UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
GE-HITACHI GLOBAL LASER ENRICHMENT LLC	)	Docket No. 70-7016-ML
	)	
	)	ASLBP No. 10-901-03-ML-BD01
(GLE Commercial Facility)	)	
	)	

NRC STAFF TESTIMONY RELATED TO TOPIC 5: NEED, ALTERNATIVES, AND ENVIRONMENTAL COST-BENEFIT ANALYSIS

Q1: Please state your name, occupation, employer, and professional qualifications.

A1: (JAD) My name is Jennifer A. Davis. I am a Senior Project Manager in the Environmental Review Branch, Environmental Protection and Performance Assessment Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs Office, U.S. Nuclear Regulatory Commission (NRC). A statement of my professional qualifications is attached.

A1: (HA) My name is Halil Avci. I am a Nuclear Materials and Waste Disposition Team Lead in the Environmental Science Division of Argonne National Laboratory (ANL). I am providing testimony under a technical assistance contract with the NRC staff. A statement of my professional qualifications is attached.

A1: (TA) My name is Tim Allison. I am an Economist in ANL's Center for Energy, Environmental and Economic Systems Analysis. I am providing testimony under a technical assistance contract with the NRC staff. A statement of my professional qualifications is attached.

Q2: Please describe your responsibilities with regard to the NRC staff's review for the proposed GE-Hitachi Laser Enrichment LLC (GLE) Facility in Wilmington, North Carolina.

A2: (JAD) I am the Project Manager for the environmental review of GLE's application for the proposed GLE Facility. I was responsible for overseeing the preparation of NUREG-1938, "Environmental Impact Statement for the Proposed GE-Hitachi Global Laser Enrichment, LLC Facility in Wilmington, North Carolina," February 2012 (FEIS) (Ex. NRC003).

A2: (HA) I served as ANL's Project Team Lead on its contract with the NRC staff to provide technical assistance for the preparation of the FEIS. In this role, I was responsible for overseeing all ANL activities supporting the NRC staff's preparation of the FEIS (Ex. NRC003).

A2: (TA) I served as ANL's Technical Lead for the Socioeconomic, Environmental Justice, and Cost-Benefit Analyses for its contract with the NRC staff to provide technical assistance for preparation of the FEIS (Ex. NRC003).

Q3: What is the purpose of your testimony?

A3: (JAD, HA, TA) The purpose of our testimony is to provide information about the NRC staff's evaluation of the need for the proposed GLE Facility, alternatives analysis, cost-benefit analysis, and recommendation regarding the proposed action in the FEIS (Ex. NRC003); and about the impact of GLE potentially compressing its construction schedule as a result of it not having commenced preconstruction activities.

<u>Purpose and Need of the Proposed Facility</u>

Q4: Please describe the purpose of the proposed GLE Facility.

A4: (JAD) As discussed in Section 1.3 of the FEIS, the proposed GLE Facility is intended to provide an additional reliable and economical domestic source of low enriched uranium (LEU) to be used in U.S. commercial nuclear power plants (Ex. NRC003, pp. 1-2 to 1-9).

Q5: Please provide a brief overview of the need for the proposed GLE Facility.

A5: (JAD) As discussed in Section 1.3 of the FEIS, the need for the proposed GLE Facility is based on (1) the need for enriched uranium to fulfill electricity generation

requirements in the United States and (2) the need for domestic supplies of enriched uranium for national energy security objectives (Ex. NRC003, p. 1-2).

Q6: Please discuss the forecasted demand for enriched uranium in the United States.

A6: (JAD) As discussed in the FEIS and the NRC staff's response to FEIS Question 4 in the Board's initial questions (Ex. NRC009), the NRC staff's analysis of the need for the proposed GLE facility considered the sources of enriched uranium compared to domestic demand for enrichment services.

The enriched uranium that would be generated by the proposed GLE Facility would be used in U.S. commercial nuclear power plants (see page 1-6 of the FEIS, Ex. NRC003). The Energy Information Administration (EIA) report, "Annual Energy Outlook 2010 with Projections to 2035," notes that U.S. commercial nuclear power plants supply approximately 20 percent of the nation's electricity requirements (Ex. NRC044, p. 43). By 2035, domestic electricity demand is projected to grow by 30 percent in the reference case (i.e., the case based on the established policies, laws, and regulations, and current trends), according to the EIA's report "Annual Energy Outlook 2011 with Projections to 2035" (Ex. NRC045, p. 73). As future demand for electricity increases, the need for enriched uranium to fuel commercial nuclear power plants is also expected to increase.

The NRC staff's analysis of the need for the proposed GLE Facility considered information found in the EIA's "Annual Energy Outlook 2010 with Projections to 2035" (Ex. NRC044). This report estimates that the nuclear power capacity in the United States will increase from 100,600 megawatts in 2008 to 112,900 megawatts by 2035 in the reference case (Ex. NRC044, p. 68). The report also estimated that nuclear generation in the United States will increase from 806 billion kilowatt hours in 2008 to 898 billion kilowatt hours in 2035 in the reference case (Ex. NRC044, p. 89).

More recent EIA reports also suggest that nuclear capacity and generation in the United States will continue to grow. The EIA's "Annual Energy Outlook 2011 with Projections to 2035"

report notes that, in the reference case, nuclear power capacity in the United States will increase from 101.0 gigawatts in 2009 to 110.5 gigawatts in 2035 and nuclear generation will increase from 799 billion kilowatt hours in 2009 to 874 billion kilowatt hours (Ex. NRC045, pp. 76 and 89). The EIA's "Annual Energy Outlook 2012 Early Release Overview" estimates that nuclear generating capacity will increase from 101 gigawatts in 2010 to a high of 115 gigawatts in 2025 and, then, will decline to 112 gigawatts in 2035 due to retirements of plants (Ex. NRC046, p. 11).

Another contributing factor considered in the NRC staff's analysis of the need for enriched uranium in the United States is the number of combined license (COL) applications for construction and operation of new commercial nuclear power plants that are actively being reviewed by the NRC and expected to be submitted to the NRC in the future. As discussed in the NRC staff's response to FEIS Question 4 in the Board's initial questions (Ex. NRC009), on February 10 and March 30, 2012, the NRC issued the first COLs to Southern Nuclear Operating Company (Ex. NRC052) and South Carolina Electric & Gas (Ex. NRC053), respectively, to build and operate new commercial nuclear power plants.

In conclusion, the following information suggests a continued, if not increased, projected domestic demand for enriched uranium: the information in Section 1.3 of the FEIS (Ex. NRC003), the NRC staff's response to FEIS Question 4 in the Board's initial questions (Ex. NRC009), the information previously discussed regarding forecasts of nuclear generation and nuclear capacity, and the number of COL applications that the NRC staff is actively reviewing and expects to be submitted in the future.

Q7: Please discuss the impact of the Fukushima Daiichi accident on the future demand for enriched uranium in the United States, and explain whether the impact of the Fukushima Daiichi accident alters the NRC staff's conclusions in the FEIS regarding the need for the proposed GLE Facility.

A7: (JAD) As discussed in the NRC staff's response to FEIS Question 4 in the Board's initial questions (Ex. NRC009), there are many uncertainties regarding the effects of the Fukushima Daiichi accident on nuclear power growth. The NRC staff recognizes that the accident has impacted global nuclear power growth; however, current information suggests that nuclear power will continue to grow globally, though potentially at a slower rate than anticipated before the Fukushima Daiichi accident.

