

21G-10-0110
GOV-01-55-04
ACF-10-0143

Attachment I

Response to RAI

40 pages to follow

Response to RAI

RAI 1

Expand description on the magnitude of trucking activities associated with current and proposed activities.

The licensee's environmental report provides only a brief discussion on transportation activities associated with licensed activities at the NFS Plant. Additional information is needed to adequately evaluate the potential environmental impacts related to transportation. The information needed includes the following:

- (1) Estimate the number of trucks that cross the NFS site boundary annually (i.e., number of shipments) stratified by the type of material that is shipped including (i) nonradioactive hazardous materials, (ii) radioactive hazardous materials, and (iii) nonradioactive nonhazardous. Values can be based on past activities or projections for future activities or a combination of both provided the estimates are considered representative of expected activities during the proposed license renewal period. If this information has been previously reported or documented, then provide the citation for the reference. If this information is excessively burdensome to obtain, practical alternatives should be discussed further with NRC.
- (2) State whether decommissioning waste shipments are expected to represent the majority of the cumulative highway miles traveled for NFS shipping activities over the life of the facility, and identify the location of the site(s) where the material is expected to be disposed. This information is needed for staff to verify the estimate of calculated traffic fatalities that was included in a previous environmental assessment (NRC, 1999) for the prior NFS license renewal. If decommissioning shipments do not represent the majority of shipping miles that are expected, then NFS should provide an estimate of the cumulative highway miles traveled for all trucking activities for the life of the facility.
- (3) Provide an estimate of the number of waste shipments that are expected from decommissioning activities (a) planned to occur during the proposed renewal period of 40 years; (b) planned to occur during the initial 10 years of the proposed renewal period of 40 years; and (c) that would occur should the license renewal application be denied and the facility decommissioned.

NFS Response 1:

- (1)
 - i) Trucks transporting Non-radioactive Hazardous Materials – 74 per year
 - ii) Trucks transporting Radioactive Hazardous Materials – 267 per year
 - iii) Trucks transporting Non-radioactive Non-hazardous Materials – 204 per year
- (2) Decommissioning waste shipments are expected to represent the majority of the cumulative highway miles traveled for NFS shipping activities over the life of the facility. The primary disposal location sites for decommissioning waste shipments are Clive, Utah (EnergySolutions) and Mercury, Nevada (Nevada Test Site).
- (3) The following is an estimate of the expected number of waste shipments from decommissioning activities:
 - a) 1732 shipments are planned to occur during the proposed renewal period of 40 years.
 - b) 433 shipments are planned to occur during the initial 10 years of the proposed renewal period of 40 years.
 - c) 6917 shipments would occur should the license renewal application be denied and the facility decommissioned.

RAI 2

Clarify whether rail is used as a transportation mode associated with current and proposed activities.

The licensee's environmental report mentions the Carolina, Clinchfield, and Ohio rail line adjacent to the site but includes no information on whether NFS uses rail for shipment of any materials or supplies. Clarify whether NFS uses the rail line to support licensed activities at the NFS Erwin plant and, if so, whether this mode is used for any hazardous material or radioactive material shipments. This information is needed to adequately evaluate the potential environmental impacts related to transportation.

NFS Response 2:

NFS uses this rail line to support licensed activities at the NFS Erwin plant, primarily for radioactive waste shipments.

RAI 3

Clarify whether other environmental or risk assessments associated with NFS activities are available and whether NFS is relying for its transportation analysis on other documented environmental or risk assessments.

In its environmental report, NFS references a prior U.S. Department of Energy (DOE) Final Environmental Impact Statement (EIS) (DOE, 1996) that evaluated the potential environmental impacts of the national program to dispose of surplus high-enriched uranium. NFS downblending activities support this program. In 2007, DOE analyzed whether the EIS needed to be supplemented and concluded that no supplement was needed (DOE, 2007). However, the supplement analysis contains information on planned changes to the program.

Discuss whether the transportation analysis in the ER is consistent with the 2007, supplement analysis issued by DOE. Clarify whether, for its transportation analysis, NFS is relying on any other documented environmental or risk analyses (e.g., from other agencies such as DOE or the U.S. Navy) that apply to other parts of NFS operations. This information is needed to adequately evaluate the potential environmental impacts related to transportation.

NFS Response 3:

The transportation analysis in the environmental report is consistent with the 2007 supplement analysis issued by DOE.

Nuclear Fuel Services is not relying on any other documents besides the two DOE Documents referenced in the previous paragraph.

