



Global Nuclear Fuel

A Joint Venture of GE, Toshiba, & Hitachi

Global Nuclear Fuel – Americas, LLC

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May 14, 2008

Ms. Johari A. Moore, Environmental Project Manager
c/o Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: Response to Environmental Assessment Request for Additional Information
(TAC L32670) Dated March 27, 2008

References: 1) SNM-1097, Docket 70-1113
2) Letter, S.P. Murray to NRC Document Control Desk, 4/2/07, GNF-A License
Renewal Application
3) Letter, G.F. Suber to S.P. Murray, 3/27/08, RAI Regarding the Environmental
Assessment for GNF-A Materials License SNM-1097 Renewal

Dear Ms. Moore:

The Global Nuclear Fuel – Americas LLC (GNF-A) facility in Wilmington, North Carolina hereby submits the requested information in support of our fuel manufacturing license Environmental Assessment. This information is being provided in response to Mr. Suber's March 27, 2008, letter (Reference 3).

Please contact me on (910) 675-5950 if you have any questions or would like to discuss this matter further.

Sincerely,

A handwritten signature in black ink, appearing to read 'S.P. Murray', is written over a white background.

S.P. Murray, Manager
Licensing and Liabilities COE

Attachment

cc: SPM-08-025
M.T. Adams, USNRC NMSS

RAI 1

Clarify Whether Any New or Modified Processes or Facilities are Associated with the License Renewal

There have been various changes to the facilities and processes at Global Nuclear Fuel-Americas (GNF-A) since the previous license renewal, such as the transition from an Ammonium Diuranate (ADU) process to a Dry Conversion Process (DCP). It is not clear from the Environmental Report (ER) Supplement you provided (GNF-A, 2007) whether any new or modified processes or facilities are being planned in connection with this license renewal request. It is also unclear whether any new or modified processes or facilities are planned over the term of the renewal (e.g. new or modified processes or facilities that may become necessary with expansion due to increased client demand and production). Please provide a clarification of the following:

(1) Clarify whether there are plans for any new processes, operations, facilities, etc. associated with this license renewal request.

(2) Clarify whether there are any plans to add or modify processes or facilities within the 40-year renewal term, and describe any associated environmental impacts such as changes in the type or quantity of effluents.

(3) Clarify whether any changes will require expansion beyond the existing site footprint and describe any associated environmental impacts.

GNF-A Response

(1) There are currently no plans for any new processes, operations, facilities, etc. that are associated with this license renewal request. Unforeseen activities will be coordinated with NRC as necessary. Global Laser Enrichment activities beyond the test loop will be handled under a separate facility license.

(2) None expected.

(3) None anticipated.

RAI 2

Identify Any Substantive Maintenance Activities Necessary to Support Current and Future Operations and Describe the Associated Impacts The ER Supplement does not identify any activities (i.e., replacement or major maintenance of facilities or equipment) that GNF-A would need to perform over the 40-year license renewal period in order to continue operations. Please identify any such activities and describe their associated impacts.

GNF-A Response

Only normal maintenance activities to keep the facility safe and functional are anticipated. Larger maintenance activities that may be different than those currently authorized by the SNM 1097 license will be coordinated with NRC as required.

RAI 3

Clarify the Extent of Undisturbed Land on the Site. The ER provides information on the size and layout of the property and the location of major buildings and facilities; however, it does not clearly define how much of the property has been disturbed or remains undisturbed. Please describe the extent of existing development on the property as well as how the boundaries of the developed area may change over the term of this renewal with any planned modifications as described in RAI 1.

GNF-A Response

The existing developed area of the site is approximately 302 acres, or nearly 19% of the total site 1624 acreage. Developed area supports the business operations of GE Aircraft Engines, GE Hitachi Nuclear Energy and Global Nuclear Fuels - Americas. In addition, there are 16 acres of power line corridor within the site (1% of total site acreage).

The developed boundary area of the current SNM-1097 license is not expected to change over the term of this renewal and should presently contain any new or modified processes or facilities as anticipated within the renewal and discussed in RAI 1.

RAI 4

Describe Transportation Modes and Traffic Conditions

The ER Supplement identifies existing roads in the vicinity of the GNF-A site as well as recent road construction; however, the ER Supplement does not describe the local traffic conditions, including conditions that have resulted from this new construction. Additionally, the ER Supplement does not address the transportation modes (e.g., truck, rail, or barge) GNF-A uses to transport products, supplies, and waste to or from the site. Please describe the local traffic conditions and identify the transportation modes used to support GNF-A operations.

GNF-A Response

Local traffic conditions are discussed as follows incorporating research and work completed by RTI International, Research Triangle Park, North Carolina for GE Hitachi Nuclear Energy (drafted April 2008, Andrew D. Stahl, P.G.).

The Wilmington Site transportation access is supported by a number of existing transportation routes and traffic patterns. The existing manufacturing operations at the Site receive materials and supplies by truck shipments. These materials include enriched uranium as input to the nuclear power plant fuel-fabrication operations. Likewise, products manufactured at the Site, including the nuclear fuel bundle components, are shipped from the Site by trucks.

The southeastern corner of the Wilmington Site is adjacent to an interchange of I-140 and Castle Hayne Road (NC 133, previously US 117). Current access to and from the Site by these trucks and all other vehicle traffic is from Castle Hayne Road. Northbound Castle Hayne Road from the I-140 interchange bordering the Site initially is a four-lane road that continues for approximately one-half mile (0.8 km) before narrowing to two lanes. The Wilmington Metropolitan Planning Organization (WMPO) designates Castle Hayne Road as an urban principal arterial south of I-140 and as an urban minor arterial north of the I-140 interchange.

A measure called AADT (Average Annual Daily Traffic) is used to describe traffic volume. AADT is the total volume of vehicle traffic in both directions of a highway or road for a year divided by 365 days. The AADT value represents the total number of vehicles expected to travel along a given segment of road on an average day and is an indicator of traffic volume.

A segment of I-140 from I-40 to Castle Hayne Road opened to traffic in August 2005; however, no NC DOT AADT data for I-140 are available to reflect the change in traffic volumes and patterns in Wilmington and the surrounding region as a result of this newly constructed traffic pattern. No negative impacts have been observed by the site operations.

The most common route now used for trucks, most visitor vehicles, and many employee vehicles to the Wilmington Site from I-40 is to continue to the interchange with I-140 (I-40 Exit 416) and then travel westbound on I-140 to the Castle Hayne Road exit (I-140 Exit 18). Alternatively, vehicles traveling from locations outside the region on I-40 can access the Wilmington Site by exiting directly off I-40 at the Holly Shelter Road exit and traveling south on Castle Hayne Road. The Site can be accessed from the downtown district of Wilmington and the port area by traveling north on Castle Hayne Road. Table RAI 4-1, following, presents the NC DOT AADT counts for Castle Hayne Road access routes to and from Wilmington Site.

NC DOT Annual Average Daily Traffic (AADT) Counts for Castle Hayne Road Access Routes to and from the Wilmington Site.

Traffic Count Station Location	2005 Average Annual Daily Traffic
Wilmington Site Access Route to and from Interstate 40^a	
Interstate 40 west of Holly Shelter Rd Exit (Exit 414)	25,000
Interstate 40 east of Holly Shelter Rd Exit (Exit 414)	26,000
Holly Shelter Rd between I-40 Exit 414 and Castle Hayne Rd	12,000
Castle Hayne Rd south of junction with North College Rd (U.S. Route 117)	13,000
Castle Hayne Rd north of the Wilmington Site near intersection with Sondey Rd	14,000
Wilmington Site Access Route to and from Downtown Wilmington	
Castle Hayne Rd south of Wilmington Site near intersection with N. Kerr Ave.	19,000

Source: NC DOT, 2005^a.

