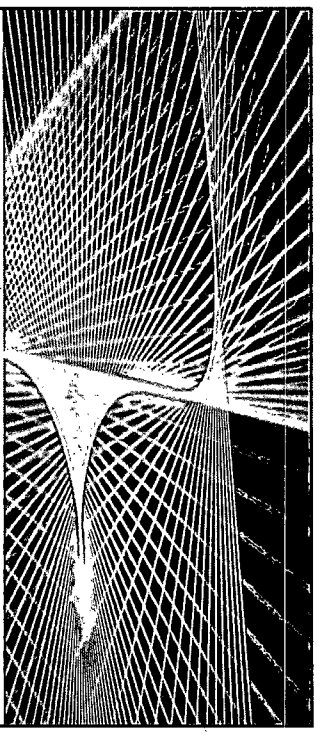
GE Hitachi
Global Laser Enrichment

Commercial Facility
Licensing



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Presentation to the U.S. Nuclear Regulatory Commission
June 16, 2008

Global Laser Enrichment (GLE) Commercial Facility

- **Project Update**
- **Environmental Report (ER)**

GLE Commercial Facility Project Update

Recent Accomplishments

- Announced Site Selection
- Submitted "White Papers" to NRC
- Completed Environmental Report 100% Draft
- Submitted E Plan for Off-Site Review

Up-coming Milestones

- Submit GLE Commercial Quality Assurance Plan

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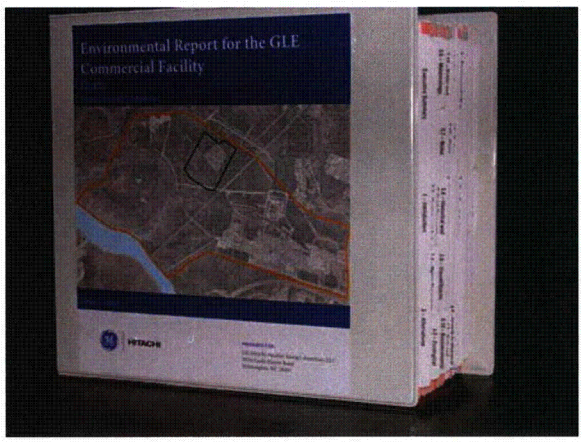

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GLE Draft ER - Introduction

Format of the report

Purpose and Need, Alternatives

Impacts from GLE

Monitoring Program

Cost Benefit

Questions

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GLE Draft ER - Format

Followed guidance in NUREG-1748

10 chapters – align with section 6 in 1748

Application to include a matrix to link the sections of the guidance with the applicable draft ER sections

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Guidance Section	Report Section	Section Title	NUREG-1748 Criteria	How does report meet criteria (subsection, table, and/or figure numbers)
6.2.1	2.1	Description of the Alternatives		Section 2.1 (introductory text)
6.2.1.1	2.1.1	No-Action Alternative	Description of the no-action alternative	Section 2.1.1 (first paragraph with supporting bullets)
6.2.1.1	2.1.1	No-Action Alternative	Summary of the major impacts should the no-action alternative be chosen	Section 2.1.1 (last paragraph); Tables 2.1-1 and 2.4-1
6.2.1.2	2.1.2.1	Proposed Action	Detailed description of the proposed action, the general project progression and pre-operational, operational, and post-operations activities, as appropriate	Sections 2.1.2.1 and 2.1.2.4.2; Figures 1-3 and ES-2
6.2.1.2	2.1.2.1	Proposed Action	Full names of all organizations sharing ownership of the proposed action	Section 2.1.2; reference to Chapter 2 of the License Application,Organization and Administration
6.2.1.2	2.1.2.2	Proposed Action	The major impacts from performing the proposed action	Section 2.1.2.2; reference to Chapter 4 and Tables 2.1-1 and 2.4-1 (see also Chapter 8)
6.2.1.2	2.1.2.3	Proposed Action	Measures used to mitigate impacts	Section 2.1.2.3; reference to Chapter 5
6.2.1.2	2.1.2.3	Proposed Action	Restoration actions	Section 2.1.2.3; reference to Chapter 5
6.2.1.2	2.1.2.3	Proposed Action	Proposed monitoring	Section 2.1.2.3; reference to Chapter 6, Tables 6-1 and 6-2, and Figures 6-1, 6-2, and 6-3
6.2.1.2	2.1.2.4	Proposed Action	Site location, including distance and direction from the nearest major city, nearby towns, nearby inhabitants, and landmarks, including highways, rivers, or other bodies of water	Existing Operations Section 2.1.2.4.1, Figures ES-1, 1-1, 1-2, and 3.4-19; Proposed Operations Section 2.1.2.4.2, Figures ES-1, 1-1, and 1-3
6.2.1.2	2.1.2.4	Proposed Action	Facility latitude and longitude coordinates	Section 2.1.2.4.1
6.2.1.2	2.1.2.4	Proposed Action	Areal extent of the site and facility layout	Existing Operations Section 2.1.2.4.1; Figures ES-1, 1-2, 3.4-19, and 3.12-1
6.2.1.2	2.1.2.4	Proposed Action	Sufficiently detailed map showing highways and railroad lines that cross the site	Existing Operations Section 2.1.2.4.1; Figures ES-1 and 1-1
6.2.1.2	2.1.2.4	Proposed Action	Aerial view or perspective drawing of the site with an indication of the facility boundary (in at least one drawing the facility site boundary should occupy about 10 percent of the view)	Existing Operations Section 2.1.2.4.1; Figures ES-1 and 1-2
6.2.1.2	2.1.2.4	Proposed Action	Layout of facilities and other features within the site boundary with the same scale as those provided for Section 6.4, Environmental Impacts	Existing Operations Section 2.1.2.4.1; Figures 1-2, 3.4-19, and 3.12-1
6.2.1.2	2.1.2.4	Proposed Action	List of buildings or areas used for chemical storage, waste management, vehicle cleaning, administration, operations and maintenance, generating electricity, health and security, parking, etc.	Proposed Operations Section 2.1.2.4.2; Figure ES-2