RAI 4

Provide a discussion on the current status of cyanide, copper, and zinc levels in Banner Spring Branch and a discussion of the monitoring program for these constituents.

According to information in NRC's 1999 environmental assessment for the renewal of SNM-124, NFS noted that non-radiological constituents were detected in surface water samples at concentration levels above the Tennessee Water Quality Criteria or the Environmental Protection Agency (EPA) drinking water maximum contaminant levels. In particular, total cyanide, nitrate/nitrite, copper, and zinc concentrations were detected at elevated concentrations in downstream locations on Banner Spring Branch (NRC, 1999, p. 3-26). In order to assess the potential environmental impacts associated with these non-radiological constituents, additional information is needed.

Therefore, please provide details on the current monitoring program for cyanide, copper, and zinc in the Banner Spring Branch. Highlight any changes in the monitoring program that have occurred since 1999, the basis for the changes, and any regulatory review of the changes.

Provide the annual-average concentrations for these constituents over the most recent 5-year period for which these concentrations were determined.

NFS Response 4:

The data provided in the NRC's 1999 "Environmental Assessment for Renewal of SNM-124 License" was 1998 data. This data was collected for the NPDES Industrial Storm Water Permit (TNR050873). The storm water samples were collected prior to discharge into Banner Spring. Table 1 (1994-2009 Storm Water Data) demonstrates the monitoring frequency, annually, and analytical results for cyanide, nitrate/nitrite, copper, and zinc in accordance with NPDES Permit No. TNR050873. A review of these attributes from 1994-2009 demonstrates that zinc was above the benchmark concentration once and nitrate/nitrite has been above the benchmark concentration every time but once. An investigation into the zinc level was conducted but no contributor could be identified. An investigation into the nitrate concentrations was conducted during 2000. The investigation could not identify any specific contributors; however, it did identify that surface water and the background monitoring well on the NFS site are 2.5 times higher in nitrate than the benchmark of 0.68 mg/l. The state of Tennessee and the Johnson City Environmental Assistance Center were notified of these analytical results.

It is important to note that on November 17, 2003, Banner Spring Branch (BSB) was relocated. The spring was enclosed inside a pipe, which runs northeasterly and northwesterly across the site. It flows inside the closed pipe until it comes to within approximately thirty (30) feet of Martin Creek, where it discharges into an open trapezoidal flume. The spring discharges from the open flume into Martin Creek. This enclosure and relocation of the spring was completed in support of the remediation efforts being performed at the North Site. Details are documented in the License Amendment Request to Remove Sampling Requirements for Banner Spring Branch dated April 5, 2004. The amendment was approved by NRC on September 13, 2004.

See Enclosure A for referenced documentation.

RAI 5

Provide confirmation that the agency issuing the discharge permit has agreed with NFS's investigation concluding that elevated nitrate and magnesium concentrations are naturally occurring in surface and groundwater at the site.

NFS presented annually sampled stormwater data for 2007 and 2008 in Tables 27 and 28 of the ER. The licensee reported that nitrate and magnesium concentration levels in storm water runoff exceeded the National Pollutant Discharge Elimination System cutoff concentration limits. Based on its investigation, NFS concluded that elevated nitrate and magnesium concentrations in storm water were consistent with naturally-occurring elevated nitrate and magnesium concentration levels in surface and groundwater. However, NFS did not indicate the results of the permitting agency's determination regarding the source of the elevated concentrations.

Provide the results of the permitting agency's review regarding the source of the elevated nitrate and magnesium concentrations, as measured in storm water discharge samples from the NFS site.

NFS Response 5:

Enclosure B describes NFS and State of Tennessee correspondence concerning nitrate and magnesium concentrations in storm water.

See Enclosure B for referenced documentation.

RAI 6

Provide a discussion of the basis for terminating certain water quality measurements in local surface water bodies in 2003.

In Section 6.2.2 of the ER, NFS states that in 2003, it stopped monitoring for ammonia, nitrates, fluoride, mercury, and acidity/alkalinity in the Nolichucky River, Martin Creek, and Banner Spring Branch due to NFS's assessment that available data did not demonstrate a statistical trend or change due to plant operations. However, NFS did not indicate the results of the permitting agency's review of the end of this monitoring.

Provide a discussion of the basis for terminating the monitoring for ammonia, nitrates, fluoride, mercury and acidity/alkalinity in the Nolichucky River, Martin Creek, and Banner Spring Branch, and include any regulatory approval of these changes in the surface water monitoring program.