^aThe segment of I-140 from I-40 to Castle Hayne Road opened to traffic in August 2005. No NC DOT AADT data are available yet for I-140 to reflect change in traffic volumes and patterns in Wilmington and the surrounding region as a result of vehicles being able to travel on the I-140 segments now open. Traffic to the Wilmington Site from I-40 is now likely to continue to I-140 (I-40 Exit 416) and travel westbound on I-140 to the Castle Hayne Road exit.

In 2005, the AADT for Castle Hayne Road north of the Wilmington Site (near Sondey Road) was 14,000 vehicles, and the count for the section of Castle Hayne south of the Site (near Kerr Avenue) was 19,000 vehicles. Currently, approximately 2,800 workers commute to and from the Wilmington Site. The daily trips of these workers to and from the Wilmington Site are accounted for in the AADT estimates. Also included in these estimates are the existing truck and ancillary traffic associated with the existing manufacturing and services operations at the Wilmington Site.

Access onto the Wilmington Site from Castle Hayne Road is through one of two gated entrances. The South Gate entrance is located directly across Castle Hayne Road from the off-ramp of westbound I-140.

The second Site entrance, the North Gate entrance, is located approximately one-quarter of a mile (0.4 km) north of the South Gate on Castle Hayne Road.

Truck deliveries to the Wilmington Site are directed to enter through the North Gate entrance. Steady traffic flows were observed during the July 24, 2007, Site visit at 10:30 a.m., 1:30 p.m. and 4:30 p.m. Traffic in the vicinity of the Site peaked during the 3:00 p.m. shift change.

Workers and visitors park their vehicles on site in one of several designated parking lots. Trucks move to the appropriate loading/unloading areas over a network of service roads between the Wilmington Site's manufacturing and services operations. Several unpaved service roads provide access to selected areas in the undeveloped portion of the Wilmington Site.

GNF-A uses trucks exclusively (no rail or barge) to support all site operations and transport products and supplies to and from the site. Waste is also transported from the site by truck.

RAI 5

Clarify Whether the Developed Areas of the Site Have Experienced Flooding

The ER Supplement indicates that portions of the property are in the 100-year floodplain; however, the developed areas are located above the floodplain. It is unclear whether any of the developed areas have experienced flooding. Please state whether the developed areas of the property have ever experienced flooding, and if so, please provide details of the impacts.

GNF-A Response

No developed areas of the site have experienced flooding during the developed site's operational history. In 1999, Hurricane Floyd generated historic peak flood elevations for New Hanover County. USGS stream gages in nearby sub-basins revealed that flooding caused by Hurricane Floyd "was likely greater than 100 years and very possibly greater than 500 years" (FEMA and State of North Carolina, 2006a). However, based on observations by employees working on the Site, there was no flooding of existing manufacturing operations at the Wilmington Site.

RAI 6

Clarify Which Aquifer GNF-A and the Surrounding Facilities Use

The GNF-A site has two aquifers; a shallow aquifer and a deep or principal aquifer. According to the ER Supplement, the source for the site's potable and process water is the deep or principal aquifer. According to Section 3.6.2 of the previous license renewal environmental assessment (EA) (NRC, 1997), the shallow aquifer is the source of fresh water for residential, commercial, and industrial facilities in the area. Please verify that GNF-A currently uses only the deep aquifer.

GNF-A Response

The GNF-A site wells produce process and potable from the Peedee Aquifer, which is the principal or "Deep" aquifer under the site. GNF-A does not use water from the surficial or "shallow" aquifer.

RAI 7

Provide Water Consumption Information for GNF-A and Discuss Any Issues in Meeting Long-Term Water Demand

The ER Supplement does not identify the amount of water GNF-A currently consumes and whether this amount may change in the future. Also, there is no discussion of GNFA's ability to meet its planned water demand over the 40-year license renewal period. Please, identify the amount of water that GNF-A uses, identify the amount of water that GNF-A plans to use in the future, and discuss expectations in meeting the water demand over the term of the renewal.

GNF-A Response

Groundwater is used at the existing Wilmington Site for industrial process water and drinking water. The average annual withdrawal is approximately 0.6 million gallons per day. Water levels measured in wells that tap the Peedee Aquifer at the Wilmington Site were evaluated in terms of the long-term sustainability of the water resource. The water levels in the aquifer do not show a long-term downward trend. A review of potential future changes to withdrawal rate indicate that the existing water use and future estimates (~10% increase) does not exceed the sustainable yield of the aquifer in this area.

RAI 8

Expand Description of Regional Historical and Cultural Resources

The ER Supplement identifies one historical artifact (cemetery) located on the site. However, the ER Supplement does not indicate (1) when or where historical and cultural analyses were conducted or (2) whether management guidelines, operating procedures, or memorandums of understanding with the State Historical Preservation Officer exist concerning the protection or mitigation procedures in the event of archeological discoveries at the site. Please discuss the scope of any previous historical and cultural resource analyses. Also, please describe the GNF-A plan for managing future discoveries of previously unidentified historical or cultural resources on site, including any guidelines concerning protection or mitigation for new discoveries.

GNF-A Response

Archaeological site maps at the North Carolina Office of State Archeology revealed that 22 previously recorded terrestrial archaeological sites are located on the Wilmington Site and a submerged archaeological site is located adjacent to the site property in the Northeast Cape Fear River.

All of the sites except for the submerged site appear to have been originally recorded in 1977 and 1978 during a New Hanover County Comprehensive Employment Training Act Survey (Wilde-Ramsing, 1978). The submerged archaeological site was originally recorded in 1987 and was revisited in 1988 and 1992 (Wilde-Ramsing, 1987, 1988; Wilde-Ramsing et al., 1992).

The submerged site consists of a 1700-1730 shipwreck, known as the "Rose Hill" wreck, and at the time of documentation was the earliest recorded shipwreck in North Carolina. This wreck has been extensively surveyed and reported in 1992 by the Underwater Archaeology Unit of the Division of Archives and History, North Carolina Department of Cultural Resources. This wreck has been recommended for inclusion in the National Register of Historic Places.

There are two other well-documented historically significant locations associated with the site.

The property is the location of the colonial "Rose Hill Plantation", well documented by the Division of Archives and History, North Carolina Department of Cultural Resources, State Historical Preservation Office (NC SHPO), New Hanover County, and local historical groups. Numerous records exist documenting colonial activity in this area and extend back to 1660 era. Several "Tar Pits" have been recently discovered during a 2007 archaeological survey coordinated by RTI International (Research Triangle Park, NC), confirming historical records of extensive logging of the site for naval stores and tar. The RTI International study was completed in response to a recommendation by NC SHPO that a comprehensive archaeological survey to identify and evaluate the significance of archaeological remains that could be damaged or destroyed by future site activities be conducted.

The "Rose Hill Plantation" was founded by Richard Quince, a prominent businessman in the Lower Cape Fear Area, in the mid 1780's. Many of the archeological findings to date are associated with the plantation activities, such as the rice fields and graveyard. The graveyard has been surveyed and marked, and is under further investigation at this time, with the recent discovery of additional gravesites. The Rose Hill Cemetery was a community graveyard and served several surrounding plantation sites. The location of the rice fields adjacent to the river is evidenced by topographical maps and aerial photography of the site.

There are currently no operating procedures or memorandi of understanding with the North Carolina Department of Cultural Resources or SHPO concerning existing historical locations on the GE site. However, a formal coordination letter to NC SHPO was submitted October 1, 2007 to ask for regulatory comment on future proposed site work pursuant to Section 106 of the National Historic Preservation Act.

The site remains in contact with NC SHPO and will evaluate, protect and mitigate new discoveries in accordance with the intent of the National Historic Preservation Act. Company personnel communicate frequently with and make every effort to respond promptly to all Cultural and Historical authorities with the State, County and local offices. The site also makes every effort to accommodate inquiries and visits by interested public.