The EIA report, "International Energy Outlook 2011," notes that electricity generation from nuclear power worldwide, in the reference case, will increase from 2.6 trillion kilowatt hours in 2008 to 4.9 trillion kilowatt hours in 2035 (Ex. NRC049, p. 4). In addition, the report projects an increase in nuclear power capacity in the United States from 101 gigawatts in 2008 to 111 gigawatts in 2035 (Ex. NRC049, p. 13). The EIA report's projections do not reflect the possible ramifications of the Fukushima Daiichi accident for the long-term global development of nuclear power or the policies that some countries have already adopted in response to the Fukushima Daiichi accident (Ex. NRC049, p. 1). However, the report notes that "although the long-term implications of the disaster at Japan's Fukushima Daiichi nuclear power plant for world nuclear power development are unknown, Germany, Switzerland, and Italy have already announced plans to phase out or cancel all their existing and future reactors (Ex. NRC049, p. 1). Those plans, and new policies that other countries may adopt in response to the disaster at the Fukushima Daiichi plant, although not reflected in the [International Energy Outlook 2011] projections, indicate that some reduction in the projection for nuclear power should be expected" (Ex. NRC049, p. 4).

As discussed in the NRC staff's response to FEIS Question 4 in the Board's initial questions (Ex. NRC009), the Fukushima Daiichi accident prompted an immediate review of the NRC's processes and regulations to determine whether the agency should make additional improvements to its regulatory system (Ex. NRC050). The NRC's Near-Term Task Force, which examined the Fukushima Daiichi accident for near-term insights, concluded that the

continued operation and licensing activities of nuclear power plants in the United States do not pose an imminent risk to public health and safety (Ex. NRC050). Further, to date, no COL applicant has withdrawn its application or sought a suspension of the NRC staff's review of its application in response to the Fukushima events.

In addition, as discussed in the NRC staff's response to FEIS Question 4 in the Board's initial questions (Ex. NRC009), the International Atomic Energy Agency (IAEA) report published in August 2011, "Energy, Electricity and Nuclear Power Estimates for the Period Up To 2050" (Ex. NRC051), which takes into consideration the effects of the Fukushima Daiichi accident, notes that the world's installed nuclear power capacity, in the low projection, is expected to grow from 367 gigawatts to 501 in 2030, down 8% from what was projected in 2010, but still showing expected growth. In the high projection in the 2011 report (Ex. NRC051), the world's installed nuclear power capacity is expected to grow to 746 GW(e) in 2030, down 7% from 2010, but again still showing expected growth. The number of operating nuclear reactors in the world is also expected to increase in both projections in this report (Ex. NRC051). Furthermore, countries such as China, India, United States, and France are maintaining nuclear power as part of their energy portfolio and/or their developmental plans.

In conclusion, based on the information discussed previously in this pre-filed testimony and in the NRC staff's response to FEIS Question 4 in the Board's initial questions (Ex. NRC009), the NRC staff continues to view the forecasted domestic demand for enriched uranium discussed in the FEIS as reasonable and still applicable in the FEIS's analysis of the need for the proposed GLE Facility. Therefore, the NRC staff finds that the Fukushima Daiichi accident does not alter the NRC staff's conclusions in the FEIS.

Q8: Please identify the sources of enriched uranium used by commercial nuclear power plants in the United States, and briefly describe the current and future availability of these sources.

A8: (JAD) In the FEIS, the NRC staff reviewed the different sources of enriched uranium currently used to meet U.S. demand based on the EIA's May 2011 "Uranium Marketing Annual Report" (Ex. NRC047). Domestic production of enriched uranium currently fulfills approximately 16 percent of U.S. demand. As discussed in the FEIS (Ex. NRC003), the Paducah Gaseous Diffusion Plant (GDP) in Paducah, Kentucky, operated by the United States Enrichment Corporation (USEC), is the primary uranium enrichment facility operating in the United States. As discussed in the NRC staff's response to FEIS Question 39 in the Board's initial questions (Ex. NRC009), USEC was evaluating whether it is economically feasible to continue operations at the Paducah GDP (Ex. NRC054). Since the NRC staff filed this response (Ex. NRC009), on May 15, 2012, the U.S. Department of Energy (DOE) announced the finalized details of a transfer of depleted uranium to Energy Northwest that will be enriched at the Paducah GDP during the next year (Ex. NRC048). This arrangement will allow operations at the Paducah GDP for another year (Ex. NRC048). There is still some uncertainty regarding whether Paducah GDP will continue to operate beyond this additional year.

Another source of enriched uranium for commercial nuclear power plants in the United States is the National Enrichment Facility (NEF) in Lea County, New Mexico, which is operated by Louisiana Energy Services, LLC (LES) and began initial operations in June 2010 (see pages 1-6 and 1-7 of the FEIS, Ex. NRC003). As discussed in the NRC staff's response to FEIS Question 5 in the Board's initial questions (Ex. NRC009), as of the beginning of April 2012, the NEF is operating 16 cascades with a capacity of approximately 1 million separative work units (SWU) per year (Exs. NRC061, NRC062, NRC063, NRC064, NRC065, NRC066, NRC067, NRC068, NRC069, NRC070). The facility is expected to reach its full NRC-licensed capacity of 3 million SWU per year by October 2013 (Ex. NRC055). In addition, LES is considering plans to expand its total capacity at NEF to 5.9 million SWU per year.

The Megatons-to-Megawatts program fulfills approximately 37 percent of U.S. demand for enriched uranium. Under this program, USEC implements the 1993 government-to-

government agreement between the United States and Russia that calls for Russia to convert 500 metric tons (550 tons) of highly enriched uranium from dismantled nuclear warheads into LEU. This program is scheduled to expire by 2013 (see page 1-7 of the FEIS, Ex. NRC003). As discussed on page 1-7 of the FEIS (Ex. NRC003), in March 2011, USEC Inc. signed an agreement with a Russian corporation, JSC "Techsnabexport" (TENEX), for LEU to be supplied to USEC from Russian commercial enrichment activities. As the NRC staff explained in response to FEIS Question 6 in the Board's initial questions (Ex. NRC009), the supply of LEU to USEC under the TENEX agreement will begin in 2013, and will increase until it reaches a level, in 2015, that includes a quantity of SWUs equal to approximately one-half the level currently supplied to USEC under the Megatons-to-Megawatts program. TENEX and USEC may mutually agree to increase the purchases and sales of SWU by certain additional optional quantities of SWU up to an amount equal to the amount USEC now purchases each year under the Megatons-to-Megawatts program (Ex. NRC054). However, both parties would need to agree to the options before USEC could begin receiving additional quantities of LEU.

Other countries that produce and export enriched uranium to the United States include China, France, Germany, the Netherlands, and the United Kingdom. These imports fulfill approximately 47% of the U.S. demand for enriched uranium (see page 1-7 of the FEIS, Ex. NRC003). As discussed in the NRC staff's response to FEIS Question 6 in the Board's initial questions (Ex. NRC009), the NRC staff has no information that would lead us to believe that the future level of these LEU imports would differ from current levels. However, the EIA notes that expansion in installed nuclear power capacity between 2008 and 2035 will predominantly occur in China, Russia, and India (Ex. NRC049, pp. 1-4 and 1-5). This expanded nuclear capacity will require enrichment services that could be supplied by the global market and, thus, could potentially affect the amount of enriched uranium imported to the United States from foreign sources.

Q9: Please discuss the impact on the need for future enrichment capability resulting from the uncertainty surrounding the construction of the American Centrifuge Plant (ACP) and Eagle Rock Enrichment Facility (EREF) gas centrifuge facilities, and explain whether this uncertainty affects the NRC staff's conclusions in the FEIS regarding the need for the proposed GLE Facility.