Table of Contents

1 – introduction

2 – alternatives

3 – description of existing environment

4 – impacts to environment

5 – mitigation measures

6 – environmental measurements and monitoring

7 – cost benefit

8 – summary of impacts

9 – references

10 – list of preparers

GLE ER - Definitions

In accordance with NUREG 1748, impacts are;

- SMALL: the environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE: the environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- LARGE: the environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

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Chapter 1 – Introduction

Background

Purpose and Need

Description of Proposed Action

Applicable Regulatory Requirements, Permits, and Required Consultations

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Background

2006- GE signed an agreement with SILEX Systems Limited to license the technology and develop the company's next-generation low-enriched uranium-manufacturing process

2007- Global Nuclear Fuels – America (GNF-A) filed an application with the NRC to amend its Special Nuclear Material license to authorize operation of a laboratory-scale test loop laser enrichment process research and development (approved May 2008)

2008- Wilmington selected as preferred site for enrichment facility

Silex = Separation of Isotopes by Laser Excitation

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Purpose and Need

The Proposed Action is intended to satisfy the need for additional reliable and economical domestic sources of enriched uranium supply

- nuclear electrical-generation requirements
- domestic uranium-enrichment capacity for national energy security
- advanced uranium-enrichment technology in the United States

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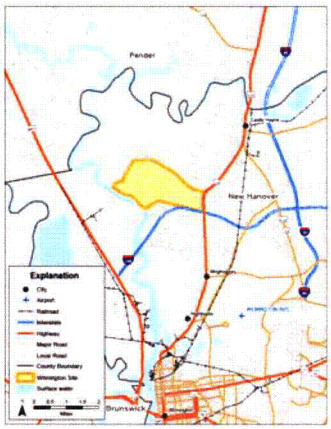

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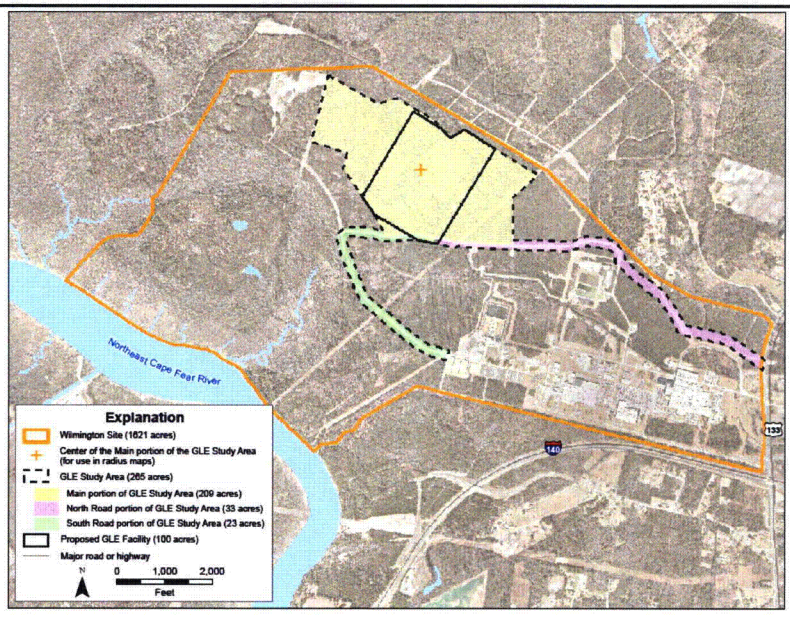