NFS Response 6:

Monitoring for ammonia, nitrates, fluoride, mercury, and acidity/alkalinity in the above three water bodies was not an SNM-124 License or state of Tennessee requirement. Sampling for these attributes was discontinued because all were within National Primary Drinking Water Standards and no significant statistical trends or change due to plant operations existed. There were no requirements for NFS to make notification to a state or federal agency upon discontinuation of sampling.

RAI 7

Provide additional information on the status of remediation efforts for identified radiological and non-radiological groundwater contaminant plumes.

Historically, NFS reported plumes of uranium; tetrachloroethylene; trichloroethylene; 1,2-dichloroethylene; and vinylchloride at the NFS site and their potential offsite excursions toward the Nolichucky River (NRC, 1999, p. 5-2). Further, in its ER, NFS states that certain constituents (tetrachloroethylene; trichloroethylene; 1,2-dichloroethylene; vinylchloride; tributyl phosphate; and uranium) are at concentrations above drinking water maximum concentration levels in the deep alluvium/shallow groundwater systems at the site (NFS, 2009a, Section 4.4). To address this situation, NFS has conducted decommissioning and remedial work and provided the results to the Tennessee Department of Environment and Conservation, Division of Hazardous Waste Management, and EPA (NFS, 2009a, pp. 4.13 and 6-5). NFS also states that the Erwin Utilities "Railroad Well" does not appear to intersect the contaminant plume at the NFS site based on its numerical groundwater simulations (NFS, 2009a, p. 4-3).

Provide the following:

- (1) Information on the remedial techniques being used by NFS to address identified groundwater contaminant plumes;
- (2) Copies of the two most recent updates to the Facility Action Plan, with documentation of the regulatory authority's approval of these action plans; and
- (3) Figures that clearly display contours and labels for current contaminant concentrations in the deep alluvium/shallow groundwater systems.

NFS Response to RAI 7:

- (1) A groundwater plume of dissolved tetrachloroethylene (PCE) and dissolved uranium originates near the maintenance shop area of the NFS plant site. The dissolved uranium plume is all on site and has not migrated off site due to its high partitioning coefficient (Kd) with respect to groundwater migration, and the dissolved PCE plume has migrated off site due to its lower Kd. The dissolved PCE plume exhibits daughter products (trichloroethylene, 1,2-dichloroethylene, and vinyl chloride) of dissolved PCE within the plume as well prior to any remediation activities. In 1999, NFS performed a remedial alternatives analysis (RAA) for source control and remediation of the on-site sources of the groundwater plume near the maintenance shop area. The RAA selected In-Situ Reactive Zone (IRZ) technology for source control and remediation of the dissolved PCE and dissolved uranium plumes on site. The RAA is enclosed (Remedial Alternatives Analysis – Source Control Project, August 1999) and describes this remediation process. The IRZ remediates dissolved uranium

through reductive precipitation and stabilization through ferrous sulfate and remediates dissolved PCE through reductive dechlorination by enhancing anaerobic microbes indigenous to the aquifer to create a reducing zone conducive to groundwater remediation. A pilot test was conducted utilizing the IRZ from 2000 – 2002. Results showed an approximately 60% reduction in dissolved uranium and approximately 83% reduction in dissolved PCE. In 2002, the IRZ was implemented on a full scale basis. Dissolved uranium has been reduced from approximately 0.75 acres at baseline to approximately 0.18 acres as of the first 2009 sampling event, and dissolved PCE has been reduced from approximately 2 acres (on-site portion of the plume only) at baseline to approximately 0.18 acres as of the first 2009 sampling event. The first 2009 sampling event is enclosed (1st Semi-Annual 2009 Full Scale Data Package, February 23, 2010) and describes the most recent activities associated with the IRZ project.

A different remediation technology has been implemented for the off-site dissolved PCE and associated daughter products plume migrating toward the backwater area of the Nolichucky River. In 2007, BOS 100 was injected just upgradient of the backwater area of the Nolichucky River on a one time basis for reductive dechlorination of dissolved PCE as well as dissolved PCE daughter products. A copy of the report is enclosed (BOS 100 Injection Services, March 30, 2007) and summarizes this project.

The Railroad Well Capture Zone Analysis is enclosed to demonstrate that it does not appear to intersect the contaminant plume.