A9: (JAD) As discussed in the NRC staff's response to FEIS Question 5 in the Board's initial questions (Ex. NRC009), USEC will need significant additional financing to complete the ACP. USEC applied for a $2 billion loan guarantee under the DOE Loan Guarantee Program in July 2008 (Ex. NRC054). Thereafter, USEC focused its efforts on obtaining a conditional commitment so that it could move forward with commercialization of the American Centrifuge technology (Ex. NRC054). However, USEC was not able to address DOE's concerns regarding the financial and project execution to DOE's satisfaction during 2011 (Ex. NRC054). Instead of moving forward with a conditional commitment for a loan guarantee, in the fall of 2011, DOE proposed a two-year cost-share research, development, and demonstration (RD&D) program to enhance the technical and financial readiness of the centrifuge technology for commercialization (Ex. NRC054). DOE indicated that USEC's application for a DOE loan guarantee would remain pending during the RD&D program, but DOE has given USEC no assurance that a successful RD&D program will result in a loan guarantee (Ex. NRC054). USEC is working with DOE and Congress to secure DOE funding for the RD&D program (Ex. NRC054).

AREVA Enrichment Services, LLC (AES) received an NRC license for construction and operation of the EREF in Bonneville County, Idaho on October 12, 2011. On December 13, 2011, AES announced that it was putting construction of the facility on hold due to financial issues (Exs. NRC059, NRC060).

The NRC staff recognizes the uncertainty surrounding the construction of the ACP and EREF enrichment facilities, and took this uncertainty into account in the FEIS. On page 1-8 in the FEIS (Ex. NRC003), the NRC staff indicated that if the proposed GLE Facility is licensed

and the ACP, EREF, NEF, and proposed GLE enrichment facilities are operated at their maximum anticipated production limits, and the Paducah GDP is shut-down, the total projected annual domestic enrichment capacity would equal 22.3 million SWU, which would exceed the projected annual demand for domestic reactors and proposed new reactors (approximately 16 million SWU). The NRC staff explained on page 1-8 in the FEIS (Ex. NRC003) that the projected level of extra capacity (that would result under the circumstances described in the previous sentence) would provide the needed assurance (required in light of the uncertainties regarding the construction and operating schedules for the ACP and EREF) that enriched uranium would be available for commercial nuclear power plants in the United States. Therefore, this uncertainty does not affect the NRC staff's conclusion in the FEIS regarding the need for the proposed GLE Facility.

Q10: Please describe how the proposed GLE Facility will contribute to meet national energy security objectives.

A10: (JAD) As discussed on page 1-9 of the FEIS (Ex. NRC003), the proposed GLE Facility could play an important role in assuring the nation's ability to maintain a reliable and economical domestic source of enriched uranium. Approximately 84 percent of U.S. current demand for enriched uranium is fulfilled by foreign sources (from the Megatons-to-Megawatts program and the other imports discussed in response to Question 8 in this pre-filed testimony). The remaining 16 percent comes from domestic production of enriched uranium, primarily from the Paducah GDP, and to a lesser extent, from the NEF. As discussed in the FEIS (Ex. NRC003), the Megatons-to-Megawatts Program and the Paducah GDP meet about half of the current U.S. demand for LEU. However, the Megatons-to-Megawatts Program is scheduled to expire by 2013, and the operating status of the Paducah GDP beyond next year (as discussed previously in this pre-filed testimony) is uncertain. LEU supplied through USEC Inc.'s new contract with TENEX would likely meet a reduced portion of this current U.S. demand. Due to

the conditions described in this paragraph, it is anticipated that there could be a supply deficit with regard to the enriched uranium available to U.S. commercial nuclear power plants.

To help fill this anticipated supply deficit, additional potential future domestic sources of enriched uranium have emerged in recent years. The NRC has issued licenses to USEC Inc. and AES to construct and operate the ACP and EREF, respectively. As explained in response to the previous question, the NRC staff considered, in the FEIS, the impact that would result if the proposed GLE Facility is licensed and the NEF, ACP, EREF, and proposed GLE enrichment facilities are operated at their maximum anticipated production limits, and the Paducah GDP is shut-down. As previously explained (and as stated on page 1-8 in the FEIS, Ex. NRC003), the impact would be that the total projected annual domestic enrichment capacity would exceed the projected annual demand. The projected level of extra capacity (that would result under the circumstances described earlier in this paragraph) would provide a supply margin to assure the availability of enriched uranium for commercial nuclear power plants in the United States, given the uncertainties surrounding the construction and operation of the ACP and EREF facilities. In other words, the NRC staff concluded that the proposed GLE Facility is necessary to help assure that there is sufficient domestic enrichment capacity, especially in light of the uncertainties associated with the other domestic enrichment facilities, and that having the proposed GLE Facility licensed and in operation would provide an additional domestic source of enriched uranium consistent with national energy security objectives.

The NRC staff also considered statements made by DOE and the National Nuclear Security Administration that indicated that having additional domestic sources of enriched uranium is important to U.S. national energy security (see page 1-9 of the FEIS, Ex. NRC003, and the NRC staff's response to FEIS Question 7 in the Board's initial questions, Ex. NRC009). For example, in a response letter to Senator Sherrod Brown dated January 13, 2012, DOE Secretary Steven Chu stated that "I continue to believe ACP offers an innovative technology approach to uranium enrichment that offers both national security and economic benefits" (Ex.

NRC056). In response to a question from Representative John Olver during a hearing of the Energy and Water Development Subcommittee of the House Committee on Appropriations on March 6, 2012, the Under Secretary for Nuclear Security and Administrator of the National Nuclear Security Administration, Thomas D'Agostino, stated the following: "What we believe is that it's very important for the United States to maintain an indigenous U.S. capability to enrich fissile material. It's important on a number of fronts. One of the fronts, ultimately, is to provide the materials that . . . the Naval Reactors program will absolutely need in order to keep our submarines and aircraft carriers operating. Because . . . the other reason it's important is, in order . . . to have unencumbered, domestically produced, low-enriched uranium, so that I can continue to have tritium for our nuclear stockpile. But it's important on other fronts as well. Particularly, we believe that in order to . . . discourage the unnecessary spread of enrichment technology, that other countries need to have confidence in the uranium enrichment market to be able to supply its needs; and that having a domestic U.S. capability . . . is absolutely important to market stability" (Ex. NRC057).

Alternatives Analysis

Q11: What was the purpose of the alternatives analysis in the FEIS?

A11: (HA) The National Environmental Policy Act of 1969 (NEPA) and the NRC's regulations implementing NEPA (10 CFR Part 51) direct the NRC staff to evaluate the impacts from the proposed action and a reasonable range of alternatives and to compare the impacts from all the alternatives analyzed in the NRC staff's preparation of an environmental impact statement (EIS). According to the guidance provided in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (see Section 5.2 of Ex. NRC006), reasonable alternatives are those alternatives that meet the proposed objectives and applicable environmental standards and are technically feasible. The alternative of no-action is required to be included as one of the alternatives analyzed in the EIS. The analysis of the no-

action alternative provides a benchmark, enabling decision-makers to compare the magnitude of environmental impacts of the action alternatives.

