NRC Staff's (Staff) review of the application by Louisiana Energy Services, L.P. (LES) to construct and operate a uranium enrichment facility to be known as the National Enrichment Facility (NEF).

A.2. My professional responsibilities included reviewing the fire safety aspects of the Safety Analysis Report and ISA Summary for the NEF and preparing Chapter 7.0, Fire Safety, of the Safety Evaluation Report (NUREG-1827). A statement of my professional qualifications is attached.

Q.3. During the October 2005 hearing the Board identified certain issues to be addressed in connection with the mandatory hearing. With regard to electrical cabinets, the Board asked how retained heat would be dissipated. In addition, the Board observed that after being extinguished by an inert gas fires have been found to re-ignite after the cabinet is opened

and asked what steps would be taken to address this possibility. Could you address these questions?

A.4. Yes. The most likely inert gas extinguishing agent to be used on an electrical cabinet fire is CO<sub>2</sub> either in a hand carried portable fire extinguisher or as a large extinguisher in a wheeled cart. None of the electrical cabinets at NEF are equipped with automatic suppression capability. If the fire has burned for more than approximately 5 minutes after ignition, the suppression capability of a hand held extinguisher may not be adequate and a wheeled extinguisher may be required. If the fire is completely extinguished, adequate heat dissipation and/or oxygen depletion will have been obtained from the extinguishing agent to preclude self sustaining nonflaming combustion. The rest of the heat dissipation will be from the normal heat transfer mechanisms of conduction into the cabinet and adjacent cable, and convection and radiation into the surrounding environment. If the fire is deep seated and the conducted heat and oxygen availability is sufficient to maintain the pyrolysis process, re-ignition of flaming combustion may occur. This nonflaming phase of burning is termed smoldering combustion. The facility fire brigade training specifically trains the responders to watch the fire for a sufficient period after flaming combustion has been suppressed to detect re-ignition and take appropriate action to extinguish the fire. In addition, smoldering combustion generates smoke which would alert the responders that the fire has not been extinguished. Appropriate action could include the application of water or foam. Pre-fire plans, which will be prepared prior to operation, will provide additional detail as necessary regarding response to fires in various plant areas.

Q.5. Is there any additional information relating to the potential for fires in electrical cabinets that you would like to present?

A.5. Yes. An electrical cabinet fire at the NEF would have no direct effect on safety in the same manner as it may for a nuclear power plant. This is because electrical power is not

required for the plant to go into a safe configuration. Control or detection circuits which are associated with safety controls are protected from fire and not routed through electrical cabinets. Most electrical cabinets at LES are not located in areas containing sufficient hazardous material to be of concern. Some cabinets are, however, located in areas such that a fire could be postulated that could effect significant quantities of hazardous material. Further, the likelihood of a fire in an electrical cabinet is reduced through measures such as use of IEEE 383 qualified cable, compliance with National Electric Code requirements, and other similar nuclear industry practices.

The primary radiological/chemical safety concern regarding any fires at the NEF is the potential for a fire to breach a  $\text{UF}_6$  confinement barrier and allow  $\text{UF}_6$  to escape. Such confinement barriers include centrifuges or process piping in the Cascade Halls, Blending and Liquid Sampling Areas and other process areas; and cylinders in the Cylinder Receipt and Discharge Building and Uranium Byproduct Cylinder (UBC) storage area. Cylinders in the storage area or outside the facility would not be affected by a fire which initiates in an electrical cabinet.  $\text{UF}_6$  confinement barriers within the facility are ordinarily protected from breach due to fire by two significant defenses or items relied on for safety (IROFS) against the spread of fire originating from any credible source.

One major type of preventive control against such an event (IROFS 36a and 36d) are combustible loading controls which limits the transient combustible loading in areas containing uranic materials. This is an administrative control that will limit both transient and in-situ combustible loads in areas of concern. The noncombustible nature of the building and processes minimize the amount of in-situ combustibles. Also as part of the combustible control IROFS, liquid and solid waste transfer and packing containers are limited to metal containers only, where required for fire resistance. This IROFS will be implemented through routine inspections, postings, and a permitting system. The other major preventive control (IROFS 35)

is the presence of fire rated barriers and automatic closing fire doors and dampers. These will keep fires that originate in other fire areas from propagating to an area of concern. These barriers are designed to withstand a two hour fire as defined by the ASTM E-119 time vs. temperature curve.

Another control, not an IROFS but considered as defense-in-depth is internal facility fire brigade response. The fire brigade is expected to respond in accordance with its pre-fire plans with adequate staffing and equipment to successfully suppress the postulated fire. The plant fire brigade will be equipped with wheeled fire extinguishers containing sufficient extinguishing agents to control postulated fires in water-exclusion areas in addition to hose lines capable of reaching any part of the facility. A backup to the plant fire brigade is the Eunice Fire department which can arrive at LES 11 to 15 minutes after notification. A modern fire alarm and detection system will provide audible and visual annunciation on a central alarm panel in the control room.