- (2) Two copies of the most recent updates to the Facility Action Plan are enclosed (2010 Facility Action Plan, January 2010; 2009 Facility Action Plan, January 2009) that summarize the years' activities. There is no formal regulatory approval process for these documents.
- (3) The most recent figures of the dissolved uranium and dissolved PCE concentrations, as well as dissolved PCE daughter products and dissolved tributyl phosphate in groundwater near the maintenance shop area, are displayed in the enclosed 1st Semi-Annual 2009 full scale data Package (1st Semi-Annual 2009 Full Scale Data Package, February 23, 2010) on Figures 2 through 7.

See Enclosure C for referenced documentation.

RAI 8

Clarify the discussion of downgradient water users and provide a justification for the 1.6-and 4.8-km [1-and 3-mi] radii used in the groundwater well search surveys.

In Section 3.4.2.2 of its ER, NFS references a 1996, report in stating that there are no known household, public, or industrial users of groundwater downgradient of the site. NFS also states that a water well survey was performed for the NFS site vicinity using data from the Tennessee Department of Environment and Conservation -Division of Water Supply. Clarify whether the results of the undated water well survey were consistent with the findings in the 1996 report.

Additionally, NFS presents some of the results of the water well survey in Tables 8 and 9 of the ER. The data in Table 8 and 9 cover public water systems within a 1.6 km [1 mi] and a 4.8-km [3-mi] radius of the NFS facility. NFS did not discuss its rationale for using these radii for its survey. This search distance is important in determining potential impacts of operational and decommissioning activities at the NFS site on nearby wells and public water systems.

Clarify the basis for the statement that there are no known household, public, or industrial groundwater users downgradient of the NFS site. Provide the NFS rationale for using the 1.6 km (1 mi) and 4.8 km (3 mi) radii for its search for public water systems near the NFS site.

NFS Response to RAI 8:

Water well surveys have been performed for NFS through the Tennessee Department of Environment and Conservation (TDEC) - Division of Water Supply at various times in the past in support of the routine groundwater program as well as groundwater remediation efforts. In order to obtain an underground injection permit from the Division of Water Supply for groundwater remediation efforts, a 1-mile radius database search is required to search public water systems and a 3-mile search of public water intakes is required. In addition to the 1-mile and 3-mile searches, NFS requested a well search of all intakes from adjoining quadrangles to account for areas outside of the 1- and 3-mile radii yet near the NFS site. Ultimately, results of the most recent well search had the same outcome as the 1996 well search with no known household, public, or industrial groundwater users downgradient of the NFS site. Immediately hydraulically downgradient of the NFS site is a CSX rail spur and an industrial park (NFS Industrial Park Facility and Impact Plastics, Inc.). The off-site dissolved PCE groundwater plume is a stable plume and has been defined both laterally and horizontally as evidenced by NFS Environmental Indicator (EI) Memorandum from the TDEC – Division of Solid Waste Management which states that the off-site PCE plume is defined and controlled (CA 750 Migration of contaminated groundwater is under control) and there is no risk associated with it (CA 725 Human exposures are under control). The EI Memorandum

is enclosed (Environmental Indicator Memorandum, 2004). Further, an independent risk evaluation of the off-site PCE plume has been performed by the ATSDR and its findings were Indeterminant Public Health Hazard for Past Conditions and No Apparent Public Health Hazard for Current and Future Conditions. The ATSDR study is enclosed (ATSDR, 2007). Both the EI Memorandum and the ATSDR Report agree with NFS Groundwater Risk Assessment which concluded that there are currently no unacceptable risks associated with the NFS Site. The Groundwater Risk Assessment (Nuclear Fuel Services, Inc. 1997) is enclosed.

See Enclosure D for referenced documentation.

RAI 9

Provide additional information concerning the hydrologic characterization of the NFS site.

In the ER, NFS discusses aspects of the groundwater systems beneath the NFS site. However, NFS does not provide a detailed discussion of the subsurface hydrology. Provide copies of or references to previous hydrologic characterizations of the NFS site and any associated modeling conducted in support of these characterizations.

NFS Response to RAI 9:

Two hydrogeologic reports have been performed for the NFS site in Erwin, Tennessee. The first hydrogeologic characterization study was performed in 1989 and is enclosed (Hydrogeologic Characterization Study NFS Facility, Erwin, Tennessee, March, 1989). The second hydrogeologic investigation was performed in the 1992/1993 timeframe and is also enclosed (1992/1993 Nuclear Fuel Services Hydrogeologic Investigation and Monitoring Well Installation Program, June 30, 1994).