In addition to informing the public and other stakeholders about the environmental impacts of alternatives, the purpose of the alternatives analysis in this FEIS was to support the NRC staff's determination regarding whether there was another alternative or alternatives that would be environmentally preferable or obviously superior to the proposed action. The concept of an alternative being "obviously superior" is discussed in NUREG-1555, "Environmental Standard Review Plan: Standard Review Plans for Environmental Reviews for Nuclear Power Plants" (see Ex. NRC072), in relation to the site selection process for nuclear reactors. NUREG-1555 (Ex. NRC072) provides a two-step process with the first step being a determination of whether any of the alternative sites would be environmentally preferable to the site proposed by the applicant. If an alternative site is determined to be environmentally preferable by the NRC staff, then the second step is applied to determine if that site is also "obviously superior." In this second step, factors other than the environmental impacts at the proposed and alternative sites are considered. The factors to be considered include facility costs for any sites identified as being environmentally preferable; institutional constraints, as they affect site availability; and any additional public concerns. The criterion for determining whether a site is obviously superior is that one or more important aspects, either alone or in combination, of a reasonably available site are obviously superior to the corresponding aspects of the applicant's proposed site, and the alternative site does not have offsetting deficiencies. An NRC staff conclusion that an alternative site is obviously superior to the applicant's proposed site could lead to a recommendation by the NRC staff that the application (that is the major Federal action being analyzed in the EIS) be denied.

Q12: What is the no-action alternative?

A12: (HA) In this case, under the no-action alternative, the NRC would not issue a license that would allow GLE to construct and operate the proposed GLE Facility at the

Wilmington Site. Consequently, under the no-action alternative, the proposed GLE Facility would not be constructed and thus not operated.

Q13: Please describe the assumptions that factored into the NRC staff's analysis of the no-action alternative in the FEIS.

A13: (HA) As discussed in Sections 2.2 and 4.4 of the FEIS (Ex. NRC003), the NRC staff assumed that under the no-action alternative, GLE would not construct the proposed GLE Facility; however, as further explained in this paragraph, the NRC staff assumed that the preconstruction activities covered by GLE's exemption request would take place at the Wilmington Site under the no-action alternative (as well as under the proposed action). As described in Section 1.4.1 of the FEIS (Ex. NRC003), on December 8, 2008, GLE submitted a request for an exemption from specific NRC requirements governing "commencement of construction" (in 10 CFR Parts 30, 40, and 70) (Ex. NRC073), and on May 8, 2009, the NRC approved GLE's request for an exemption (Ex. NRC074). This exemption allowed GLE to conduct certain preconstruction activities, including site clearing, site grading and erosion control, building of storm water retention ponds, access roadways, guard houses, utilities, parking lots, and administrative buildings not used to process, handle, or store classified information (Ex. NRC074). In response to the NRC staff's request for additional information (RAI) in November 2009 (RAI response 2-1 on page 1 of Enclosure 1 in Ex. NRC071), GLE indicated that the activities undertaken under the exemption may include all of the activities identified in the exemption request, but that the actual work to be completed and the schedule for these activities were uncertain at that time. GLE also stated that some of the activities could be up to 75 percent complete, whereas others may be only 10 percent complete, by the time the NRC decides whether or not to grant a license for the proposed GLE Facility (Ex. NRC071). Based on this information, the NRC staff assumed that all of the preconstruction activities identified in the exemption request would occur regardless of the NRC's decision to license the

proposed GLE Facility and thus would be part of the no-action alternative as well as the proposed action.

In addition, the NRC staff assumed that, under the no-action alternative, enrichment services would continue to be performed by existing domestic and foreign uranium enrichment suppliers. More specifically, the NRC staff assumed that, under the no-action alternative, the Paducah GDP and the NEF would continue to supply enrichment services, and the ACP and EREF may also provide enrichment services in the future. The impacts associated with the construction and operation of the NEF, ACP, and EREF were analyzed by the NRC staff in the EISs for each respective facility.

Q14: Please discuss the NRC staff's comparison of the proposed action and the no-action alternative in the FEIS.

A14: (HA) Table 2-3 in the FEIS (Ex. NRC003) provides a summary comparison of the environmental impacts of the proposed action and the no-action alternative. Because the NRC staff assumed in the FEIS that the preconstruction activities (identified in GLE's exemption request and previously discussed in this pre-filed testimony—see Exs. NRC073, NRC074) would occur under both the proposed action and the no-action alternative, any impacts associated with preconstruction activities are assumed to have already occurred under the proposed action and the no-action alternative. Under the proposed action, additional impacts would occur from the NRC-authorized construction, operation, and eventual decommissioning of the proposed GLE Facility; whereas, under the no-action alternative, no additional impacts would occur at the Wilmington Site. Consequently, the environmental impacts at the Wilmington Site would be greater under the proposed action than under the no-action alternative.

In the comparison of impacts between the proposed action and the no-action alternative, Table 2-3 in the FEIS (Ex. NRC003) indicates that under the proposed action, the impacts in most resource areas would be SMALL. The only resource areas in which impacts would be SMALL to MODERATE are historic and cultural resources, air quality, ecological resources,

noise, and transportation. Table 2-3 indicates that the impacts under the no-action alternative in all resource areas would be SMALL. However, Table 2-3, as well as the Executive Summary and Section 4.4 in the FEIS, should have stated that the impacts for the no-action alternative would be SMALL to MODERATE for historic and cultural resources, air quality, ecological resources, noise, and transportation (the same resource areas in which the proposed action would have a SMALL to MODERATE impact) because (1) the SMALL to MODERATE impacts in these resource areas under the proposed action would be primarily associated with the preconstruction and construction activities and (2) the NRC staff assumed that the preconstruction activities (identified in GLE's exemption request and previously discussed in this pre-filed testimony—see Exs. NRC073, NRC074) would occur under the no-action alternative, as well as under the proposed action. Therefore, the impacts under both the proposed action and the no-action alternative would be SMALL in most resource areas, and would be slightly different but still SMALL to MODERATE for historic and cultural resources, air quality, ecological resources, noise, and transportation.

As stated in the footnotes to Appendix B of 10 CFR Part 51, the NRC defines the three impact significance levels of SMALL, MODERATE, and LARGE as follows:

- SMALL—environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that those impacts that do not exceed permissible levels in the Commission's regulations are considered small.
- MODERATE—environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- LARGE—environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Therefore, a MODERATE impact in a resource area means that the environmental effects in the resource area would be sufficient to noticeably alter important attributes of the resource but not to destabilize them. Often an impact classified as MODERATE would be temporary and the resource would be able to recover after the action causing the impact is completed, or would be able to be mitigated. Because of this information about the MODERATE impacts and because, as explained in the previous paragraph, the impacts under both the proposed action and the no-action alternative would be SMALL in most resource areas and slightly different but still SMALL to MODERATE for the other resource areas, the NRC staff did not consider the differences in impacts between the proposed action and the no-action alternative to be significant. In addition, as discussed in the "Cost-Benefit Analysis" section of this pre-filed testimony, the NRC staff determined that the proposed action would better meet the purpose and need than the no-action alternative would. As a result, the NRC staff recommended, in Section 2.4 of the FEIS (Ex. NRC003), that unless safety issues mandate otherwise, the proposed license be issued (instead of the no-action alternative).

Q15: Please describe how the NRC staff's comparison of the proposed action and the no-action alternative in the FEIS would change in light of GLE not having completed any preconstruction activities at this time.

A15: (HA) If GLE does not conduct any preconstruction activities prior to the NRC's licensing decision (which seems likely because, as of the time when this pre-filed testimony was prepared, GLE had not completed any preconstruction activities), the impacts that would be associated with the no-action alternative at the Wilmington site would essentially be zero because no preconstruction activities would be completed if a license is not issued for the proposed GLE Facility (the no-action alternative). However, the preconstruction activities would still be performed if a license is issued for the proposed GLE Facility, and thus the impacts for the proposed action would be exactly as described under the proposed action in Table 2-3 in the FEIS (Ex. NRC003). Even if no preconstruction activities were to occur under the no-action

alternative, the NRC staff's recommendation regarding the proposed action in Section 2.4 of the FEIS (Ex. NRC003) would not change because of the information about MODERATE impacts discussed in response to the previous question; and because as discussed in the "Cost-Benefit Analysis" section of this pre-filed testimony, the NRC staff determined that the proposed action would better meet the purpose and need than the no-action alternative would.