Q.6. Does this conclude your testimony?

A.6. Yes.

Rex G. Wescott

## RELEVANT PROFESSIONAL EXPERIENCE

U.S. NUCLEAR REGULATORY COMMISSION (NRC)  
Senior Fire Protection Engineer (FCSS/NMSS)

ROCKVILLE, MD  
November 1996 - present

- Responsible for fire protection reviews and establishment of review criteria for Tank Waste Remediation Systems (TWRS) project.
- Responsible for fire protection inspections of Gaseous Diffusion Plants following Certification by NRC.
- Responsible for integrated safety analysis (ISA) methodology review of Mixed Oxide Fuel Fabrication Facility Construction Authorization Request.
- Responsible for fire protection review of LES National Enrichment Facility License Application and ISA.
- Responsible for fire protection and ISA methodology review of USEC American Centrifuge Plant License Application and ISA.
- Responsible for fire protection reviews of ISA for Westinghouse, Global and Nuclear Fuel Services Facilities.

Senior Hydrologist (DWM/NMSS)

December 1989 - November 1996

- Responsible for totals system performance calculations, guidance and reviews for proposed Yuca Mountain spent fuel repository.
- Served as special employee for the Office of Commission Appellate Adjudication in regard to fire protection aspects of a materials license for University of Missouri.
- Participated in a Team inspection as fire protection inspector at B&W Navy fuel Facility for FCSS/NMSS.

Plant Systems Engineer (Office of Special Projects)

April 1987 - December 1989

- Responsible for 10 CFR 50 Appendix R reviews of Sequoyah NPP Unit 1 & 2 and Browns Ferry NPP Unit 2.
- Participated in team inspection in response to Browns Ferry Unit 2 drywell fire in July 1987.
- Performed other plant systems calculations and reviews in regard to pumps, chiller systems, and radiological dose.

Rex G. Wescott

Plant Systems Engineer (BWRP/NRR)

November 1985 - April 1987

- Responsible for hydrologic and coastal engineering reviews for Limerick NPP, Pilgrim NPP, Oyster Creek, and Pilgrim NPP.
- Responsible for review of 10 CFR 50 Appendix R exemption request for Hatch NPP.

Hydraulic Engineer (NRR)

March 1981 - November 1985

- Responsible for hydrology and coastal engineering reviews for preparation of Safety Evaluation Reports for 8 nuclear power plants.
- Represented NRC on Interagency Committee on Dam Safety - Working Group on Inflow Design Floods
- Testified as an expert witness in three hearings before The Atomic Safety and Licensing Board on Three water related issues concerning Limerick NPP.

Hydrologist (Office of Standards Development)

December 1978 - March 1981

- NRC representative to ANS 2.8 Working Group (Determination of Design Basis Flooding for Power reactor Sites)
- Participated in working group for development of 10 CFR 70.61 regarding disposal of low level radioactive wastes.

**EDUCATION**

CLARKSON COLLEGE  
B.S. Physics

POTSDAM , NY  
September 1966 - May 1970

CLARKSON COLLEGE  
M.S. Engineering Science

POTSDAM , NY  
December 1974

POLYTECHNIC INSTITUTE OF NY  
Graduate studies in Fluid Mechanics & Coastal Eng

BROOKLYN, NY  
1974 - 1978

UNIVERSITY OF MARYLAND  
B.S. Fire Protection Engineering

COLLEGE PARK, MD  
1985 - 1988

**PROFESSIONAL REGISTRATION**

Licensed Professional Engineer, State of Maryland

1983 - present

**Louisiana Energy Services, L.P., Docket No. 70-3103-ML**  
**March 2006 Mandatory Hearing on Uncontested Issues**  
**Prefiled Hearing Exhibits**

<b>Party Exh. #</b>	<b>Witness/ Panel</b>	<b>Description</b>
Staff 49-M	Safety Evaluation Report	NUREG-1827, "Safety Evaluation Report for the Proposed National Enrichment Facility in Lea County, New Mexico," (2005)
Staff 50-M	Standard Review Plan	"Louisiana Energy Services National Enrichment Facility Safety Evaluation Report Executive Summary," (Sept. 16, 2005).
Staff 51-M	Standard Review Plan	NUREG-1520, "Standard Review Plan for Review of License Applications for Fuel Cycle Facilities," (2002).
Staff 52-M	Decommissioning Funding	SECY-03-0161, "2003 Annual Update - Status of Decommissioning Program," (Sept. 15, 2003).
Staff 53-M	Decommissioning Funding	NUREG-0586, "Draft Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," (1981).
Staff 54-M	Decommissioning Funding	NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," (1988).
Staff 55-M	Decommissioning Funding	NUREG-0584, "Assuring the Availability of Funds for Decommissioning Nuclear Facilities," (1982).
Staff 56-M	Decommissioning Funding	NUREG-CR-1481, "Financing Strategies for Nuclear Power Plant Decommissioning," (1980).
Staff 57-M	Decommissioning Funding	57 Fed. Reg. 30,383-30,387 (July 9, 1992)

