February 3, 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 OF DONALD E. PALMROSE CONCERNING NUCLEAR INFORMATION AND RESOURCE SERVICE AND PUBLIC CITIZEN ENVIRONMENTAL CONTENTION 4 ("NIRS/PC EC-4") (IMPACTS OF WASTE STORAGE)

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

A1. My name is Donald E. Palmrose. I am employed as a Senior Nuclear Safety Engineer with Advanced Technologies and Laboratories International, Inc. I am providing this testimony under a technical assistance contract with the NRC.

Q2. Have you previously submitted testimony in this proceeding?

A2. Yes. I provided testimony in this proceeding on January 7, 2005, on behalf of the U.S. Nuclear Regulatory Commission. In that testimony, I described my current responsibilities. I also attached a copy of my professional qualifications.

Q3. What was the purpose of your previous testimony?

A3. I provided my views concerning Nuclear Information and Resource Service and Public Citizen (NIRS/PC) Environmental Contention 4 (EC-4).

Q4. What is the purpose of this testimony?

A4. To provide my views on NIRS/PC's pre-filed testimony of Dr. Arjun Makhijani regarding contention NIRS/PC EC-4.

Q5. What have you done to prepare this testimony?

A5. I have reviewed all of the pre-filed testimony, including supporting documentation and related NEPA analysis.

Q6. On the basis of your review, do you agree with all of the conclusions and analyses presented in the pre-filed testimony of Dr. Makhijani?

A6. I agree with some, but not all of the conclusions and the underlying analyses presented by Dr. Makhijani.

Q7. Do you agree with Dr. Makhijani's statements in his pre-filed direct testimony at pages 7-8 and 12-13, that due to the lack of specific information it is not possible to quantify all of the impacts of a potential decision by LES to use a process that produces anhydrous hydrofluoric acid?

A7. Yes.

Q8. Do you agree with Dr. Makhijani's statements in his pre-filed direct testimony at pages 7, 11, and 12 that the potential impacts on the environment are likely to be higher if the conversion facility used by LES produces and ships anhydrous hydrofluoric acid instead of neutralizing the aqueous hydrofluoric acid and disposing of the calcium fluoride (CaF2)?

A8. No. First, I would like to reiterate that I do not believe that it is possible to make a definitive assessment of which process would result in greater or lesser environmental impacts given the uncertainty of the technology that would be used and the site where the conversion facility would be located. Instead, one can draw only generic conclusions regarding potential impacts. At this time, DOE has compiled the most complete, available environmental analysis for anhydrous hydrofluoric acid management and the associated impacts in the Final Programmatic Environmental Impact Statement for the Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride, DOE/EIS-0269, Office of Nuclear Energy, Science and Technology, U.S. Department of

Energy, April 1999 (PEIS). Examination of the information in the PEIS does not indicate that the overall potential impacts for the option of producing anhydrous hydrofluoric acid are likely to be greater than those for neutralization of aqueous hydrofluoric acid to calcium fluoride (CaF_2) for disposal or sale.

For the management of hydrofluoric acid following conversion of the depleted uranium hexaflouride, the PEIS presents the options of either producing anhydrous hydrofluoric acid (i.e., upgrading aqueous hydrofluoric acid to anhydrous hydrofluoric acid) or the neutralization of aqueous hydrofluoric acid to CaF_2 for disposal or sale. Therefore, the impacts between the options of producing anhydrous hydrofluoric acid or neutralizing to CaF_2 are found in the PEIS in the following sections; Appendix F (Conversion) and Appendix J (Transportation) (LES Exhibit 18).

For conversion operations, the PEIS lists the impacts as being none, nonexistent, or small for most impact areas with no differentiation between the anhydrous hydrofluoric acid and CaF_2 options for the following: normal operations at F16 and F-21; physical hazards at F-37; air quality at F-40; water and soil at F-47, F49, F-50; socioeconomics at F-52; ecology during operation at F-58, F-61; land use at F-68. Impacts to ecology were assessed as being moderate from facility construction for any option, thus the impacts would not be different for either anhydrous hydrofluoric acid or CaF_2. PEIS at F-58.