RAI 9

Identify Plans, Outstanding Actions, and Potential Impacts Associated With Remaining Ammonium Diuranate Process Material, Equipment, or Wastes

The ER Supplement indicates that the DCP has replaced the ADU process. However, the ER Supplement also indicates that certain equipment or facilities associated with the ADU process are still present onsite. For example, the uranium recovery unit has been placed on standby. Nitrate basins in the waste treatment area were emptied of liquids and solids but still remain and currently contain mostly rainwater. It is not clear whether the final disposition for the remaining ADU process material, equipment, and wastes has been achieved or what plans GNF-A has for these items. Please identify any plans or outstanding actions associated with remaining material, equipment, or wastes from the ceased ADU process and describe the associated impacts.

GNF-A Response

There are no immediate plans to dismantle this area. This area and some equipment could possibly be used if the current ceramics operation needed to be expanded. Currently, the systems have been isolated and put in temporary lay-up. These systems and equipment pose no impact on current operations or the environment.

RAI 10

Describe Planned Future Liquid Effluent Treatment, Permitting, and Associated Impacts, and Describe Any Associated Changes to the Current System

The liquid effluent treatment system described in the ER Supplement discharges the effluent into the Northeast Cape Fear River under National Pollutant Discharge Elimination System (NPDES) permit NC0001228 {North Carolina Division of Water Quality, 2006}. GNF-A applied for and was granted permit WQ0031317 to construct and operate a wastewater treatment and reclaimed water utilization facility that would not discharge waste into surface waters (North Carolina Division of Water Quality, 2007a,b). The ER Supplement does not provide any information on this new system that eliminates liquid effluent discharge to surface water. Please provide the following information or provide justification for its absence:

- (1) Describe the new liquid effluent treatment system including the associated permitting, waste streams, and impacts, and state whether any new land was disturbed.*
- (2) Describe how the new system affects the status of the current system (i.e., whether this supplements or replaces, completely or in part, the old system).*
- (3) If portions or all of the old system will no longer be used, describe the plans and final disposition associated with any remaining material, equipment, or wastes from the old system and describe associated impacts.*

GNF-A Response

The Site has one NPDES (National Pollutant Discharge Elimination System) permit, NC0001228, for the treatment of wastewaters and discharge to the surface waters of North Carolina, Northeast Cape Fear River. Within that permit, there is allocation for two separate types of treatment systems with separate discharge points. Those are: (1) process water treatment and (2) sanitary water treatment. Each is a separate facility and has its own surface water discharge point. The volume discharge from the process water treatment is approximately 450,000 gallons per day. The volume discharge from the sanitary water treatment is generally 35,000 gallons per day.

- (1) GNF-A holds North Carolina State DWQ (Division of Water Quality) permit, WQ0031317, which authorizes the site to replace the gravity clarifiers with a MBR (Membrane Bioreactor) technology waste treatment system. Additional pre-treatment screening equipment, liquid storage capacity, and distribution equipment for re-cycled water, were also added. This State permit allows the recycling of treated sanitary wastewaters back into the industrial process. In this case, the waters are used as direct replacement influent water to a Site cooling tower, replacing approximately 35,000 gallons per day of process supply water. No new land was disturbed with this action.
- (2) The new MBR clarification technology is an addition to the existing plant, replacing the old gravity clarifiers. The old clarifier tanks are used in the new configuration as additional liquid storage and surge capacity.
- (3) Unused portions (legacy piping, etc.) of the old sanitary waste treatment plant (SWTP) system have been removed, leaving the infrastructure necessary to support back-up storage tank and other process equipment. This MBR technology addition did not require total removal of the original SWTP. Solid waste generation and handling routines have not materially changed.

RAI 11

Provide Updated Land Use Information

The ER Supplement does not contain a land use section providing a description of the surrounding offsite area. For example, no updated description of facilities within 8 km [5 mi] of GNF-A are provided in the ER Supplement. Please provide an updated description of local land use.

GNF-A Response

The land use in the vicinity of the Wilmington Site is discussed as follows and generally covers the 8 km (5 mi) radius around the site.

The Wilmington Site is a 1,624-acre (657.2-hectare) parcel owned by General Electric Corporation (GE Corporation) west of Castle Hayne Road (NC 133). The property is currently zoned I-2, which is described in the New Hanover County zoning code as intended for heavy industrial uses. No portion of the property is currently used for agricultural purposes.

Immediately north of the Wilmington Site is a large parcel of approximately 4,069 acres (1,647 hectares) owned by Hilton Properties and appraised at \$841,200 in 2006. The current zoning designation for this property is Rural Agricultural, which is designed for low-density residential development with an emphasis on farming and open-space preservation. This parcel is locally known as the Sledge Forest and is currently used for timber management and as a private hunting area. Access to the Sledge Forest is provided via a private, unpaved road that intersects Castle Hayne Road (NC 133) and closely follows the northern property line of the Wilmington Site.

The Northeast Cape Fear River borders the Wilmington site to the southwest, and industrial land uses are dominant on the opposite (west) side of the river. The BASF Corporation, Elementis Chromium facilities and the L.V. Sutton coal-fired power plant operated by Progress Energy are examples of industrial operations located in this area. This industrial area sits between the Northeast Cape Fear River and the main branch of the Cape Fear River.

In the eastern and southern vicinities of the Wilmington Site, residential uses are dominant due to the presence of the communities of Wrightsboro (south), Skippers Corner (northeast), and Castle Hayne (northeast). Located adjacent to the Wilmington Site's eastern boundary across Castle Hayne Road are the North Carolina State University Horticultural Crops Research Station, a truck parking lot, and a small recreational park for use by Wilmington Site employees (owned by GE Corporation). Further north along Castle Hayne Road (between Hermitage Road and McDougald Drive) are three water supply wells that meet the potable water demands of the existing Wilmington Site facilities. Also along this stretch of Castle Hayne Road are four mobile homes located on the opposite side of the street from the Site.

Three public secondary schools are located within 5 miles (8 km) of the Wilmington Site: Wrightsboro Elementary School, Emma B. Trask Middle School, and Emsley A. Laney High School (North Carolina Department of Public Instruction, 2003). Trask Middle School also serves as an emergency shelter for New Hanover County.

Wilmington International Airport is located approximately 5 miles (8 km) south-southeast from the Site. The New Hanover County Landfill is located approximately 4 miles (6 km) southwest of the Site.

The Wilmington Site is located in an unincorporated area of New Hanover County. Portions of the Wilmington Site are located within a designated Conservation Area or Resource Protection Area, as shown on the most recent land classification map update for the Wilmington-New Hanover County CAMA land use plan. The existing Wilmington Site manufacturing facilities (Eastern Site Sector) are located in a designated Aquifer Resources Protection Area.

Zoning ordinances reflect the Wilmington-New Hanover County CAMA land use plan goals of protecting groundwater resources by, for example, limiting residential densities in areas where septic systems are used for wastewater treatment. In addition, the plan suggests “prevention of [land] uses that pose risk of spill of hazardous materials, and encouraging development practices that promote sustained recharge” (City of Wilmington and New Hanover County, 2006).

Development of the Wilmington Site by GE Corporation predates the CAMA land use plan initially prepared by the City of Wilmington and New Hanover County in 1976. GE/GEH/GNF-A manage the groundwater resource beneath the manufacturing portion of the Site by inducing hydraulic control of the aquifer through production of process water, thus isolating this portion of the aquifer from deeper and surrounding aquifers.

The undeveloped South-Central, Western, Northwestern, and North-Central Site sectors are located outside the Aquifer Resources Protection Area. The North-Central Site Sector is located in a designated Wetland Resource Protection Area. The purpose of this land category designation is to protect the loss of wetlands from development (City of Wilmington and New Hanover County, 2006). Field surveys found that this area does not contain large areas of wetlands. Based on aerial photographs of New Hanover County, the majority of the naturally occurring wetlands were drained prior to 1963.