Q16: Please identify and briefly discuss the other alternatives (in addition to the no-action alternative) that the NRC staff considered in the FEIS.

A16: (HA) As discussed in Section 2.3 of the FEIS (Ex. NRC003), the NRC staff considered a range of alternatives, including alternative sites outside of the Wilmington Site, alternative locations within the Wilmington Site, alternative sources of low-enriched uranium, and alternative technologies available for uranium enrichment. In terms of siting, the NRC staff reviewed the site selection process used by GLE and determined that GLE's process was rational and objective. GLE's site selection process is described in Section 2.2.3.1 of GLE's Environmental Report (Ex. GLE006) and in Section 2.3.1 of the FEIS (Ex. NRC003). Based on the NRC staff's review and assessment of GLE's site selection process, the NRC staff determined that none of the alternative sites outside of the Wilmington Site or the other potential alternative locations within the Wilmington Site would be environmentally preferable to the location selected by GLE within the Wilmington Site for the proposed GLE Facility.

As discussed in Sections 2.3.2 and 2.3.3 of the FEIS (Ex. NRC003), after considering the alternative sources of low-enriched uranium and alternative technologies for enriching the uranium, the NRC staff concluded that the only other alternative that would meet the purpose and need for the proposed GLE Facility (as described in Section 1.3 of the FEIS, Ex. NRC003) would be the use of gas centrifuge technology instead of GLE's proposed laser-based technology. The NRC staff conducted a qualitative assessment of the alternative of using gas centrifuge technology at GLE's proposed location within Wilmington Site in Section 2.3.4 of the FEIS (Ex. NRC003). Based on this qualitative assessment, the NRC staff concluded that

employing gas centrifuge technology in place of the proposed laser-based technology would not be environmentally preferable.

Q17: What did the NRC staff conclude as a result of the alternatives analysis in the FEIS?

A17: (HA) As a result of the alternatives analysis in the FEIS (Ex. NRC003), the NRC staff concluded that there were no other alternative sites or technologies that would be environmentally preferable or superior to the site and the technology proposed by GLE. In comparing the proposed action to the no-action alternative in Table 2-3 of the FEIS (Ex. NRC003), and as discussed in the answer to Question 15 in this pre-filed testimony, the NRC staff concluded that even though the environmental impacts associated with the proposed action were incrementally higher than the impacts associated with the no-action alternative, the differences were not significant. In Section 2.4 of the FEIS (Ex. NRC003), the NRC staff concluded, as a result of the alternatives analysis and the cost-benefit analysis in the FEIS, that the overall benefits of the proposed GLE Facility would outweigh the environmental disadvantages and costs associated with the proposed GLE Facility. This conclusion was based on the following considerations:

1. There is a need for an additional, economical, domestic source of enrichment services; and
2. The environmental impacts from the proposed action are generally SMALL, even though the impacts could be as high as MODERATE in the areas of historic and cultural resources, air quality, ecological resources, noise, and transportation.

Cost-Benefit Analysis

Q18: Please describe the purpose of cost-benefit analysis in general, and the NRC staff's cost-benefit analysis in the FEIS in particular.

A18: (TA) Cost-benefit analyses are undertaken to provide a rationale for deciding whether a project is likely to have a net positive impact by aggregating each of the costs and

benefits resulting from the project. The cost-benefit analysis performed for the FEIS for the proposed GLE Facility compared the estimated costs and benefits of the proposed facility, including the environmental impacts and costs associated with the construction, operation, and decommissioning of the proposed facility and the benefits resulting from the proposed facility contributing enriched uranium to meet the demand for nuclear fuel for commercial nuclear power plants, enhancing national energy security, and upgrading nuclear fuel manufacturing technology. The primary purposes of the cost-benefit analysis performed for the FEIS were to evaluate the costs and benefits of the proposed action and the no-action alternative and to compare those two evaluations to help determine which had the higher overall net benefits.

Q19: Please discuss the analytical methodologies used in a cost-benefit analysis.

A19: (TA) Under 10 CFR 51.71(d), unless excepted under 10 CFR 51.75, an EIS prepared by the NRC staff is required to consider the economic, technical, and other benefits and costs of the proposed action and alternatives, and to indicate what other interests and considerations of Federal policy, including factors not related to environmental quality, are relevant to the consideration of environmental effects of the proposed action. Section 5.7 of NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (Ex. NRC006), provides guidance for cost-benefit analyses performed by the NRC staff for an EIS for a proposed materials facility, such as the proposed GLE Facility. This guidance was used to develop the information presented in Chapter 7, entitled "Cost-Benefit Analysis," in the FEIS for the proposed GLE Facility (Ex. NRC003).

In general, cost-benefit analysis involves valuing the benefits and costs associated with a proposed action in monetary terms, where possible. Depending on the extent of the data available, cost-benefit analyses may rely partially on qualitative data to assess the various costs and benefits. Costs and benefits are often separated into two categories: private and societal. Private costs and benefits are those that impact the applicant for the proposed project, while societal costs and benefits are those that impact society as a whole.

Private costs associated with the proposed GLE Facility include costs that would be incurred by GLE during the construction, start-up, operation, depleted uranium disposal, and decommissioning phases for the proposed facility. Private benefits associated with the proposed GLE Facility include the revenue that GLE would receive from the sale of enriched uranium during the operational life of the proposed GLE Facility. All costs and benefits expressed in monetary terms (both private and societal) are adjusted for inflation to present the value of the costs and benefits for the time period with most recent data, in order to indicate the relative magnitude of costs and benefits. Cost contingencies, which incorporate uncertainties by allowing for potential escalation in costs, are included in estimates of private costs. For the proposed GLE Facility, the year with the most recent data was 2008.

Unlike private costs and benefits, not all societal costs and benefits can be quantified. Quantifiable societal costs considered in the FEIS's cost-benefit analysis included tax incentives provided by the county and State in support of the proposed GLE Facility. Non-quantifiable societal costs included land use, historic and cultural resources, visual, air quality, geology and soils, water, ecological, environmental justice, noise, transportation, public and occupational health, and waste management impacts. Non-quantifiable societal benefits included the extent to which national energy policy goals, although unrelated to the NRC's licensing decision, would be satisfied by the construction and operation of the proposed GLE Facility. Quantifiable societal benefits were the socioeconomic benefits that would be produced by the proposed facility in the region. More specifically, these benefits include direct employment and income, local property taxes, State and local sales taxes, State individual and corporate income taxes, and Federal income taxes that would be generated during the construction and operation of the proposed GLE Facility, and indirect income and employment that would be generated by spending of project-related wages and salaries, and by local vendors providing materials, equipment, and services to the proposed GLE Facility, during each phase of the proposed project.

Once all data on costs and benefits—both private and societal—have been collected, the cost-benefit analysis sums all quantifiable costs and benefits, and then considers the non-quantifiable costs and benefits together with the aggregated quantifiable costs and benefits in order to weigh the overall costs versus benefits of the proposed action. The NRC staff considered the non-quantifiable costs and benefits of the proposed GLE Facility by factoring those costs and benefits qualitatively into its analysis. As discussed in Chapters 4 and 7 of the FEIS (Ex. NRC003), the majority of the environmental impacts associated with the proposed GLE Facility were found to be SMALL. As a result, these impacts were assumed to have a minor impact on the overall societal costs. In addition, the non-quantifiable societal benefits related to meeting the national energy policy objectives were considered qualitatively in the cost-benefit analysis.