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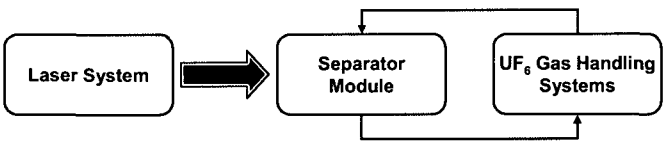
GLE Laser Enrichment System



Regulatory Requirements, Permits, and Consultations

U.S. NRC

- Standards for Protection Against Radiation (Part 20)
- Rule of General Applicability to Domestic Licensing of Byproduct Material (Part 30)
- Domestic Licensing of Source Material (Part 40)
- Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions (Part 51)
- Domestic Licensing of Special Nuclear Material (Part 70)
- Packaging and Transportation of Radioactive Material (Part 71)
- Physical Protection of Plants and Materials (Part 73)
- Material Control and Accounting of Special Nuclear Material (Part 74)
- Facility Security Clearance and Safeguarding of National Security Information and Restricted Data (Part 95)

Regulatory Requirements, Permits, and Consultations

U.S. Environmental Protection Agency (EPA)

- Environmental Standards for the Uranium Fuel Cycle (40 CFR 190 Subpart B)
- Clean Water Act (CWA)
- Clean Air Act (CAA)
- Safe Drinking Water Act (SDWA)
- Resource Conservation and Recovery Act (RCRA)
- Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 (40 CFR 350 to 372)
- Noise Control Act of 1972

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Regulatory Requirements, Permits, and Consultations

U.S. Department of Transportation

Advisory Council on Historic Preservation

U.S. Army Corps of Engineers

U.S. Department of Labor (OSHA)

U.S. Department of Interior

- Endangered Species Act
- Land Policy and Management Act
- Bureau of Indian Affairs

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Regulatory Requirements, Permits, and Consultations

North Carolina Department of Environment and Natural Resources

- Division of Air Quality (NC DAQ)
- Division of Water Quality (NC DWQ)
- Division of Water Resources (NC DWR)
- Division of Environmental Health, Public Water Supply Section (NC DEH, PWSS)
- Division of Waste Management (NC DWM)
- North Carolina Radioactive Materials Branch
- Division of Coastal Management (NC DCM)
- Division of Land Resources
- North Carolina Wildlife Resource Commission
- Division of Parks and Recreation, Natural Heritage Program
- Division of Forest Resources (NC DFR)

North Carolina Department of Cultural Resources

North Carolina Department of Transportation (NC DOT)

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Chapter 2 -Alternatives

Alternatives Considered but Eliminated

- Site Alternatives
- Technology Alternatives
- Facility Design Alternatives
- Specific location on the Wilmington site

Description of Alternatives (impacts evaluated in later chapters)

- Proposed Action
- No Action

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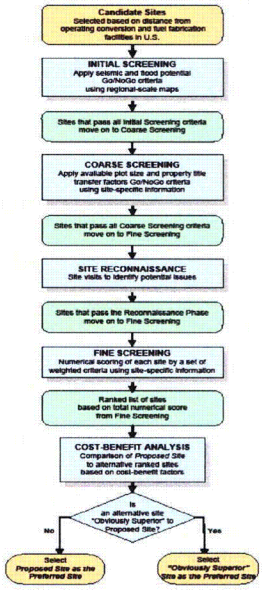

Figure 2.2-1. Site selection methodology.

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Cumulative Effects

Summarized in chapter 2

- Effects across lifecycle of phases
- Effects across resources
- Effects from other facilities/activities (on and off site)

Each impact section contains cumulative effects analysis

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Chapter 3 – Description of Existing Environment

Land Use

Transportation

Geology and Soils

Climatology, Meteorology, and Air Quality

Ecology

Water Resources

Noise

Visual/Scenic Resources

Historic and Cultural Resources

Socioeconomics

Public and Occupational Health

Waste Management

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Chapter 4 – Impacts to the Environment

Land Use

Transportation

Geology and Soils

Climatology, Meteorology, and Air Quality

Ecology

Water Resources

Environmental Justice

Noise

Visual/Scenic Resources

Historic and Cultural Resources

Socioeconomics

Public and Occupational Health

Waste Management

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Land Use - Regional

Wilmington Metropolitan Statistical Area was studied (New Hanover, Pender, Brunswick counties)

Population growth rate in 3 counties exceed the state as a whole (continue to increase)

New Hanover – mixed use land

Pender – mostly undeveloped

Brunswick – mostly undeveloped

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Land Use – Site Vicinity

Bordered by forest used for timber management and hunting

Bordered by I-140 and Northeast Cape Fear River

Nearest towns are Castle Hayne and Wrightsboro (~2 miles)

Foreseeable future development – no impacts

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Land Use – Wilmington Site

- Wilmington site zoned for heavy industrial use
- Site absent of any special land use classifications
- Proposed action is consistent with other land use on the site
- SMALL impacts overall (regional, local, onsite)