Most of this area is Pine Forest, Pine Plantation, and Pine-Hardwood Forest biotic communities. The Western Site Sector adjacent to the Northeast Cape Fear River is located in an area designated on the land classification map as both a Conservation Area and a Natural Heritage Protection Area. The purpose of the Conservation Area designation for implementing the City of Wilmington and New Hanover County CAMA land use plan is to provide for management and protection of significant or limited natural resources while protecting the rights of the property owner (City of Wilmington and New Hanover County, 2006). Natural Heritage Protection Areas are areas identified by the North Carolina Natural Heritage Program as having unique habitats that need special protection.

The Northeast Cape Fear River Floodplain natural area includes the Swamp Forest biotic community on the Wilmington Site. GE Corporation, GNF-A, and GEH do not conduct any activities in this area, and have no plans for future activities.

RAI 12

Provide Demographic and Socioeconomic Information

The ER Supplement does not contain GNF-A's employment levels or the local demographic and socioeconomic information such as population and economic characteristics and trends. For the environmental review, it would be important to know not just the total number of employees at the entire complex, but the specific number involved in activities that relate directly to fuel manufacturing operations (i.e. employees whose positions would likely become obsolete if fuel manufacturing operations ceased). Please provide a description of GNF-A's employment levels along with local current and projected demographic and socioeconomic information.

GNF-A Response

According to the U.S. Census Bureau's 2000 Decennial Census, a total of 321 Census blocks fall within a 5-mile (8-km) radius of the Wilmington Site. The majority of these Census blocks (261) are within New Hanover County and contains 12,997 persons and 4,953 households. A total of 57 Pender County Census blocks are within the 5-mile (8-km) radius, with a combined population of 3,305 persons and 1,274 households. An examination of Census block data from 2000 reveals a total of three Census blocks in Brunswick County with some portion of their total area inside the 5-mile (8-km) radius. The total population of these three Census blocks is 36 persons in 17 households (NC CGIA, 2002a). It should be noted that all blocks with any portion of their area inside the 5-mile (8-km) radius were included in this population count.

Current staffing at the GNF-A Wilmington site is approximately 2100 workers with a projected employment level of 3000 within 5 years.

Approximately 650 nuclear workers could be affected if fuel manufacturing operations were to cease.

RAI 13

Update the Existence, Levels, Management, and Impacts of Groundwater Contamination

The ER Supplement references groundwater contamination discovered in 1991 and limits the information concerning this event to shallow aquifer monitoring data for pH, fluoride, ammonia, and nitrates. The previous license renewal EA discusses two groundwater contamination discoveries in 1991. The first discovery was organic chemicals including trichloroethylene in the deep aquifer. In response, additional wells and a pump and treat system were installed. The second discovery was the presence of uranium, nitrates, and fluorides in the shallow aquifer beneath part of the Fuel Manufacturing Operations building. In response, additional wells were installed, soil was excavated, and a horizontal groundwater collection system was installed. To facilitate an assessment of current water quality and potential cumulative impacts and to understand remediation progress and goals, please provide the following:

- (1) Identify all known cases of aquifer contamination requiring or undergoing remediation.*
- (2) State whether the contamination source has been identified and eliminated.*
- (3) Describe impacts from the contamination.*
- (4) Relate levels of all contaminants to any target or regulatory limits.*
- (5) Provide information on contaminated water management.*
- (6) Explain the conditions that would allow termination of the remediation process.*
- (7) Provide information on monitoring plans for early identification of any future inadvertent water contamination*

GNF-A Response

- (1) Industrial operations over the past 40 years at the Wilmington site have impacted groundwater in several specific locations. These areas of concern have been well documented and are being monitored and/or remediated by programs that have been established in coordination with governing regulatory agencies. North Carolina Department of Environment and Natural Resources (NCDENR)

has oversight of all areas of concern and is provided status and monitoring reports as required on an ongoing basis.

Northwest Site Area: Handling of lubricants in the Northwest site area during the 1960s and 1970s resulted in groundwater impacts from trichloroethylene (TCE) and its degradation products cis-1,2 dichloroethylene (cDCE) and vinyl chloride (VC). The Corrective Action Plan for the Northwest Site Area (CAP), dated April 27, 1999, documents a monitored natural attenuation corrective action remedy that was approved by NCDENR on November 5, 1999. Groundwater with constituents of concern are predicted to continue to attenuate via natural processes with resulting constituent concentrations posing no significant risk to human health or the environment. An associated monitoring program has been designed to verify the continued attenuation and migration patterns of the groundwater constituents and the absence of significant human-health and ecological risk.

Storage of calcium fluoride in the northwest Site area resulted in uranium and fluoride reaching groundwater. The area was excavated in 1996 and backfilled in 2000. The Nuclear Regulatory Commission (NRC) amended the facility Materials License SNM-1097 in April of 2000 by granting unrestricted release of the previous Northwest Calcium Fluoride (CaF₂) Storage Area. Monitoring in nearby wells for the primary constituents (fluoride and uranium) demonstrates the continued attenuation of the groundwater impacts and the absence of significant exposure risk.

Waste Treatment Area: Waste treatment operations resulted in the release of nitrate to the Principal Aquifer. Repairs to the facility were implemented upon discovery of the release, and the facility currently is no longer used for storage of nitrate-bearing liquids. Monitoring in the area also has included fluoride and uranium. However, no Principal Aquifer groundwater impacts from these two constituents have been detected in this area. Groundwater monitoring has demonstrated that the nitrate in the Principal Aquifer is naturally attenuating and that the area of elevated nitrate is likely static and without significant migration. A routine monitoring program continues to demonstrate the relative stability of the groundwater impacts in the area. In addition to this Principal Aquifer nitrate monitoring program, wells in this area are also monitored for groundwater quality by GNF-A, in accordance with NRC Materials License SNM-1097.

Fuel Component Operation (FCO) Clean-room Area: A monitoring program was established to evaluate a release of acid process solutions discovered in the FCO clean-room area in the mid 1990s. In 1999, clean-room equipment was replaced as part of a facility renovation and remedial activities were conducted at the release location. Impacted soil was excavated as part of the remedy and disposed offsite. Continuing monitored groundwater quality parameters include pH, fluoride, nitrate, and five indicator metals (chromium, zirconium, tin, nickel, and copper). The area impacted was within the area beneath the active FCO manufacturing building.

Fuels Manufacturing Operation/Fuels Manufacturing Operation Expansion (FMO/FMOX) Area: In 1991, process liquid containing fluoride, nitrate, and uranium was accidentally released into the subsurface through a construction joint in the FMOX building. The impacted soil beneath the building was excavated, and a groundwater-collection sump (the Horizontal Collection System) was installed to recover groundwater with the constituents of concern from the upper Surficial Aquifer. An additional sump (SD-1SW) was installed in a former storm drain to recover shallow groundwater from the area. A monitoring network (the FX-series wells) was subsequently installed around the FMO/FMOX building. Routine sampling of groundwater from these wells has continued since 1992. The primary groundwater constituents with elevated concentrations include fluoride, nitrate, and uranium. The primary objective of the routine monitoring program is to detect changes in groundwater quality by sampling wells located around the perimeter of the FMO/FMOX building; these data are also specifically generated in accordance with NRC Materials License SNM-1097.

Aeration Basin/Process Lagoon Area: The existing facility process water treatment system includes an aeration basin and process lagoon system. This area is monitored on a regular basis, and shallow, localized groundwater impacts from selected inorganic and radiological constituents have at times

been detected. This monitoring is specifically performed by GNF-A in accordance with NRC Materials License SNM-1097.

East/Central Site Elevated Organic Solvents: Historic releases of organic solvents led to groundwater detections in the east/central areas of the Wilmington Site. Wells have been installed to monitor for volatile organic compounds (VOCs) in accordance with the *Remedial Action Plan for Organic Compounds in Groundwater* (RTI Report No. 5040-01F, December 14, 1992) and the *Corrective Action Plan for Organic Compounds in Groundwater* (RTI Report No. 5040/006/01F, March 30, 1994).