In assessing the potential impacts from facility accidents, the PEIS considers the most severe or bounding accidents for frequency categories. The categories are defined as likely, unlikely, extremely unlikely and incredible as determined by the probability per year for the accident scenario. PEIS at F-33 to F-34. The bounding accidents that involve hydrofluoric acid concern the rupture of a hydrofluoric acid pipeline to a stand alone storage tank (in the unlikely category), and an accident involving the hydrofluoric acid storage tank itself (in the incredible category). A storage tank would be present only in the event that the anhydrous hydrofluoric acid option is chosen. The impacts to surface water, ground water, soils, and ecology from these accidents were assessed as negligible or nonexistent due to rapid mitigation and the small volume of anhydrous hydrofluoric acid in the release. PEIS at F-47, F-50, F-52, F-61. Impacts to human health were also considered. The overall impacts are expressed in terms of the maximum risk for an irreversible adverse effect (i.e. permanent injury). For the bounding accidents, the maximum risk was determined to be less than one irreversible adverse effect over the projected years of facility operation. PEIS at F-35, F-36. For waste management, the impacts from normal operation of the U_3O_8 conversion facility were assessed as ranging from negligible to large, depending upon the choice of technology and the ultimate generation volumes and disposition of CaF_2 for the facility. PEIS at F-64. The impacts would be negligible in the case of anhydrous hydrofluoric acid because it would be used as a resource, and there would be a minimal amount of CaF_2 produced that would need to be treated as waste. If the option of neutralization to CaF_2 was chosen, the impacts due to waste storage would be significantly greater due to the large volume of CaF_2 that would be processed and would need to be treated as waste.

Appendix J of the PEIS assessed the impacts on human health and the environment from the transportation of depleted uranium and associated materials (i.e., anhydrous hydrofluoric acid and CaF_2). Both the radioactive and chemical nature of the materials transported, as well as the operation of the transportation vehicles would have an impact on risks involved in the various options (i.e. anhydrous hydrofluoric acid and CaF_2). PEIS at J-12. The PEIS presents these risks to human health for normal operations and accidents in Tables J.5 and J.6 assuming that anhydrous hydrofluoric acid would be shipped only by rail while CaF_2 could be shipped by either truck or rail. Regardless of which hydrofluoric acid management option is chosen (i.e. upgrading to anhydrous hydrofluoric acid or neutralizing to CaF_2), the impacts from routine transportation were found to be none for chemical impacts and very small for radiological impacts. Vehicle-related health risks were determined to be independent of the nature of the cargo and would be incurred for similar shipments of any commodity. PEIS at J-13. No radiological fatalities would be expected as a result of a potential severe accident involving either anhydrous hydrofluoric acid or CaF_2. PEIS at J-27. While it was determined that a severe accident involving anhydrous hydrofluoric acid could result in fatalities due to irreversible adverse effects, the overall probability of an anhydrous hydrofluoric acid accident occurring would depend on the total number of shipments and the actual locations of the origin and destination sites. PEIS at J-27, J-28. The probability of an accident would increase with the number of shipments and distance between sites. In order to make a general assessment, DOE made assumptions concerning the distance between sites and the number of shipments. DOE assumed that approximately 5000 railcars of anhydrous hydrofluoric acid would be produced if the entire DOE uranium hexafluoride (UF_6) inventory were converted to oxide. DOE also assumed that the distance traveled per shipment would be 1000 km, and that based on the national average accident statistics for railcars, the overall probability for such an accident in an urban area would be about $3x10^{-5}$ over the duration of the program. The resulting overall risk to the public (defined as the product of the accident consequence and the probability) from a hydrofluoric acid related transportation accident was determined to be 1 irreversible adverse effect (i.e., about 1 person would be expected to experience irreversible adverse effects). PEIS at J-28. Absent specific information regarding distances and total number of shipments, the generic analysis contained in the PEIS is the most complete and best available information on transportation accidents involving anhydrous hydrofluoric acid.

Q9. Can you quantify what airborne emissions would be released for a conversion facility and the efficiency of hydrofluoric acid scrubbers without knowing the actual configuration of the facility and the scrubber technology that would be used?

A9. No, not precisely. However, a generic analysis of these types of emissions for a conversion facility was addressed in the PEIS at F-16. Due to the similarity of the different conversion processes analyzed, the PEIS notes that the level of airborne emissions are expected to vary only slightly from each other, resulting in similar radiological impacts. PEIS at F-16.

Q10. Do you agree with Dr. Makhijani's pre-filed testimony on page 14 in which he states that based on experiences at the uranium plant near Fernald, Ohio, that impacts of lower scrubber efficiency should be assessed in the impacts of the deconversion facility?

A10. No. The low scrubber efficiency example at Fernald given at page 14 of Dr. Makhijani's testimony is not appropriate for comparison to hydrofluoric acid scrubbers since the operating conditions are different. First the Fernald conditions for six of the scrubbers were for handling hot exhaust gases from the kiln and furnaces for a caustic liquid. This would present different engineering challenges than those posed by the use of hydrofluoric acid scrubbers. Secondly, the testimony does not acknowledge or address hydrofluoric acid scrubber performance from existing UF_6 to uranium oxide conversion facilities.

Q11. Do you have any other significant comments on the pre-filed testimony of Dr. Makhijani you have reviewed?

Q11. No.