Transportation - Traffic

- Analysis included traffic study for Wilmington Metropolitan Statistical Area (MSA)
- Transport of workers and materials to/from site is by car or truck
- Located near Interstate 40, adjacent to Interstate 140
- Castle Hayne Road (NC 133) provides site access
- Impacts in vicinity of Castle Hayne Road determined to be MODERATE
- Local, regional, national impacts are SMALL

Transportation – Radioactive Material

Analysis included risk from radioactive material transport by truck (approved shipping containers)

Similar material is currently shipped to/from Wilmington site

Modeled dose to public/drivers using RADTRAN

Reference NUREG-0170 for radioactive material transportation accidents

Impacts are SMALL (consistent with other fuel cycle facilities)

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Geology and Soils

Evaluated regional and site-specific geology

Analyzed seismic information

Reviewed potential geologic or other natural hazards

Conducted geotechnical investigation in GLE Study Area

Described properties of the soils at the site

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Geology and Soils

Concluded SMALL impacts resulting from soil disturbance (e.g., erosion and runoff)

Potential for a seismic event to induce an impact on the facility is SMALL

Other geologic or natural hazards considered and not evaluated as potential hazards or impacts (e.g., volcanic activity, landslides, or radon gas).

Subsurface conditions in GLE Study Area acceptable for construction

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Water Resources

Groundwater

Surface water

Floodplains

Wetlands

Water Use

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Groundwater

GLE facility – design and operate to prevent groundwater contamination

- No burial grounds, underground tanks
- Limit liquid use and waste generation
- Avoid floor penetrations
- Multiple samples prior to pumping process waste to GNF
- Spill control measures

Robust environmental monitoring program

- Expand site monitoring program (comprehensive)
- GLE perimeter groundwater monitors in direction of flow

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Groundwater (cont.)

Hydrogeologic conditions of the site well characterized

Groundwater impacts from past operations well understood

Currently monitor 88 wells for specific constituents (NC DWQ, NRC)

Corrective Action Plans implemented, ongoing, and effective (active remediation and natural attenuation)

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Surface Water

Field surveys – streams, wetlands, other surface waters

Process effluents discharged to existing industrial effluent channel – NPDES permit

Sanitary effluents – treated and reused as process water for GNF

Storm water – drained to effluent channel – NPDES permit

Construction Best Management Practices to minimize soil runoff

Impacts determined to be SMALL

NPDES = National Pollutant Discharge Elimination System

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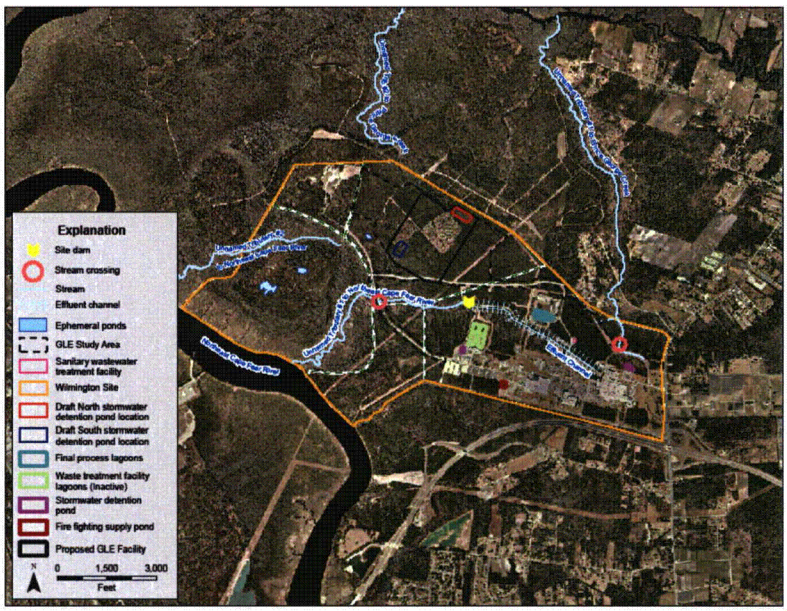

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Floodplains

Floodplains are located on the site, not within the GLE study area

Hydrologic modeling determined effect of topographic changes and storm water runoff from GLE on floodplains

Concluded impacts are SMALL

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Wetlands

No wetlands identified within the main study area

3 jurisdictional, 2 isolated wetlands identified on proposed roads

Consultation/permit process started with Corps of Engineers and NC Division of Water Quality (404 and 401)

