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UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

NRC115

GE-Hitachi Global Laser Enrichment LLC Facility Mandatory Hearing

July 11-13, 2012

**NRC Staff Presentation Topic 5:
Need, Alternatives, and Environmental
Cost-Benefit Analysis**



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Topic 5(a)

Presenter:

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Purpose and Need of the Proposed Facility

- The proposed action is for GLE to construct and operate, and eventually, decommission a commercial laser-based enrichment facility near Wilmington, North Carolina.
- The need for the proposed facility is based on:
 - the need for enriched uranium to fulfill electricity generation requirements in the U.S.
 - the need for domestic supplies of enriched uranium for national energy security objectives
- U.S. commercial nuclear power plants supply approximately 20% of the nation's electricity requirements.
- Domestic electricity demand is projected to continue to grow

Demand for Enriched Uranium

- Nuclear generating capacity is expected to increase in the U.S.
- Number of newly-licensed nuclear power plants in the U.S. was also considered in the analysis.
- The Energy Information Administration (EIA) forecasts of nuclear generating capacity, combined with applications from the industry for construction and operation of new plants, suggest a continuing demand for enriched uranium.

Current Supply of Enriched Uranium

- Domestic production currently fulfills ~ 16% of U.S. demand
 - Primarily from USEC's Paducah Gaseous Diffusion Plant
 - National Enrichment Facility (NEF) in Lea County, NM
- Foreign sources fulfill ~ 84% of U.S. current demand
 - Megatons-to-Megawatts Program fulfills ~ 37% of U.S. demand
 - Other foreign sources fulfill ~ 47% of U.S. demand

Need for Future Enrichment Capability

- Potential impacts of the Fukushima Daiichi accident
 - Current information suggests that nuclear power will continue to grow, though at a slower rate than anticipated before the accident.
- Energy Information Administration projections do not reflect the possible ramifications of the Fukushima Daiichi accident
 - However, the EIA acknowledges some reduction in the projection for nuclear power growth
- International Atomic Energy Agency Report (Ex. NRC051)
 - Takes into consideration the effects of the accident
 - World's installed nuclear power capacity still shows growth

Need for Future Enrichment Capability

- Uncertainty surrounding construction of enrichment facilities taken into account in the FEIS (Ex. NRC003)
 - USEC's American Centrifuge Plant
 - AES's Eagle Rock Enrichment Facility
- Operation of NEF, ACP, EREF, and the proposed facility, and the Paducah Gaseous Diffusion Plant is shut down
 - Enrichment capacity ~ 22.3 million SWU/year
- Projected U.S. annual demand ~ 16 million SWU
- Needed assurance that enriched uranium would be reliably available for domestic nuclear power production



Topic 5(b)

Presenter:

Halil Avci

Team Leader

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Basis of Alternatives Analysis

- Alternatives Analysis is required by the National Environmental Policy Act (NEPA) and the NRC's regulations implementing NEPA (10 CFR Part 51)
- No-action alternative, which is required to be analyzed by NEPA and 10 CFR Part 51, serves as the baseline for comparing the magnitude of environmental impacts of the action alternatives

No-Action Alternative

- Assumptions
 - An NRC license is not granted
 - The proposed GLE Facility is not built
 - Preconstruction activities occur
 - E.g., site clearing, site grading and erosion control, stormwater retention ponds, access roadways and guardhouses, utilities, parking lots, and certain administrative buildings
 - Uranium enrichment services continue to be performed by existing domestic and foreign suppliers

Comparison of Proposed Action and No-Action Alternative

- Preconstruction activities are assumed to occur under both the proposed action and the no-action alternative.
- Under the proposed action, the impacts in most resource areas would be SMALL.
 - SMALL to MODERATE – historic and cultural resources, air quality, ecological resources, noise, and transportation impacts
 - MODERATE impacts – primarily associated with the preconstruction and construction activities

Comparison of the Proposed Action and the No-Action Alternative

- Under the no-action alternative, the impacts in most resource areas would also be SMALL.
 - Historic and cultural resources, air quality, ecological resources, noise, and transportation impacts would be somewhat less but still SMALL to MODERATE under the no-action alternative.
 - The FEIS (Ex. NRC003) incorrectly stated that all impacts under the no-action alternative were SMALL.
- Effect of GLE having completed no preconstruction activities
 - No change in the NRC staff's recommendation regarding the proposed action in the FEIS (Ex. NRC003).