A report titled *Comprehensive Site Assessment and Corrective Action Plan for Organic Compounds in Groundwater - Vicinity of the Northern Property Boundary Area* (RTI Report No. 5040/022/01F, May 9, 1996) was prepared in the second quarter of 1996 and specifically addresses groundwater with elevated organic solvent near the northern property boundary area and its inferred source area. The primary objective of the monitoring program is to evaluate the distribution and migration of VOCs in the Principal Aquifer beneath the Site and to evaluate the effectiveness of remediation activities. Remediation and containment of the areas with elevated VOCs continues through the withdrawal of groundwater in Site recovery and process water wells.

- (2) Present contamination sources have been identified and have implemented monitoring and control remedies approved by NCDENR.
- (3) Impacts from constituent releases are controlled with ongoing remedies (see number 1 above) at the present time in order to minimize current environmental impact and ultimately eliminate future concern.
- (4) Specific contaminant concentrations generally exceed regulatory levels within the areas targeted for remedy as described above.
- (5) Active remediation activities provide hydraulic containment of impacted Principal Aquifer groundwater in the Eastern Site Sector. The pumped groundwater is treated and used by the existing Wilmington Site facilities for industrial process water. Groundwater elevation contours indicate the presence of a hydraulic trough-of-depression, which demonstrates that the pumping system maintains lowered groundwater elevations and hydraulic containment on the Site. The pumping conditions in these wells are routinely monitored, and the system is adjusted to provide effective hydraulic containment for constituents of concern. Additional remediation is provided by the two sumps collecting shallow groundwater in the FMO/FMOX area. These sumps include a horizontal collection system and a former stormwater system vault, where groundwater is recovered for treatment.
- (6) Remedial activities related to releases from the site operations could be terminated following review by NCDENR and agency issuance of a "Letter Of No Further Action" and meeting any NRC conditional requirements in accordance with NRC Materials License SNM-1097.
- (7) As identified in the ER supplement, GNF-A Wilmington has an extensive Environmental Monitoring Program, blanketing the site from known points of release, to and beyond site boundaries. The program includes monitoring wells, soil samples, vegetation samples and water samples for identification of potential sources of soil contamination. GNF-A monitors groundwater for various constituents from 88 monitoring wells across the Wilmington Site and these results are routinely provided in updates to the Environmental Report associated with that license (most recent update; GNF-A, 2007).

RAI 14

Clarify the Existence, Levels, Management, and Impacts of Onsite Soil Contamination

As identified in the current ER Supplement and described in the previous license renewal EA, soils have been contaminated from past GNF-A activities. It is unclear whether the GNF-A site contains contaminated soil undergoing or requiring future remediation. Please provide the following:

- (1) Identify all known areas undergoing or requiring future remediation.*
- (2) State whether the contamination sources have been identified and eliminated.*
- (3) Describe impacts from the contamination.*
- (4) Relate levels of all contaminants to any target or regulatory limits.*
- (5) Provide information on contaminated soil management.*
- (6) Explain the conditions that would allow termination of the remediation process.*
- (7) Provide information on monitoring plans for early identification of any future inadvertent soil contamination.*

GNF-A Response

- (1) Radiological areas requiring future remediation are identified and documented in internal records as required by 10 CFR 70.25. These areas are routinely monitored, remain under licensee control, and are not undergoing active remediation at this time.
- (2) The comprehensive GNF-A Wilmington Environmental Monitoring Program samples at the points of release have continued to identify low or non-detectable concentrations of uranium and non-radiological contaminants.
- (3) The GNF-A Wilmington operations have had insignificant effects on the environment in the past, and have maintained comprehensive control procedures to ensure continuing insignificant effects in the future.
- (4) The radiological contamination levels in the soil on site range from background levels up to several thousand parts per million of uranium. These levels do not represent a measurable dose to workers or the public.
- (5) Prior to any excavation on site, the affected area is reviewed by the EHS group to determine any necessary controls for the soil.
- (6) As described in the Site Decommissioning and Closure Plan, site closure activities include the cleaning and removal of radioactive contamination so as to reduce the level of radioactivity to levels acceptable for release of the facility for unrestricted use to allow NRC license termination pursuant to 10CFR20.1401 and 20.1402.
- (7) As identified in the ER supplement, GNF-A Wilmington has an extensive Environmental Monitoring Program, which is based upon monitoring at the points of release. The program includes monitoring wells, soil samples, and water samples for identification of potential sources of soil contamination.

RAI 15

Provide Aquatic Resource Information

The ER Supplement does not contain aquatic resource information. Please provide a current, basic description of the aquatic species and habitat.

GNF-A Response

Aquatic communities in the vicinity of the Wilmington Site mainly exist in the Northeast Cape Fear River and its associated tributaries and creeks. The Northeast Cape Fear River is a blackwater river that has relatively low levels of dissolved oxygen and higher turbidity than the Cape Fear River. The Northeast Cape Fear River and its tributaries have a naturally low pH and are classified as swamp water by the NC DENR DWQ. At the Wilmington Site, the river is tidally influenced. Salinity concentrations vary with the rate of freshwater input and the amount of tidal exchange.

On the Wilmington Site, there are three streams that provide habitat to aquatic wildlife. Two of the streams, unnamed tributaries 1 and 2 (located in the Swamp Forest community in the Western Site Sector), drain to the Northeast Cape Fear River. The remaining stream is located on the Eastern Site Sector and drains northward to Prince George Creek. The first two unnamed tributaries to the Northeast Cape Fear River are classified as freshwater streams, but their lower reaches are tidally influenced by the river. The third stream, the unnamed tributary to Prince George Creek, is a freshwater stream and is not tidally influenced within the Wilmington Site.

All three streams are capable of accommodating the aquatic species associated with the neighboring Northeast Cape Fear River. However, the tidal variations in dissolved oxygen and salinity may affect the suitability of the habitat for some species. Eastern mosquitofish (*Gambusia holbrooki*) were observed in unnamed tributary #1 to the Northeast Cape Fear River, as were a brown water snake (*Nerodia taxispilota*) and an adult blue crab (*Callinectes sapidus*). These species were observed above the point of tidal influence.

In addition, there are three small ephemeral ponds in the Western Site Sector and North-Central Site Sector, along with wetland areas through out the Site provide habitat. These areas provide a water source for wildlife found on the Site.

The Northeast Cape Fear River and its tributaries contain a variety of freshwater fish, but are also important nursery areas for marine fish. A mixture of freshwater and saltwater fish are found in the Northeast Cape Fear River, including channel catfish (*Ictalurus punctatus*), hybrid bass (*Morone saxatilis* x *chrysops*), largemouth bass (*Micropterus salmoides*), American shad (*Alosa sapidissima*), Atlantic croaker (*Micropogonias undulatus*), Atlantic stingray (*Dasyatis sabina*), Atlantic sturgeon (*Acipenser oxyrinchus*), and spotted seatrout (*Cynoscion nebulosus*). The species of fish that occupy the river and its tributaries will vary seasonally and will shift with the salinity of the water. The fish community of the river will be comprised of more estuarine species during drought conditions, when river salinities may be elevated (Barwick, 2007).

The nursery area is also important for blue crab. The Northeast Cape Fear River and Prince George Creek (downstream of the Wilmington Site) are used by blueback herring for spawning and by American shad and striped bass as nursery grounds. Atlantic and Shortnose sturgeon also use the Northeast Cape Fear as a nursery, but they do not ascend into smaller tributaries (NOAA, 2002).

Both commercial and recreational fishing occur on the Northeast Cape Fear River. Commercial fishing is more prevalent downstream of the Wilmington Site and in the Cape Fear River Estuary. Commercial and recreational fishing of American shad and striped bass takes place on the Northeast Cape Fear River at

the Wilmington Site (NOAA, 2002). In addition to fishing for these anadromous fish, the Northeast Cape Fear River offers freshwater fishing of largemouth bass, catfish, herring, and American and hickory shads. Spring is peak season for largemouth bass and bluegills. Catfish, which are non-game fish, are typically caught in April, May, September, and October.