Will limit impacts to small areas, provide mitigation

Impacts determined to be SMALL

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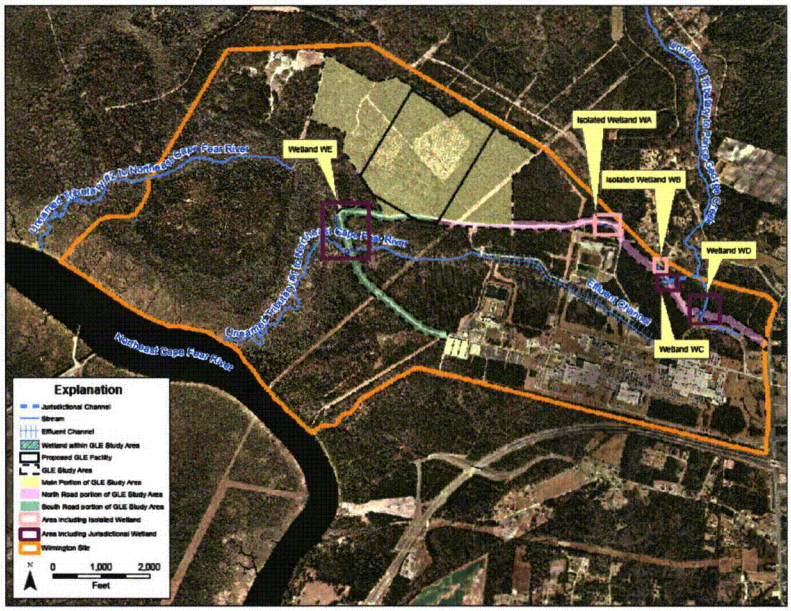

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Water Use

Surface water is not used as drinking water supply

Currently, Wilmington site uses groundwater for potable and process water supplies

GLE will also use groundwater for potable and process

GLE use will be less than currently used on-site

Modeling has demonstrated that the aquifer can accommodate the GLE withdrawals

Impacts are determined to be SMALL

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Ecology

Field survey on entire Wilmington site

Fish and Wildlife Service consultation – provided lists of Threatened, Endangered, Federal Species of Concern for county

Rare/unique/endangered/threatened species absent from study area (although habitat exists for some)

GLE construction - Land disturbance of Pine Forest, Pine Plantation, Pine-Hardwood Forest

Impacts to ecology anticipated to be greatest during construction

Impacts determined to be MODERATE

Mitigation measures will be implemented

Climatology, Meteorology, and Air Quality

Wilmington climate is mild, characterized by humid summers, mild winters

Extremes in climatology – heat, rain, wind

Wilmington is NAAQS attainment area

Wilmington site currently has two NC DAQ air permits

NRC regulates radioactive air effluents

NAAQS = National Ambient Air Quality Standards

NC DAQ = North Carolina Division of Air Quality

GLE Air Emissions

UF_6 is main chemical of concern

Emissions-control devices at source (either charcoal or scrubber)

Air emissions dispersion modeling with XOQDOQ

Conservative assumptions input into model

Impacts were determined to be SMALL

GLE Air Emissions (cont.)

During construction phase, fugitive dust and vehicle emissions were modeled

Impacts determined to be SMALL

Noise

Currently, noise levels are routinely monitored to remain within acceptable limits

Analysis included measuring noise levels in 4 locations on the site

Anticipate GLE noise levels to be highest during construction (MODERATE impacts)

Will mitigate using Best Management Practices

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Historic/Cultural Resources

Formal coordination with NC State Historic Preservation Office

Survey to detect unrecorded cultural resources

Two new sites were identified

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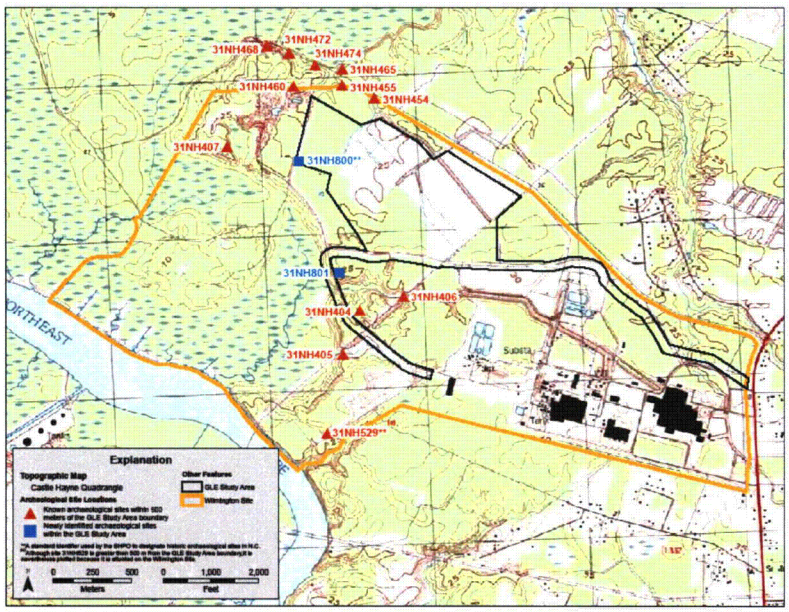

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Historic/Cultural Resources (cont.)