Alternatives Considered but not Analyzed in Detail

- Sites outside of the Wilmington Site
- Other locations within the Wilmington Site
- Alternative sources of low-enriched uranium
- Alternative technologies for uranium enrichment

NRC Staff Conclusions

- No other alternative sites or technologies 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, even though the environmental impacts associated with the proposed action are incrementally higher than the impacts associated with the no-action alternative, the differences are not significant
- Based on the results of the alternatives analysis and the cost-benefit analysis, the NRC staff concluded that the overall benefits of the proposed GLE Facility outweigh the environmental disadvantages and costs



Topic 5(c)

Presenter:

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Purpose of Cost-Benefit Analysis

- Provides a framework for assessing the likelihood of a net positive benefit from a project
- The cost-benefit analysis performed for the FEIS (Ex. NRC003) had two purposes:
 - To evaluate the costs and benefits of the proposed action and the no-action alternatives, and
 - To compare those two evaluations to help determine the alternative with the higher overall net benefits

Analytical Methodology

- Quantify private costs associated with each stage of the proposed facility
 - Construction, start-up, operations, decommissioning
 - Adjust for inflation, include contingencies
- Quantify private benefits
 - Revenue that GLE would receive from the sale of enriched uranium during the operational life of the proposed facility
- Identify (non-quantifiable) societal costs
 - Impacts on land use, historical and cultural resources, visual resources, air quality, geology and soils, water resources, ecological resources, noise, transportation, public and occupational health, waste management

Analytical Methodology

- Quantify societal costs
 - Local and State tax incentives
- Assess quantifiable societal benefits in the region of influence
 - Direct employment and income, local property taxes, State and local sales taxes, State individual and corporate income taxes, and Federal income taxes
 - 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

Analytical Methodology

- Identify non-quantifiable societal benefits
 - The extent to which the proposed GLE Facility would satisfy national energy policy goals
- Sum all quantifiable costs and benefits
- Weigh overall costs versus benefits of the proposed action
 - Non-quantifiable costs and benefits are considered qualitatively together with aggregated quantifiable costs and benefits

Summary of Results

- Quantifiable benefits associated with construction and operation of the proposed GLE Facility would exceed quantifiable costs, outweighing the overall benefits of the no-action alternative
- Non-quantifiable societal costs were factored into the analysis qualitatively, but found to be small
- Non-quantifiable societal benefits related to meeting the national energy policy objectives were also considered qualitatively in the analysis

Limitations of the Analysis

- Certain impacts were not included in the cost-benefit analysis
 - Impacts that were assumed to be approximately equal for the proposed action and the no-action alternative
 - Impacts that were assumed to be too small to materially affect the results of the analysis
- Short-term uncertainty surrounding nuclear electricity generation meant that the economic effects of additional domestic supplies of enriched uranium were not estimated, including:
 - The impact on the share of nuclear power generation in the domestic electricity market
 - The impact on overall electricity demand and prices



Topic 5(d)

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NRC Staff's Recommendation Regarding the Proposed Action

- The NRC staff considered impacts from preconstruction, construction, operations, and decommissioning.
- The applicable environmental monitoring program and the proposed mitigation measures would eliminate or substantially lessen any potential adverse impacts.
- Even though the environmental impacts associated with the proposed action are incrementally higher than the impacts associated with the no-action alternative, the differences are not significant.
- The NRC staff determined that the proposed action is preferable to the no-action alternative because the proposed action would better fulfill the purpose and need.

NRC Staff's Recommendation

- The NRC staff concluded that the overall benefits of the proposed GLE Facility would outweigh the environmental impacts and costs associated with the proposed facility
- In accordance with 10 CFR 51.91(d), the NRC staff recommended that:
 - Unless safety issues mandate otherwise, the proposed license be issued to GLE



Second Part of Topic 5(e)

Presenter:

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Would the Impacts Change on an Annual Basis if GLE's Construction Schedule is Compressed?

- Impacts in some resource areas (e.g., air quality, ecology, noise, transportation, public and occupational health, waste management, and socioeconomics) would increase on an annual basis.
- Impacts in some resource areas (e.g., geology and soils, and surface water) may decrease on an annual basis.
- Impacts in other areas (e.g., land use, historic and cultural resources, environmental justice, and accidents) would not change.
- Overall, the impacts conclusions in the FEIS (Ex. NRC003) would not change.



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