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# **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:

Jennifer Davis

Senior Project Manager

Office of Federal and State Materials  
and Environmental Management Programs

Division of Waste Management and  
Environmental Protection



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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

Nuclear Materials and Waste Disposition Team

Environmental Science Division

Argonne National Laboratory

# 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:

Tim Allison

Economist

Center for Energy, Environmental  
and Economic Systems Analysis  
Argonne National Laboratory

# 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)

Presenter:

Jennifer Davis

Senior Project Manager

Office of Federal and State Materials  
and Environmental Management Programs

Division of Waste Management and

Environmental Protection

# **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:

Halil Avci

Team Leader

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

## **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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