Spring, summer, and fall seasons generally yield significantly higher commercial landings than the winter season (approximately 10% of the total seafood mass harvested in 2006 was landed in winter months) (Bianchi, 2007). In 2006, nearly 1,727,795 pounds (783,800 kg) of commercial fish and shellfish were harvested by commercial fisheries in New Hanover County. The reported economic value of commercial fishing landings in the county amounted to \$2,347,701 for the 2006 calendar year (NC DMF, 2007).

The annual economic value of recreational fishing on the Cape Fear River Basin (including the Northeast Cape Fear River sub-basin) was estimated at approximately \$1.03 million for the survey period of July 1, 2003, to June 30, 2004 (Ashley and Rachels, 2005). The Cape Fear River offers better fishing opportunities for catfish and sunfish, whereas the Neuse and Chowan rivers in North Carolina are better for striped bass, white perch, and crappie. Compared with the Neuse and Chowan rivers, the Cape Fear River has fewer tournaments for largemouth bass anglers. This low number of bass tournaments on the Cape Fear River lessens the economic value of the recreational fishery compared to others rivers in the state (Ashley and Rachels, 2005).

RAI 16

Provide Nonradiological Air Permit and Emission Information

The ER Supplement indicates that the site operates under a North Carolina Department of Environment and Natural Resources air permit. The ER Supplement also indicates that the State reviews air emissions levels when the permit is renewed and an emissions inventory report for toxic air pollutants is submitted every 5 years. However, the ER Supplement does not provide information concerning permit limits and conditions or any nonradiological air emission levels or concentrations. Please provide the following:

- (1) Identify all air permits that pertain to the GNF-A complex.*
- (2) Explain whether each permit applies specifically to facilities that fabricate fuel (and the related or supporting activities) or the entire Wilmington complex (including enrichment test loop operations, aircraft engines operations, etc.).*
- (3) Describe the limits and conditions (i.e., emissions levels or process throughputs) for each permit for both National Ambient Air Quality Standards and National Emissions Standards for Hazardous Air Pollutants.*
- (4) Provide the relevant information (i.e., measured or modeled emission levels or process throughputs) for comparison to permit limits and conditions.*

GNF-A Response

(1) Air Permit 1756R17 is the current permit for GNF-A air emission sources (FMO & FCO). Air Permit 1161R19 is the current permit for GE-H (SCO) and GE Aviation (AE) air emission sources. Both air permits are synthetic minor air permits.

(2) Air permit 1756R17 applies to the GNF-A facilities that fabricate fuel (FMO) and zirconium fuel bundle components (FCO). A separate air permit (1161R19) applies to GE-H (SCO) and GE Aviation (AE) air emission sources. Other parts of this facility do not have air emissions sources requiring an air permit.

(3) This facility is located in an area that is in compliance with the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. Since this facility is in an attainment area, NAAQS does not apply. National Emissions Standards for Hazardous Air Pollutants do not apply because this facility is not considered a major source of Hazardous Air Pollutants. The synthetic minor air permits specify the conditions and limitations for the permitted air emission sources in order to remain below major source (Title V) applicability. For the GNF-A facility, permit 1756R17 specifies the operation and maintenance requirements for each permitted air emissions source and/or air cleaning device. Each permit requirement is verified by the Site NC DENR Air inspector annually.

(4) For the GNF-A air permit 1756R17, the following permit limits and conditions apply. The emissions inventory data was submitted to NC DENR in 2004 for Calendar Year (CY) 2003.

- Incinerator charge rate shall not exceed 1,200 pounds per hour as required by the permit. Maximum charge rate in 2007 was 315 pounds per hour.
- Toxic Air Pollutant (TAP) limit for HF emissions from the HF recovery building shall not exceed 0.63 pound/day and 0.064 pound/hour. Actual HF emissions reported for this source was 1.68 pounds/yr which equates to 0.005 pound/day and 0.00019 pound/hour.
- Facility-wide emissions shall be less than 100 tons/yr SO₂, 100 tons/yr NO_x, 10 tons/yr HF, and 100 tons/yr PM₁₀. Actual facility-wide emissions reported were 0.18 ton/yr SO₂, 7 tons/yr NO_x, 0.16 ton/yr HF, and 0.43 ton/yr PM₁₀.
- Operating hours of the 650 kW generator shall not exceed 240 hours/yr per permit. Actual total operating hours in 2007 was 45 hours.
- Operating hours of the two 1,250 kW generators shall not exceed 1,320 hours per generator per year. Actual total operating hours in 2007 for each generator was 44 hours and 35 hours.
- The sulfur content of the #2 fuel oil used for the boilers shall be limited to 0.4 percent by weight and for the generators shall be limited to 0.2 percent by weight. Actual sulfur content in the #2 fuel oil does not exceed 0.05 percent by weight.
- Each washing column in the HF building shall maintain a minimum water flow rate of 20 liters per hour. The actual minimum flow rate is set at 25 liters per hour.
- To ensure enforceability of the facility-wide PM₁₀ emissions limit of 100 tons/yr, preventative maintenance (PMs) for all permitted scrubbers and fabric filters in operation shall be performed. PMs are performed as required by the air permit and tracked in an electronic database.

RAI 17

Clarify the Wastewater and Stormwater NPDES Description and Expand if Appropriate

The ER Supplement indicates that the process and sanitary wastewaters are regulated under NPDES and that the site has an individual stormwater NPDES permit. Exhibit E-2, in the ER Supplement, identifies five surface water sampling points (outfalls) and the associated sampling parameters and frequency. However, it is not clear which outfalls are associated with the NPDES permit. In addition, the sampling parameters and frequency in Exhibit E-2 do not appear to match the sampling information presented in the Memorandum of Agreement (North Carolina Division of Water Quality, 200S), revising the NPDES requirements for upstream and downstream water quality monitoring. Other exhibits in the ER Supplement provide sampling information for the five outfalls, but compliance limits are only identified for the process and sanitary wastewater streams. It is unclear whether all permit conditions have been identified. Based on the description in the ER Supplement in Section E-13 and Exhibit E-2, it is unclear how many sampling points are used for NPDES compliance monitoring or whether there is just one wastewater NPDES permit for the GNF-A complex. Please provide the following:

- (1) Identify all NPDES permits with which the entire Wilmington complex must comply.
- (2) Explain which outfalls are associated with each permit and whether each permit applies specifically to the fuel fabrication (and related or supporting activities) or the entire Wilmington complex.
- (3) Relate the sampling parameters and frequency description in the ER Supplement to those in the Memorandum of Agreement.
- (4) If warranted, include limits and conditions of each permit and relevant compliance data for comparison to these limits and conditions.

GNF-A Response

- 1) The Wilmington Site has two National Pollutant Discharge Elimination System (NPDES) permits. Both NPDES permits are associated with the whole GE (landlord or contiguous property ownership) Site and are not associated with any singular business, building or operation on the Site. They are:
 - a) Wastewater, (Process) and (Sanitary), NC0001228
 - b) Stormwater, NCS000022
- 2) The first NPDES permit (NC0001228) has two treatment systems and two separate discharge points (outfalls) to the surface waters of North Carolina. Process Wastewater is discussed in Section E-13 of the ER Supplement and the discharge point is shown on Exhibit C-4 of the ER Supplement. Sanitary Wastewater is discussed in Section E-14 of the ER Supplement. The sanitary discharge point is shown on Exhibit C-6 of the ER Supplement. Effective April 1, 2008, the treated waters for the sanitary plant are being re-cycled back into the industrial use waters for the plant Site, primarily to one of the Site's cooling towers. The recycled volume averages 35,000 gallons per day.