Q20: Please provide a brief description of the data used in the NRC staff's cost-benefit analysis in the FEIS.

A20: (TA) The data used in the FEIS's cost-benefit analysis included data from GLE's Environmental Report (ER) (Ex. GLE006), the non-public Appendix U to the ER (Ex. NRC117), enclosures to a January 17, 2011, letter from GLE with updated, non-public information (Exs. NRC075, NRC076), and the technical analyses in Chapters 4 and 7 of the FEIS (Ex. NRC003). Data from these sources was reviewed to the extent possible to ensure reasonableness and accuracy. In order to update the socioeconomic and environmental baseline described in the ER, additional data from various Federal, State, and local sources were also used. The socioeconomic region of influence (ROI) is defined as the area where proposed GLE Facility's workers and their families are expected to live and spend their income, thereby affecting the economic conditions of the region. The socioeconomic ROI corresponds to the Wilmington Metropolitan Statistical Area (MSA), a three-county area, comprised of Brunswick, New Hanover, and Pender Counties. This ROI was used for the assessment of socioeconomic costs and benefits. The conclusions presented in Chapter 4 and Section 7.1.1 of the FEIS (Ex.

NRC003) for each of the affected resource areas, including land use, historic and cultural resources, visual resources, air quality, geology and soils, water resources, ecological resources, environmental justice, noise, transportation, public and occupational health, and waste management, were considered. These analyses in the FEIS also used data from GLE's ER and RAI responses as the basis for their impact assessments.

Q21: Please summarize the results of the NRC staff's cost-benefit analysis in the FEIS.

A21: (TA) The NRC staff estimated that the combined quantifiable benefits (both private and societal) from all phases of the proposed GLE Facility would exceed the quantifiable costs of constructing and operating the proposed GLE Facility. Specific information about the costs and benefits (i.e., the numerical values with regard to the quantifiable costs and benefits) have not been provided in this pre-filed testimony because these values were derived from non-public, proprietary information provided by GLE (Exs. NRC117, NRC075, NRC076), and this information is included in a non-public appendix of the FEIS (Appendix H of the FEIS, Ex. NRC004).

In addition, as previously described in response to Question 19 in this pre-filed testimony, non-quantifiable costs and benefits of the proposed GLE Facility (including the impact of the proposed action on various environmental resource areas) were qualitatively factored into the analysis. As discussed in Chapters 4 and 7 of the FEIS (Ex. NRC003), the majority of the environmental impacts associated with the proposed GLE Facility were found to be SMALL. As a result, these impacts were assumed to have a minor impact on the overall societal costs. In addition, the non-quantifiable societal benefits related to meeting the national energy policy objectives were considered qualitatively in the cost-benefit analysis. After comparing the aggregated costs and benefits—both the quantifiable and non-quantifiable, as well as the private and societal—of the proposed action to the no-action alternative, the NRC staff found that the net benefits of the proposed action (constructing and operating the proposed GLE Facility) outweighed the overall costs and benefits of the no-action alternative.

Q22: Please describe the overall conclusions of the NRC staff's cost-benefit analysis in the FEIS.

A22: (TA) As explained in the previous response, the NRC staff's cost-benefit analysis in the FEIS concluded that the benefits and costs of the proposed GLE Facility would outweigh the benefits and costs of the no-action alternative. As discussed in Section 7.2.5 of the FEIS (Ex. NRC003), after considering the local and national socioeconomic benefits and the costs of construction, operation, and decommissioning of the proposed GLE Facility on a range of environmental resources, as well as on public and occupational health, the NRC staff concluded that the proposed action is preferable to the no-action alternative in the following respects:

- The proposed action would contribute to meeting future demand for domestic sources of enriched uranium and would increase national energy security. It would also introduce a newer technology that has the potential to have smaller resource requirements and environmental impacts in the United States to fulfill these needs.
- The proposed action would have positive impacts in the region of influence on employment, income, and tax revenues collected by Federal, State, and local governmental agencies during the construction, operations, and decommissioning phases (as discussed in Sections 4.2.13 and 4.2.17.12 of the FEIS, Ex. NRC003).

As discussed in Section 7.3 of the FEIS (Ex. NRC003) and in response to questions in the "Purpose and Need" section of this pre-filed testimony, both the proposed action and the no-action alternative would include the continued use of gaseous diffusion technology at Paducah GDP and gas centrifuge technology at NEF to enrich uranium, the development of new facilities based on gas centrifuge technology (ACP and EREF), and the importation of enriched uranium from foreign sources. However, in contrast to the no-action alternative, the proposed action would better satisfy the objectives of meeting future demand for enriched uranium in United States and improving national energy security because the proposed action would provide a

new and reliable domestic source for enriched uranium. Therefore, in comparison to the no-action alternative, the proposed action would be associated with net positive benefits.

Q23: Please discuss any limitations to the cost-benefit analysis conducted for the FEIS.

A23: (TA) One limitation is that certain impacts were not included as part of the FEIS's cost-benefit analysis because the effect of these impacts was assumed to be either (1) approximately equal for the proposed action and the no-action alternative or (2) too small to materially affect the comparative cost-benefit analysis. For instance, preconstruction activities were not included in the cost-benefit analysis because it was assumed in the FEIS that these activities would occur under both the proposed action and no-action alternative, and visual and scenic resource impacts were not included in the cost-benefit analysis because those impacts were assumed to be too small to materially affect the analysis. This limitation would not affect the overall conclusions in the FEIS because the impacts were approximately equal for the proposed action and no-action alternative, or were too small to materially affect the cost-benefit analysis.

In addition, as stated in Section 7.2.2 of the FEIS (Ex. NRC003), the cost-benefit analysis does not estimate the economic effects of a cheaper source of enriched uranium for nuclear power plants, or assess the impact of lower enriched uranium prices on the ratio of nuclear and non-nuclear power in the domestic economy, on overall power demand and price, or on the potential economic benefits to consumers and suppliers. Although it is likely that some adjustments in U.S. nuclear fuel manufacturing and nuclear electricity markets could occur if the proposed GLE Facility were licensed, uncertainty surrounding nuclear electricity generation, at least in the short-term, makes it difficult to predict the impact of changes in the availability and price of domestic uranium supplies.

Rationale for the NRC Staff's Recommendation Regarding the Proposed Action

Q24: Please discuss the basis for the NRC staff's recommendation regarding the proposed action in the FEIS for the proposed GLE Facility.

A24: (JAD) As discussed in Section 2.4 and Chapter 7 of the FEIS (Ex. NRC003), and in the "Purpose and Need," "Alternatives Analysis," and "Cost-Benefit Analysis" sections of this pre-filed testimony, and after weighing the impacts of the proposed action and comparing alternatives (including the no-action alternative), the NRC, in accordance with 10 CFR 51.91(d), recommended that unless safety issues mandate otherwise, the proposed license be issued to GLE. In this regard, the NRC concluded in the FEIS (Ex. NRC003) that the environmental impacts of the proposed action are generally SMALL (although they could be as high as MODERATE in the areas of historic and cultural resources, air quality, ecological resources, noise, and transportation), and that the applicable environmental monitoring program described in Chapter 6 and the proposed mitigation measures discussed in Chapter 5 of the FEIS would eliminate or substantially lessen any potential adverse environmental impacts associated with the proposed action. In other words, the NRC staff concluded that the overall benefits of the proposed GLE Facility would outweigh the environmental impacts and costs associated with the construction, operation, and decommissioning of the proposed GLE Facility. Furthermore, the NRC staff determined that the proposed action is preferable to the no-action alternative because the proposed action would better fulfill the following needs:

- the need for enriched uranium to fulfill electricity generation requirements in the United States; and
- the need for domestic supplies of enriched uranium for national energy security.