Site 31NH800**

- late eighteenth century to early twentieth century
- Pearlware shards, earthenware shards, glass, brick, nail

Site 31NH801

- Prehistoric archaeological site Middle Woodland period
- ~150 historic artifacts (ceramic shards, lithic tools, animal bone fragments, charcoal)
- Meets criteria for significance (potential to yield important information about time period)

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Historic/Cultural Resources (cont.)

Current plans for road (no widening) will result in no disturbance to Site 31NH801 (impacts SMALL)

If plans change and the site is to be disturbed, further consultation with NC SHPO will be required

Mitigative measures to preserve the artifacts and cultural information would be implemented as necessary

NC SHPO = North Carolina State Historic Preservation Office

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Visual/Scenic Resources

Used Bureau of Land Management tool to evaluate visual impacts

Visual Resources Management System (VRMS)

Current site is rated as a 4 (low scenic quality)

GLE facility will not affect that rating

Impacts determined to be SMALL

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Socioeconomics

GLE employment will vary (250-900)

Variety of skill sets and labor types needed

For analysis, assumed 20-40% construction workers and 100% engineers employed from outside region

Analyzed impacts on economy, housing, education, medical, law enforcement, fire and rescue

Impacts were determined to be SMALL


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Environmental Justice

Evaluates whether disproportionately high adverse impacts on minority and low-income communities exist

Used NRC guidelines – collected demographic data, analyzed identified impacts and compared to minority and low-income communities

Impacts will not disproportionately affect minority and low-income communities

Impacts determined to be SMALL


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Public and Occupational Health

Analyzed potential impacts from radiological and non-radiological sources

Considered impacts to air quality, surface water, and groundwater

Analyzed normal operating conditions and postulated accidents

Determined impacts to potential receptors of interest (nearest resident, maximally exposed individual, schools…)

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Public and Occupational Health (cont.)

Impacts determined to be SMALL for normal operating conditions

Accident analysis still in progress, final results when ISA is complete

ISA = Integrated Safety Analysis

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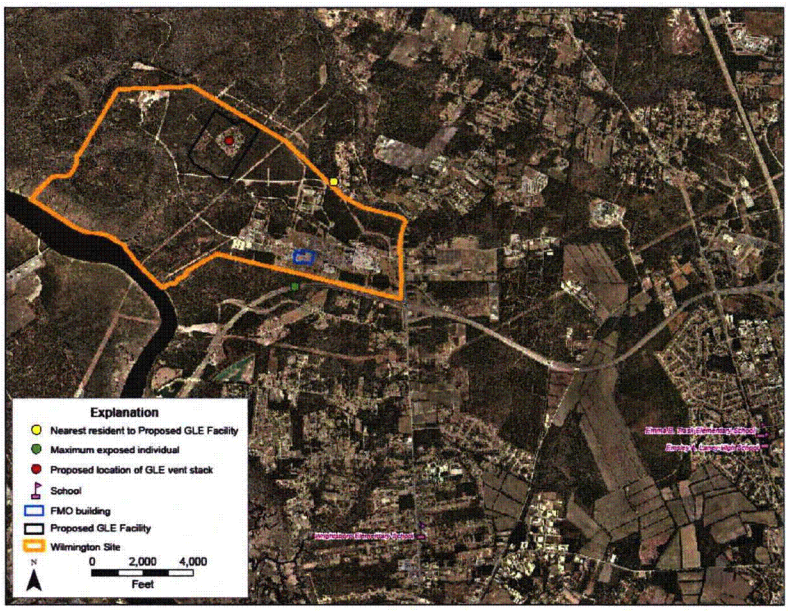

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Public Health

Annual and Committed Dose Equivalents for Exposures to the Nearest Resident from Gaseous Effluents

Source	Units	Infant EDE	Child EDE	Teen EDE	Adult EDE
Cloud immersion	mSv	1.66E-13	1.66E-13	1.66E-13	1.66E-13
	mrem	1.66E-11	1.66E-11	1.66E-11	1.66E-11
Inhalation	mSv	1.31E-06	3.86E-06	5.07E-06	5.61E-06
	mrem	1.31E-04	3.86E-04	5.07E-04	5.61E-04
Ground plane exposure	mSv	1.63E-09	1.63E-09	1.63E-09	1.63E-09
	mrem	1.63E-07	1.63E-07	1.63E-07	1.63E-07
Sum Total	mSv	1.31E-06	3.87E-06	5.07E-06	5.61E-06
	mrem	1.31E-04	3.87E-04	5.07E-04	5.61E-04

EDE = Effective dose equivalent.