The second NPDES permit (NCS000022) authorizes Site Stormwater discharges. The stormwater drainage system collects drainage water from the developed areas of the facility and discharges through 16 outfalls. Required analytical samples are taken at Outfalls 9, 13, and 14, which are considered representative sample points for the system. The conditions of the permit require the Table RAI 17-1 parameters to be sampled semi-annually as part of the stormwater monitoring program.

Table RAI 17-1. NPDES (Stormwater) Permit Benchmark Sampling Requirements.

Discharge Characteristic	Units	Sample Type	Sample Location	Benchmark
Lead, total recoverable	mg/L	Grab	9	0.0338
Oil and Grease	mg/L	Grab	9,13,14	30
pH	standard	Grab	9,13,14	4.3 - 9
Total Suspended Solids	mg/L	Grab	9,13,14	100
Total Rainfall	Inches	---	---	
Rainfall Event Duration	Minutes	---	---	

- 3) NPDES Permit NC0001228 (process and sanitary) waives in-stream monitoring requirements contingent on GNF-A maintaining membership in the LCFRBMC (Lower Cape Fear River Basin Monitoring Coalition). GNF-A has maintained continuous membership in the LCFRBMC.

The Memorandum of Agreement (MOA) establishes the framework for a unified monitoring program between the LCFRBMC and the North Carolina State DWQ (Division of Water Quality). This

agreement facilitates a single, comprehensive monitoring program for all LCFRBMC NPDES Permit holders.

Due to participation in the LCFRBMC MOA, the North Carolina State DWQ has waived certain site-specific NPDES in-stream monitoring requirements. The GNF-A NPDES permit in-stream monitoring requirements that have been waived are: dissolved oxygen, temperature and conductivity. The sampling parameters and sample frequency description in the ER Supplement (Section E-13 and E-14) do not include a listing or discussion of the in-stream monitoring covered by the MOA.

The sampling parameters and frequency description in Section E-13 of the ER Supplement are for process wastewater and Section E-14 covers sanitary wastewater. These two processes are separate systems within NPDES permit NC0001228.

Exhibit E-2 (page 1 of 3) "Discharge from final process basins", lists the NPDES permit monitoring requirements for the process wastewater treatment completed at the discharge monitoring point. The same exhibit (Exhibit E-2), in the section called "Discharge from sanitary wastewater treatment facility", lists the NPDES permit monitoring requirements at the discharge point for the sanitary wastewater treatment facility.

- 4) Due to the Site's good standing and excellent NPDES compliance history with North Carolina State DWQ, the limits, permit conditions and extensive compliance sampling data are not included here.

RAI 18

Clarify the Short-Term and Long-Term Management of Low-Level Radioactive Waste

Section 7.2.3.6 of the 2007 License Renewal Application and the previous EA state that noncombustible low-level radioactive waste is sent offsite for disposal. However, the flowchart in the ER Supplement indicates that noncombustible low-level radioactive waste is stored onsite and that combustible low-level radioactive waste is incinerated onsite. During the site visit, GNF-A staff indicated that the incinerator had not been in operation for about 2 years. Please provide the following:

- (1) Clarify the current manner in which noncombustible low-level radioactive waste is managed including onsite storage capacity.*
- (2) Clarify the long-term plans (over the 40-year license renewal period) for managing noncombustible low-level waste if shipping to Barnwell is not an option.*
- (3) Describe the management of combustible low-level waste, including the storage capacities and any impacts of storage along with the processing capabilities and utilization of the onsite incinerator.*

GNF-A Response

- (1) Noncombustible low-level radioactive waste is stored on site until a sufficient quantity is available to make efficient shipments to an offsite licensed burial facility. Adequate storage capacity is available within controlled areas to safely accommodate the current and anticipated volumes of noncombustible waste.
- (2) The noncombustible low-level waste for the site is not sent to Barnwell for disposal. Instead, a contract is in place with Energy Solutions and the waste is buried at their licensed facility in Clive, Utah.

(3) The onsite incinerator has been restarted and is available for the treatment of combustible low-level waste. The incinerator is processing, on average, approximately 10 waste boxes (64 ft³ each) per week. Adequate storage capacity is available within controlled areas to safely accommodate the current and anticipated volumes of combustible low-level waste.

RAI 19

Provide Generation Rates for Solid Waste Streams

The ER Supplement did not provide generation rates for the following solid waste categories: low-level radioactive (combustible and noncombustible), hazardous, and nonhazardous. Please provide the generation rates for these waste categories for at least the last 3 years as well as future projections for the term of the renewal and indicate whether the rates provided are for the fuel fabrication and related or supporting activities or for the entire Wilmington complex. The generation rates for the fuel fabrication and supporting activities are of primary interest. Data for at least the last 3 years is requested so that trends and variations can be identified.

GNF-A Response

Low-level radioactive waste generation rates related to fuel manufacturing and supporting activities are shown below. Data is provided for the last three years. The higher waste volumes for 2005 and 2006 were due to dredging of the process lagoons.

Low-level radioactive waste generation from fuel manufacturing in the future is expected to remain at approximately the same volumes/rate based on operational capacity and business projections.

	Non Combustible (ft3)	Combustible (ft3)
2005	367,213 Note (1)	22,272
2006	161,300 Note (1)	18,560
2007	60,362	17,408

Note (1) - Includes soil like material generated from lagoon dredging.

Hazardous, Non-Hazardous and Municipal Solid Waste Volumes for the Wilmington Site are as follows:

Year	² Hazardous (ton)	³ Non- Haz (ton)	Municipal Solid Waste (ton)
2005	2670	2610	1445
2006	2200	2930	1422
2007	1290	2160	1418

All weights are from entire Wilmington Site Complex

² 99.8% of haz-waste is from Zircaloy fuel rod cladding manufacture.

³ 50-60% of totals from Aircraft facility metal recycle.

Hazardous waste generation dropped significantly in 2007 due to improvements in the fuel rod cladding etch process. Hazardous waste generation rates will be driven by production rates and are expected to increase slowly over time from the 1200-1500 tons per year range. Non-hazardous material generation

will be driven in large part by GE Aircraft Engines production rates. The GNF contribution to non-hazardous waste is only partially related to production rates and is expected to remain flat or increase very slowly over time. Municipal solid waste generation is proportional to total site population and increases are expected to be offset by conservation and recycling efforts. The Municipal solid waste stream volume should generally remain stable.

RAI 20

Identify the Amount of Dilute Hydrofluoric Acid Waste Generated From the Dry Conversion Process and Verify the Characterization and Management of this Waste

Section C-1 of the ER Supplement states that the dilute hydrofluoric acid (typically 1 - 2%) from the DCP is neutralized through the sites NPDES-permitted waste operations. Please provide the following:

- (1) Identify the amount of dilute hydrofluoric acid waste generated.*
- (2) Verify that the characterization of the waste as "typically 1-2%" is accurate.*
- (3) Describe the management (i.e., treatment and disposal) of this waste.*

GNF-A Response

- (1) In 2007, 116,020 gallons of dilute HF were generated and treated on site.
- (2) Dilute HF generated in 2007 averaged 1.2% concentration with a range of 0.45% - 3.0%. 88% of the shipments were less than 2% HF concentration.
- (3) The dilute aqueous HF waste stream from the dry conversion process (DCP) is transferred to the Waste Treatment facility in approximately 4500 gallon batches. At Waste Treatment, the dilute HF is mixed with lime (calcium hydroxide) to form calcium fluoride (CaF₂). The CaF₂ is dewatered, and the solids are collected and included with the other non-combustible low level radioactive wastes shipped to the Energy Solutions disposal facility in Clive, UT. The liquid effluent from the dewatering unit is pH adjusted and combined with the treated radiological waste from FMO in the aeration basin and final process lagoons. Before the treated wastewater is discharged to the effluent channel, the water is tested at various sample points. If the pH needs to be further adjusted, the water is retained and treated until the proper pH levels are obtained.