In 1996, a groundwater model was performed for the NFS site in Erwin, Tennessee. At that time no off-site monitoring wells existed, but the on-site PCE and uranium plume was well documented based on on-site monitoring wells. The groundwater model predicted an off-site dissolved PCE plume, but not an off-site dissolved uranium plume. The 1996 groundwater model is enclosed (Final Project Report Groundwater Flow and Constituent Transport Modeling At The Nuclear Fuel Services Facility, April 25, 1996). After the 1996 groundwater model was performed, off-site wells were installed and confirmed what the 1996 groundwater model predicted. In 1999, the groundwater model was revised using data from the off-site monitoring wells as well as data from the on-site monitoring wells. The 1999 revised groundwater model is enclosed (Revised Groundwater Flow and Solute-Transport Modeling Report, February 1999). In the 2009/2010 timeframe, another revision to the groundwater model was performed to account for the groundwater remediation that had been on-going near the maintenance shop area utilizing the In-Situ Reactive Zone (IRZ) technology since the 1999 groundwater model had been performed. The 2009/2010 revised groundwater model is enclosed (Revised Groundwater Flow and Solute-Transport Modeling Report, February 2010).

See Enclosure E for referenced documentation.

RAI 10

Provide additional information about the onsite wetlands.

In its ER, NFS reported two onsite wetlands on the north side of the NFS site (NFS, 2009a, p. 3-2), but the exact location and hydrologic properties of these wetlands are not provided in the environmental report (NFS, 2009a). Because (i) the north site includes ponds and burial areas that have been under remediation; and (ii) the groundwater table in the alluvium aquifer is close to the ground surface at the NFS site, which would increase the likelihood of hydraulic connection between the alluvium aquifer and wetlands, provide the following additional information regarding the wetlands:

- (1) a detailed description and discussion, to include their exact locations on a site map, whether they are classified as U.S. water, their current status (whether they are wet or dry), and their potential hydraulic connections with the alluvium aquifer below; and
- (2) the status of the permitting process with the U.S. Army Corps of Engineers.

NFS Response 10:

- (1) Detailed description of wetlands

Figure 2 (NFS Site) shows the wetland areas in relationship to the NFS site. Wetland A is depicted in Photograph 1 (Wetland A) and Photograph 2 (Wetland A & Adjacent Area). Wetland B is shown in Photograph 3 (Wetland B) and Photograph 4 (Wetland B & Adjacent Area).

Wetland A

Wetland A is an area of 0.17 acres located on the north side of the NFS site, inside the Protected Area (see Figure 1, Wetland A). A site assessment of Wetland A was conducted on April 29, 2009, (see Figure 4, Wetland A Data Form Routine Wetland Determination, of Enclosure G).

The soil in Wetland A was evaluated using the Munsell Soil Color Chart. The soil test pit dig revealed a Munsell Soil Color Chart matrix of 2.5Y 2.5/1 for the topsoil horizon and 2.5Y 5/2 for the subsoil horizon. The black organic topsoil is approximately 1 inch to 6 inches deep and the sandy gray to brown subsoil starts at approximately 7 inches below the surface.

The hydrology within Wetland A was evaluated. The source of Wetland hydrology is groundwater. Depth to surface water level is zero (0) inches. Depth to free water in pit is approximately six (6) inches. The depth to saturated soil is zero (0) inches. Primary water indicator is saturation in the upper twelve (12) inches of soil with the secondary indicator facultative (FAC) neutral test.

The vegetation in Wetland A was typed to determine the presence of hydrophytic vegetation. The dominant vegetation in Wetland A is identified in Figure 4 of Enclosure G. The dominant wetland vegetative indicators are facultative wetland and obligate wetland vegetation.

The adjacent land use is depicted in Photograph 2 (Wetland A & Adjacent Area). To the south of Wetland A are manufacturing facilities, to the north and east are areas under decommissioning activity, and the west is a facility vehicle road.

Wetland A exhibits the criteria necessary to qualify as a jurisdictional wetland in accordance with the 1987 Corps of Engineers Wetland Delineation Manual.

Wetland B

Wetland B is a wooded wetland area of 0.18 acres located on the north side of the NFS site (see Figure 1, Wetland B). A site assessment of Wetland B was conducted July 20, 2007 and a reevaluation was performed August 3, 2009 (see Figure 5, Wetland B Data Form Routine Wetland Determination, of Enclosure G).