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Waste Management

GLE waste management will build on existing site programs (includes wastewaters and solid waste)

GLE wastewaters – treated and monitored prior to discharge

GLE solid wastes – use current practices at Wilmington site

Depleted UF_6 – stored on-site followed by Dept of Energy taking possession

Impacts determined to be SMALL for wastewaters/solid waste

Impacts for UF_6 tails still in progress

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GLE Waste Management

Types, Sources, and Quantities of Wastewaters Generated by Proposed GLE Facility Operations

Wastewater Type	Wastewater Source
Process liquid radwaste	Wastewaters from main GLE operation building decontamination room; process area floor drains, sinks, sumps, and mop water; lab area floor drains, sinks, sumps, and mop water; change room showers and sink; and aqueous process liquids that have the potential to contain uranium.
	Bleed-off from packed-bed wet scrubber used for main GLE operations building air emissions control system.
Cooling tower blowdown	Main GLE operation building HVAC cooling tower.
Sanitary waste	Sanitary waste from building areas used by Proposed GLE Facility workers (e.g., restrooms, break rooms).
Stormwater runoff	Stormwater runoff from Proposed GLE Facility impervious surfaces (e.g., building roofs, parking lots, service roads, outdoor storage pads, and other maintained areas)

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Wilmington Site Solid Waste Management

Solid Waste Source	On-site Waste Management	Offsite Waste Treatment/Disposal
Municipal solid waste (MSW)	Collected and temporarily stored in roll-off containers.	Filled roll-off containers transported by commercial refuse collection service to New Hanover County Landfill[b] in Wilmington, NC.
Nonhazardous wastes from GLE operations equipment cleaning and maintenance activities that are recyclable or not accepted by MSW landfill.	Collected and temporarily stored in containers.	Filled containers transported by truck to Heritage Environmental Services TSDF[c] in Indianapolis, IN or Charlotte, NC.
Wastes designated as RCRA hazardous wastes	Collected and temporarily stored in containers.	Filled containers transported by truck to Heritage Environmental Services TSDF[c] in Indianapolis, IN.
Laboratory waste from UF_6 feed cylinder sampling and analysis	Collected and transferred to FMO for processing to deconvert to U_3O_8.	Not applicable
Combustible used or spent uranium-contaminated materials	Collected in boxes. Filled boxes transferred to and burned in existing on-site FMO waste incinerator.	Waste incinerator ash transported in containers by truck to EnergySolutions Disposal Facility[d] in Clive, UT.
Noncombustible used or spent uranium-contaminated materials	Collected and temporarily stored in boxes.	Filled boxes transported by truck to EnergySolutions Disposal Facility[d] in Clive, UT.
GLE liquid radwaste treatment system filtrate/sludge	Collected and temporarily stored in metal cans.	Filled cans transported by truck to EnergySolutions Disposal Facility[d] in Clive, UT.

[a] Includes liquid and semi-solid wastes that are stored and managed in tanks or containers.
[b] Licensed RCRA subpart D landfill.
[c] Licensed RCRA subpart C treatment, storage, and disposal facility (TSDF).
[d] Licensed low level radioactive waste (LLRW) disposal facility.
[e] Licensed depleted uranium conversion facility currently under construction at DOE site.

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Chapter 5 – Mitigation Measures

SMALL impacts for majority of resources

MODERATE impacts identified for transportation, ecological resources, noise (on or near the Wilmington site)

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Mitigation for Transportation Impacts

New site entrance

Castle Hayne Road turn lanes

Alternating shifts, scheduling off-hour deliveries

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Mitigation for Impacts to Ecological Resources

Tree surveys/planting

Implement programs to enhance wildlife habitat on the Site

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Mitigation for Noise Impacts

Comply with local ordinances

Utilize "reduced noise" equipment

Overall Best Management Practices

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Chapter 6 – Environmental Monitoring and Measurements

Radiological Monitoring

Non-Radiological Monitoring

Industrial Health and Safety Monitoring

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Radiological Monitoring

Direct radiation

Stack monitor (main bldg)

Air monitors (11 new monitors)

Groundwater (13 new wells)

Surface water (existing outfall, river samples)

Soil (4 new locations)

Sediment (existing locations)

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Non-Radiological Monitoring

Stack monitoring for fluoride

Storm water (2 new ponds – NPDES permit)

Surface water (existing outfall – NPDES permit, river samples)

Ground water (fluoride, pH)

Ecological (forestry management program)