Impact of GLE Potentially Compressing its Construction Schedule due to GLE Not Having Commenced Preconstruction Activities

Q25: Please describe whether the environmental impact of construction activities will increase on an annual basis if the construction schedule for the proposed GLE Facility is compressed, and explain whether this potential impact would affect the NRC staff's conclusions in the FEIS.

A25: (HA) At this point, since GLE has not conducted any preconstruction activities, compressing the construction schedule would mean compressing the schedules for both the preconstruction activities and the NRC-authorized construction activities. The table below lists the resource areas and indicates whether the impacts in that area would increase if the construction schedule (which would include the preconstruction activities) is compressed for the proposed GLE Facility. The table indicates that in some areas, the impacts would increase, whereas in other areas, the impacts may actually decrease.

Due to resource constraints (e.g., staffing and availability of equipment), and the sequencing of activities (e.g., site clearing would have to take place before site grading), there would be a limit with regard to how much GLE could compress the construction schedule (even if chose to compress its schedule). If GLE decided to compress its schedule, as demonstrated in the table following this response, the NRC staff believes that the increases in annual impacts would not be great enough to change the impact conclusions in the FEIS. In addition, an increase in the impacts in some resource areas on an annual basis would not translate into an overall increase in impacts for that resource area. For example, the amount of waste generated in one year may increase, but the total amount of waste generated over the entire duration of preconstruction and construction would not change. Moreover, for some resource areas, any increase in impacts in a given year may actually have beneficial results. For instance, under ecological impacts, a compressed schedule would shorten the duration over which the wildlife would be disturbed. Similarly, a compressed schedule may allow reclamation and/or revegetation to occur over the entire project area sooner than planned under the original project schedule (and sooner than assessed in the FEIS). This change in timing of events would present a slight benefit to vegetation (and wildlife that are supported by the vegetative communities).

Resource Area	**Would the impacts change on an annual basis if GLE's construction schedule is compressed?**
Land Use	No
Historic and Cultural Resources	No
Visual and Scenic	No
Air Quality	Yes. More equipment and workers on site could generate more emissions and dust, which could increase the number and duration of air quality exceedances in a given year.
Geology and Soils	Yes. Under the compressed schedule, the impacts to soils could be reduced due to disturbed ground being less exposed to possible major storms (less erosion).
Surface Water Resources	Yes. Under the compressed schedule, the impacts to surface water bodies could be reduced due to disturbed ground being less exposed to possible major storms (reduced turbidity).
Groundwater Resources	No
Ecological	Yes. Small changes would occur on an annual basis—some of which would be adverse and some of which would be beneficial (as described previously in this response).
Noise	Yes. More equipment and workers on site could increase the noise impacts in a given year, but the overall duration of the noise impacts associated with the proposed GLE Facility would be shorter.
Transportation	Yes. More workers on site and more deliveries to the site could increase the transportation impacts in the vicinity of the Wilmington Site in a given year, but the overall duration of the transportation impacts associated with the proposed GLE Facility would be shorter.
Public and Occupational Health from Normal Operations	Yes. With regard to radiological impacts, if there are more workers at the site, the annual collective dose to those workers would be higher, but the individual doses and the overall collective dose during the entire preconstruction and construction period would not change (assuming the same number of worker hours would be required to get the job done). With regard to non-radiological impacts, the number of injuries due to industrial accidents could be higher in a given year, but overall the number of injuries during the entire preconstruction and construction period would not change as long as the total number of worker hours to complete the job does not change.
Waste Management	Yes. More waste could be generated in a given year, but the overall waste generation during the entire preconstruction and construction period would not change.
Socioeconomic	Yes. More workers and more spending would increase

	the socioeconomic impacts in a given year, but the overall duration of the socioeconomic impacts associated with the proposed GLE Facility would be shorter.
Environmental Justice	No
Accidents	No

Q26: Does this conclude your testimony?

A26: (JAD, HA, TA) Yes.

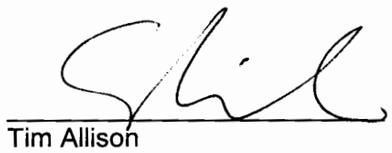
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	Docket No. 70-7016-ML
	)	
GE-HITACHI GLOBAL LASER ENRICHMENT LLC	)	ASLBP No. 10-901-03-ML-BD01
	)	
	)	June 18, 2012
(GLE Commercial Facility)	)	

AFFIDAVIT OF TIM ALLISON

I, Tim Allison, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications are true and correct to the best of my knowledge and belief.



Tim Allison

Executed at Lemont, Illinois
this 18th day of June, 2012

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	Docket No. 70-7016-ML
GE-HITACHI GLOBAL LASER ENRICHMENT LLC	)	ASLBP No. 10-901-03-ML-BD01
(GLE Commercial Facility)	)	June 18, 2012

AFFIDAVIT OF HALIL AVCI

I, Halil Avci, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications are true and correct to the best of my knowledge and belief.

Halil Avci

Executed at Lemont, Illinois
this 18th day of June, 2012

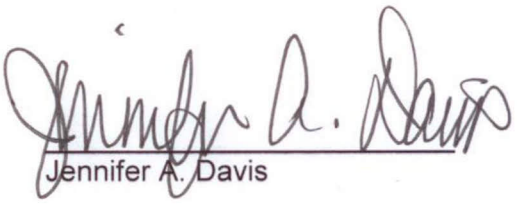
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	Docket No. 70-7016-ML
	)	
GE-HITACHI GLOBAL LASER ENRICHMENT LLC	)	ASLBP No. 10-901-03-ML-BD01
	)	
	)	June 18, 2012
(GLE Commercial Facility)	)	

AFFIDAVIT OF JENNIFER A. DAVIS

I, Jennifer A. Davis, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications are true and correct to the best of my knowledge and belief.



Jennifer A. Davis

Executed at Rockville, Maryland
this 18th day of June, 2012

Tim Allison
Statement of Professional Qualifications

CURRENT POSITION

Economist
Decision and Information Sciences Division
Argonne National Laboratory
Argonne, Illinois

EDUCATION

M.S., Mineral and Energy Resource Economics, West Virginia University
M.A., Geography, West Virginia University
B.S., Economics and Geography, University of Portsmouth, UK

PROFESSIONAL

Association of American Geographers

QUALIFICATIONS

Mr. Allison is an economist with over 21 years of work experience at Argonne National Laboratory. He has been working in the areas of local and regional economic development impacts, with specific regard to nuclear fuel plant licensing and reactor licensing. He received a Bachelor's degree in Economics and Geography from Portsmouth University, UK, and Master's degrees from West Virginia University specializing in local and regional economic development impacts of energy and nuclear waste policy. His expert areas include input-output and economic base modeling, statistical analysis, fiscal analysis and the analysis of social and health impacts of energy and waste programs as they relate to low-income and minority populations.

Mr. Allison has written over 50 technical reports, published 10 papers in high-rated, peer-reviewed journals mostly as a senior author, and made over 30 presentations to professional conferences and workshops.

Halil Avci
Statement of Professional Qualifications

CURRENT POSITION

Team Lead
Nuclear Materials and Waste Disposition Team
Environmental Science Division
Argonne National Laboratory
Argonne, Illinois

EDUCATION

Ph.D., Nuclear Engineering, University of Wisconsin, Madison
M.S., Nuclear Engineering, University of Wisconsin, Madison
B.S., Nuclear Engineering, University of Wisconsin, Madison

PROFESSIONAL

American Nuclear Society, Member
Health Physics Society, Member
Chicago Council on Science and Technology, Member

QUALIFICATIONS

Dr. Avci is a nuclear engineer with over 33 years of experience in energy and environmental fields, including the environmental effects of energy production and use, nuclear energy, nuclear reactor licensing and license renewals, waste management, radiation effects, risk assessment, and accident analysis. He has managed and mentored a diverse group of technical staff for over 18 years, managed large programs and individual projects, and served as a technical analyst or task leader as part of project teams. Dr. Avci has also taught at the College level for about 10 years.