RAI 21

Clarify the Management of All Resource and Recovery Conservation Act Hazardous Waste

Exhibit C-7 in the ER Supplement identifies two types of Resource Conservation and Recovery Act (RCRA) hazardous wastes and indicates that both are treated and/or disposed of offsite. Exhibit C-8 identifies four types of RCRA waste (including alkaline cleaner) that, according to the previous EA, were treated onsite and discharged as a liquid effluent. Please clarify the treatment and disposal of all RCRA waste.

GNF-A Response

Exhibit C-7 in the ER Supplement summarizes some of the highest volume solid wastes generated on-site and sent off-site for treatment, disposal, or recycle.

Exhibit C-8 in the ER Supplement summarizes the higher volume RCRA hazardous wastes generated on-site.

RCRA wastes are transported off-site by a permitted hauler and taken to a permitted TSD (Treatment, Storage, and Disposal) facility for recycle, treatment, or disposal. The only exceptions to this are alkaline cleaner, which undergoes elementary neutralization on-site, and used sodium hydroxide, which is taken off-site by a permitted hauler for beneficial re-use.

RAI 22

Provide Historical Radiological Dose Exposure Data for the Liquid Effluent Pathway for Compliance with Public Health Regulations

Dose calculations for public exposure to airborne effluent releases were included in the ER Supplement, but similar calculations for public exposure to liquid effluent releases were not included. The ER Supplement states that direct inhalation of airborne releases is the most likely intake pathway for the public. However, the ER Supplement indicates that the largest annual dose calculation for airborne exposure from 1995 to 2005 was at 4 percent of the 10 CFR Part 20 limit, while the largest concentration measured at the liquid effluent site discharge location over the same time period was at 41 percent of the 10 CFR Part 20 limit. The level of public exposure to the combined effluents is unclear. Please provide historical public exposure data (dose calculations for at least the last 5 years) for the liquid effluent pathway for comparison to 10 CFR Part 20 limits. Data for at least the last 5 years is requested so that trends and variations can be identified.

GNF-A Response

Actual radioactivity values from sampling data and actual liquid effluent flow from the Final Process Lagoon Effluent were used to calculate the liquid effluent concentration data for the last five years.

The uranium liquid effluent limit in 10 CFR 20 Appendix B is 3E-07 $\mu\text{Ci/mL}$.

Liquid effluent concentrations and public dose estimates for the last 5 years are as follows:

	Maximum Projected TEDE ⁽¹⁾
2007: 7.11E-08 $\mu\text{Ci/mL}$	12 mrem/yr
2006: 8.58E-08 $\mu\text{Ci/mL}$	14 mrem/yr
2005: 1.25E-07 $\mu\text{Ci/mL}$	21 mrem/yr
2004: 9.29E-08 $\mu\text{Ci/mL}$	15 mrem/yr
2003: 5.44E-08 $\mu\text{Ci/mL}$	9 mrem/yr

⁽¹⁾ Assumes liquid effluent concentration continuously ingested over course of a year

RAI 23

Provide Historical Radiological Dose Exposure Data for Compliance with Occupational Health Regulations

Dose calculations for workers are not included in the ER Supplement. Please provide historical occupational exposure data (dose calculations for at least the last 5 years) for comparison to 10 CFR Part 20 limits. Data for at least the last 5 years is requested so that trends and variations can be identified.

GNF-A Response

Fuel manufacturing occupational collective dose (rem) and average and maximum worker dose (mrem) for the past 5 years are as follows:

Collective Dose (rem)

Year	CEDE	DDE	TEDE
2003	45	10	55
2004	58	11	70
2005	48	12	60
2006	50	10	60
2007	42	7	48

Average and Maximum Dose (mrem)

Year	Avg. TEDE	Max. TEDE
2003	69	510
2004	75	470
2005	64	560
2006	62	480
2007	50	530

RAI 24

Provide Occupational Injury and Fatality Rates and a Summary of Health Effects Studies

Occupational health data for workers is not included in the ER. Please provide the following and note whether the information provided is specifically for employees working to support fuel fabrication operations or for all employees at Wilmington complex:

- (1) Injury rates, such as the total recordable incident rate, and the relevant industry standard for comparison.*
- (2) Occupational fatality rates or fatalities.*
- (3) Existence and summary information of any health effects studies.*

GNF-A Response

A summary of fuel manufacturing work related injuries and illnesses and comparison rates are as follows:

2007: I&I: 1.1, DART: 0.42, Fatalities: 0	Comparison NAISC rate (data not available)
2006: I&I: 1.3, DART: 0.75, Fatalities: 0	Comparison NSISC rate I&I: 2.9, DART: 1.5
2005: I&I: 0.5, DART: 0.17, Fatalities: 0	Comparison NSISC rate I&I: 2.5, DART: 1.4

I&I = Injury and Illness rate

DART= injuries involving Days Away, Restricted, or job Transfer rate.

There are no known health effect studies specific to the Wilmington facility.

RAI 25

Identify Reasonably Foreseeable Future Actions and Cumulative Impacts

The ER Supplement does not include adequate information to facilitate an evaluation of the cumulative impacts of a 40-year renewal of the GNF-A license. Please identify and discuss any known current and reasonably foreseeable future actions taking place at the Wilmington complex, which are not related to fuel fabrication operations that may cumulatively impact the affected area, including the General Electric (GE) laser enrichment test loop and the potential GE laser enrichment facility, as well as local activities outside of the Wilmington complex.

GNF-A Response

Off-Site Future Actions

Most of the industrial development in the vicinity of the Wilmington Site is on the northeast side of the Northeast Cape Fear River. No new industrial developments are known to be planned in the immediate vicinity of the Wilmington Site on the east side of the river. A developer is proposing a new 237-acre (95-ha) continuing care retirement community (River Bluffs subdivision) that would be built on the undeveloped land parcel bounded by the Wilmington Site's southern property line, I-140, and the Northeast Cape Fear River (New Hanover County Planning Board, 2008).

On-Site Future Actions

There are four (4) on-site planned future actions not related to fuel fabrication operations that may cumulatively impact the affected areas. These actions include the ATC II Complex, the Tooling Development Center, the Global Laser Enrichment (GLE) Test Loop and Commercial Facility.

The ATC II office complex will be located adjacent to the existing ATC I office building in the southeastern portion of the Eastern Site Sector, near the south gate Wilmington Site entrance. The entire project will disturb approximately 30 acres (12 ha) of the Wilmington Site. In preparation for the new office complex, the site has constructed a storm water retention pond and has installed a new parking lot and a set of temporary trailers in front of the existing ATC I building. The temporary trailers will serve as offices until the new complex is completed. There will be no effluents from these activities aside from those associated with construction and sanitary waste. The facility will require an estimated 7,500 gallons (28,400 liters) of potable water, and it is conservatively assumed that there will be no consumptive losses and the same volumes of sanitary wastewater would be generated for treatment in the existing Wilmington Site sanitary WTF which can accommodate the increase.

The Tooling Development Center will be located in the southwestern portion of the Eastern Site Sector. It will consist of five new buildings and will disturb approximately 30 acres (12 ha) of the Wilmington Site.

The facility will require an estimated 5,000 and 11,000 gallons (18,900 and 41,600 liters) of process water and potable water, respectively, and it is conservatively assumed that there will be no consumptive losses and the same volumes of process and sanitary wastewaters would be generated for treatment in the existing Wilmington Site final process lagoon facility and sanitary WTF, respectively which can be accommodated by the treatment facilities. No radioactive material will be used in the Tooling Development Center buildings, and no air permits will be required. Approximately 0.75 miles (1.2 km) of new road will be constructed in the Eastern Site Sector in order to access the Center.

The cumulative impacts of the GLE Test Loop are minimal as discussed in the SNM-1097 Test Loop license amendment request. The impacts from the Commercial Facility are expected to be small and will be addressed in a separate Environmental Report submittal for the GLE Commercial Facility license application.

The cumulative impacts of the facilities and actions described above are anticipated to be small.