NPDES = National Pollutant Discharge Elimination System

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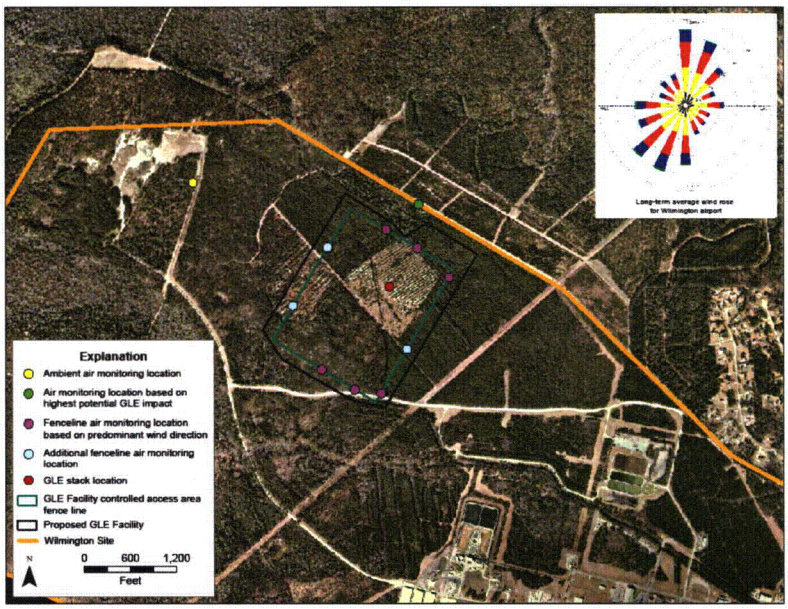

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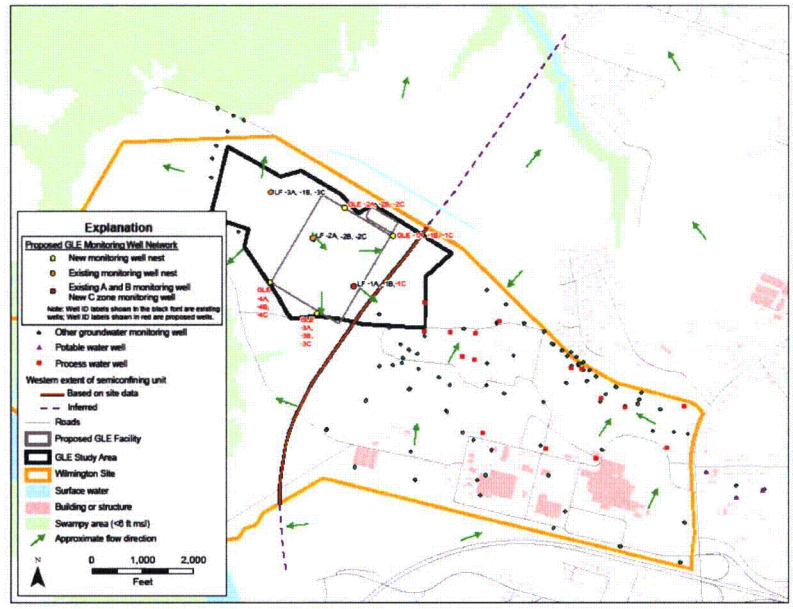

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Industrial Health and Safety Monitoring

Indoor air quality

Noise (worker and public)

Ergonomics

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Chapter 7 – Cost Benefit Analysis

External Costs and Benefits

External Environmental Impacts and Benefits

Socioeconomic Impacts and Environmental Justice

Private Benefits and Costs of Proposed GLE Facility

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Cost Benefit Analysis

Qualitative Summary of Projected Benefits and Costs

Benefit-Cost Category	Description	Scale of Impacts
	Benefits	
Energy Security	Increases availability of nuclear fuel, reducing reliance on foreign sources of enriched uranium; establishes an advanced uranium-enrichment technology in the United States.	LARGE
Enriched Uranium Produced	Estimated 6 million SWU, helps address projected SWU shortfall in United States after 2014.	LARGE
Reduced Emissions	By allowing increased nuclear power generation, may encourage reduced emissions of criteria pollutants and greenhouse gases by fossil-fuel fired electric utility power plants.	MODERATE
Energy Efficiency	SILEX technology produces enriched uranium using less electric power than existing uranium enrichment technologies.	MODERATE
Economic Impacts	Employment of up to 750 during construction and start-up, 350 during operation; increases in regional income due to their payroll and local GLE purchases of goods and services.	MODERATE
Tax Receipts	Sales and income taxes due to GLE and employee spending; corporate income tax on GEH profits.	SMALL

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Cost Benefit Analysis

Qualitative Summary of Projected Benefits and Costs (continued)

Benefit-Cost Category	Description	Scale of Impacts
	Costs	
Construction Cost	$1.1 billion; $142 million to $282 million per year, over 7 years.	MODERATE
Operating Cost	$70 million to $98 million per year.	MODERATE

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Chapter 8 – Summary of Impacts

Unavoidable Short-Term Adverse Environmental Impacts for Proposed Action

- Majority are SMALL
- Some MODERATE, will mitigate

MODERATE – transportation, ecological, noise (see mitigation measures in Ch. 5)

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Questions and Discussion

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