As a section manager or a team lead since 1993, Dr. Avci's responsibilities have included recruitment, development, performance evaluation, and advancement of a diverse group of scientists and engineers with varying cultural and technical backgrounds, including health physicists, nuclear engineers, environmental engineers, environmental toxicologists, chemical risk assessors, and computational scientists. As manager of Argonne's Technical Assistance Program to the U.S. Nuclear Regulatory Commission (NRC) for licensing of new reactors (since April 2010) and license renewal of operating reactors (Since 2006), he manages over 30 task orders. The technical work performed by Argonne staff under this program involves both environmental and safety aspects of reactor siting, construction and operation and is spread over three Divisions. Dr. Avci has also directed the technical support work provided by Argonne to the U.S. Department Energy's (DOE) Depleted Uranium Hexafluoride Management Program since 1999. Under this program, Argonne prepared one programmatic and two site-specific environmental impact statements, and provided other technical and logistical support to DOE.

Dr. Avci has also served as a project manager, team lead, or a technical analyst on a number of projects since joining Argonne in 1990. The major projects include GE-Hitachi Global Laser Enrichment Facility Environmental Impact Statement (EIS) (project team lead and project manager), Victoria County Station Early Site Permit EIS (co-team lead and project manager), Nuclear Reactor License Renewal Environmental Reviews (served as the subject matter expert for health physics on license renewal teams for four license renewal applications, and served as the Deputy Project Manager and a Tech Lead for waste management and uranium fuel cycle analysis on the Generic EIS (GEIS) for License Renewal of Nuclear Plants Update project), Depleted Uranium Hexafluoride Management Program Programmatic EIS (PEIS) and Site-Specific EISs (served as the project team lead for the preparation of a programmatic EIS for analyzing the alternative strategies for the long-term management and use of DOE's inventory of depleted uranium hexafluoride (DUF_6) and two site site-specific EISs for the construction and operation of DUF_6 conversion facilities at the Paducah, KY, and Portsmouth, Ohio sites), Mixed Oxide Fuel Fabrication Facility EIS (served as the assistant project manager and a technical team member, and later as the project manager after the previous project manager retired), Draft Waste Management Programmatic EIS (served as the technical director responsible for the oversight and coordination of Argonne's technical work in support of the draft PEIS; this work involved characterization of wastes and assessment of the facilities used to treat, store, and dispose DOE's inventory of radioactive, mixed, and hazardous wastes), and New Production Reactor EIS (served as the Tech Lead for radiological impacts analysis from normal operations and postulated accidents in the proposed New Production Reactors and associated support facilities).

Prior to joining Argonne, Dr. Avci worked for about 10 years for Battelle Memorial Institute, where his principal responsibilities included postclosure performance assessment of the then proposed second geologic repository in the U.S. for the disposal of spent fuel and high-level waste, and developing computer models designed to predict the consequences of nuclear reactor accidents. Dr. Avci has also been teaching at Northwestern University's School of Continuing Studies as an adjunct faculty member since 2003, and taught full time for two years in the early 1980s at the Bogazici University in Istanbul Turkey.

Dr. Avci is the author or co-author of 50+ journal papers, reports, conference publications, and presentations.

Jennifer Davis
Statement of Professional Qualifications

CURRENT POSITION

Senior Project Manager
Environmental Review Branch
Environmental Protection and Performance Assessment Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Washington, D.C.

EDUCATION

B.A., Historic Preservation/Classical Civilization, Mary Washington College

PROFESSIONAL

Duke University Environmental Leadership Courses: The Law of NEPA, Accounting for Cumulative Effects
The Shipley Group: Cultural and Natural Resource Management
National Preservation Institute: Integrating Cultural Resources in NEPA Compliance: Environmental Assessment, Cultural Resource Management and Historic Preservation Responsibilities and their Implementation Through the NEPA Process
SWCA Environmental Consultants: Issues in Section 106: Advanced
Advisory Council on Historic Preservation: The Section 106 Essentials, Section 106 – An Advanced Seminar

QUALIFICATIONS

Ms. Davis has 10 years of experience managing and participating in major, multidisciplinary environmental projects for U.S. Nuclear Regulatory Commission (NRC) within the Offices of Nuclear Reactor Regulation (NRR) and the Office of Federal and State Materials and Environmental Management Programs (FSME). This experience includes National Environmental Policy Act (NEPA) reviews and preparation of environmental impact statements (EISs). She also supports environmental reviews managed by other NRC staff, reviews NEPA documents prepared by others, analyzes and determines NEPA documentation requirements for nuclear materials facilities, and contributes to the development of guidance associated with the preparation of NRC NEPA documents. Ms. Davis also serves as a technical reviewer for field of historic and cultural resources and National Historic Preservation Act (NHPA) Section 106 compliance and has provided technical support to other program offices.

As a Senior Project Manager at the NRC, Ms. Davis has planned, led, and participated in major, complex multidisciplinary environmental reviews and development of EISs for licensing of nuclear facilities under NRC regulations in Title 10 of the *U.S. Code of Federal Regulations* (10 CFR) Parts 40, 70, 51, and 54. She serves as the EIS project manager for the proposed

General Electric-Hitachi Global Laser uranium enrichment facility near Wilmington, North Carolina. During this review, Ms. Davis also provided technical support in finalizing the first three in-situ recovery supplemental EISs and assisted project managers in Section 106 compliance.

Prior to joining FSME, Ms Davis served both as an environmental scientist and project manager in the Division of License Renewal (DLR) within NRR. Ms. Davis has served in a leadership role on a number of significant projects including the update to *Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants* (NUREG-1437, Volumes 1 and 2) and supported the associated rulemaking, lead project manager for Monticello LR application (NUREG-1437, Supplement 26); provided technical oversight/support for 25 license renewal reviews; support and authored historic and archaeological resource sections for Susquehanna, Beaver Valley, Three Mile Island, Prairie Island, Kewaunee, Cooper, and Prairie Island supplemental EISs to NUREG-1437; developed NRC's Section 106 through NEPA approach used in both NRR and NRO licensing reviews, and provided technical support to other license renewal, early site permit, and combined operating license reviews.

Prior to serving as an environmental scientist and project manager in DLR, Ms. Davis was a general scientist who supported environmental project managers in the assessment of environmental impacts associated with nuclear power plant operations and the preparation of EISs for license renewal and early site permit applications. This support included preparation of correspondence to external stakeholders; preparation of management briefing and public presentation materials; participation in environmental site audits, public meetings, and EIS writing sessions; and the review of technical assessments for EISs. Ms. Davis assisted in the preparation of environmental assessments for license amendments and exemptions for nuclear power plants. She assisted in the preparation and review of standards, guidelines, procedures, and requirements for assessing the impact of nuclear power plants on the environment. Ms. Davis also attended and participated in technical conferences and seminars sponsored by the NRC and/or professional societies, for the purpose of emphasizing the safety and environmental impact of nuclear power plants while serving as a technical expert in the field of archaeology.

Prior to joining the NRC, Ms. Davis worked for Old Dominion University Research Foundation and served as their payroll coordinator. She also served as a field archaeologist for Louis Berger and Associates in 1996.