<b>Party Exh. #</b>	<b>Witness/ Panel</b>	<b>Description</b>
Staff 58-M	Criticality	"National Enrichment Facility Integrated Safety Analysis Summary," (2004).
Staff 59-M	Criticality	Interim Staff Guidance (ISG)-03, "Nuclear Criticality Safety Performance Requirements and Double Contingency Principle," (Feb. 17, 2005).
Staff 60-M	FEIS Purpose and Need	NUREG-1790, "Final Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico," (2005).
Staff 61-M	FEIS Purpose and Need	Louisiana Energy Services Environmental Report, Section 1.0, "Purpose and Need for the Proposed Action," (2004).
Staff 62-M	FEIS Purpose and Need	Council on Environmental Quality Regulations, 40 CFR 1500.1 and 1502.13.
Staff 63-M	FEIS Purpose and Need	Natural Resources Conservation Service, U.S. Dept. of Agriculture, "Writing a Purpose and Need Statement," (2003).
Staff 64-M	FEIS Purpose and Need	Letter from J.L. Connaughton, Executive Director, Council on Environmental Quality, to N.Y. Mineta, Secretary, U.S. Dept. of Transportation (May 12, 2003).
Staff 65-M	FEIS Purpose and Need	Maeda, H. 2005. "The Global Nuclear Fuel Market – Supply and Demand 2005-2030: WNA Market Report", World Nuclear Association Annual Symposium
Staff 66-M	FEIS Purpose and Need	Combs, J. 2004. "Fueling the Future: A New Paradigm Assuring Uranium Supplies in an Abnormal Market", World Nuclear Association Annual Symposium
Staff 67-M	FEIS Purpose and Need	Cornell, J. 2005. Secondary Supplies: Future Friend or Foe?, World Nuclear Association Annual Symposium



<b>Party Exh. #</b>	<b>Witness/ Panel</b>	<b>Description</b>
Staff 68-M	FEIS Purpose and Need	Van Namen, R. (2005) "Uranium Enrichment: Contributing to the Growth of Nuclear Energy", USEC Presentation to Platts Nuclear Fuel Strategies Conference.
Staff 69-M	FEIS Purpose and Need	Euratom (2005) "Analysis of the Nuclear Fuel Availability at EU Level from a Security of Supply Perspective", Euratom Supply Agency – Advisory Committee Task Force on Security of Supply.
Staff 70-M	FEIS Purpose and Need	International Energy Outlook (2000-2005)
Staff 71-M	FEIS Purpose and Need	EIA, "Uranium Marketing Annual Report," (2004), available at <a href="http://www.eia.doe.gov/cneaf/nuclear/page/forecast/projection.html">http://www.eia.doe.gov/cneaf/nuclear/page/forecast/projection.html</a> .
Staff 72-M	FEIS Purpose and Need	Letter from W.D. Magwood, U.S. Dept. of Energy, to M. Virgilio, U.S. Nuclear Regulatory Commission, "Uranium Enrichment," (July 25, 2002).
Staff 73-M	FEIS Purpose and Need	U.S. Dept. of Energy, "The Global Nuclear Energy Partnership," (2006), available at <a href="http://www.gnep.energy.gov/default.html">http://www.gnep.energy.gov/default.html</a> .
Staff 74-M	FEIS Purpose and Need	U.S. Dept. of Energy, "GNEP Element: Expand Domestic Use of Nuclear Power," (2006), available at <a href="http://www.gnep.energy.gov/pdfs/06-GA50035c_2-col.pdf">http://www.gnep.energy.gov/pdfs/06-GA50035c_2-col.pdf</a> .
Staff 75-M	FEIS Purpose and Need	U.S. Dept. of Energy, "GNEP Element: Establish Reliable Fuel Services," (2006), available at <a href="http://www.gnep.energy.gov/pdfs/06-GA50035g_2-col.pdf">http://www.gnep.energy.gov/pdfs/06-GA50035g_2-col.pdf</a> .

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CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF PRE-FILED MANDATORY HEARING TESTIMONY CONCERNING ELECTRICAL CABINET FIRES " in the above-captioned proceedings have been served on the following by deposit in the United States mail; through deposit in the Nuclear Regulatory Commission's internal system as indicated by an asterisk (\*), and by electronic mail as indicated by a double asterisk (\*\*) on this 11<sup>th</sup> day of October, 2005.

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