The soil in Wetland B was evaluated using the Munsell Soil Color Chart. The soil test pit dig revealed a Munsell Soil Color Chart matrix of 10Y 2/1 for the topsoil horizon and 10Y 3/1 for the subsoil horizon. The black organic topsoil is approximately 1 inch to 6 inches deep and the sandy dark gray subsoil starts at approximately 6 inches below the surface.

The hydrology within Wetland B was evaluated. The source of Wetland B hydrology is a wet weather spring and groundwater. Depth to surface water level is zero (0) inches. Depth to free water in pit is approximately twelve (12) inches. The depth to saturated soil is eight (8) inches. Primary water indicator is saturation in the upper twelve (12) inches of soil with the secondary indicator FAC neutral test.

The vegetation in Wetland B was typed to determine the presence of hydrophytic vegetation. The dominant vegetation in Wetland B is identified in Figure 5 of Enclosure G. The dominant wetland vegetative indicators are facultative plants.

The adjacent land use is depicted in Photograph 4 (Wetland B & Adjacent Area). To the south of Wetland B is Wetland A and manufacturing facilities, to the north and east are areas under decommissioning activity, and the west is a facility vehicle road.

Wetland B exhibits the criteria necessary to qualify as a jurisdictional wetland in accordance with the 1987 Corps of Engineers Wetland Delineation Manual.

- (2) The status of the permitting process with the U.S. Army Corps of Engineers.

On March 24, 2010 the U.S. Army Corps of Engineers issued File No. 2010-00144; Proposed Excavation/Filling of Two Wetland Areas Adjacent to Banner Spring Branch (Nolichucky River Tributary at Mile 9409R), in Erwin, Unicoi County, Tennessee (See Department of the Army Letter to B.M. Moore, dated March 24, 2009).

See Enclosures F and G for referenced documentation.

RAI 11

Provide terrestrial and aquatic resource information.

The ER summarizes vegetation and aquatic species near NFS (Section 3.5); however it does not provide information for these resource areas on the NFS site. The 1999 EA for the renewal of NFS' current license provided terrestrial information found on site. Provide any changes that have occurred during the last ten years with respect to vegetation. No past analysis was provided for aquatic species found on site. Provide a list of aquatic species found on site at NFS.

NFS Response 11:

In the last ten (10) years, a large part of the vegetation on the NFS site has been removed due to decommissioning activities. However, the typical vegetation on the NFS site is as follows: pine trees, oak trees, maple trees, sweet gum trees, black walnut trees, weeping willow, button bushes, golden rod, sweet gale, pussy willows, swamp milkweed, cardinal flowers, sweet scented Joe Pye weeds, blackberry bushes, and various species of fern and grass. The majority of this vegetation can be attributed to either terrestrial or aquatic wetland. Nuclear Fuel Services, Inc. has two wetland areas with aquatic vegetation described in Figure 4 (Wetland A Data Form Routine Wetland Determination) and Figure 5 (Wetland B Data Form Routine Wetland Determination).

Nuclear Fuel Services, Inc. utilizes several water management areas in support of decommissioning activities on the northern side of the site. These areas attract geese, ducks, turtles, and various amphibians.

See Enclosure G for referenced documentation.

RAI 12

Provide non-radiological air permit and emission information.

The ER indicates that facility non-radiological emissions are regulated by permit. Table 22, Section 4.12 of the ER identifies allowable limits for certain pollutants. It is unclear whether permit restrictions are limited to the allowable annual emission levels expressed in Table 22. Hydrogen and ammonia were not included, but these were identified as regulated compounds in the 2002, environmental assessment. Descriptions of the permits are needed to assess any potential impacts related to air resources.

- (1) Identify all air permits that pertain to the NFS site
- (2) Describe the limits and conditions (i.e., emissions levels or process throughputs) for each permit for both National Ambient Air Quality Standards (NAAQS) and National Emissions Standards for Hazardous Air Pollutants
- (3) Describe any changes in operations or facilities that resulted in permit modifications (i.e. not including Hydrogen and Ammonia).

NFS Response 12:

- (1) Table 3 lists the current air permits. NFS has filed timely operating permit and renewal applications for all air permits. NFS is currently waiting for the State of Tennessee to issue a Conditional Major Permit which will combine all existing permits into one permit. See Enclosure Q for current air permits.
- (2) NFS complies with process throughputs and emission levels as stated in permit applications and permit conditions.
- (3) There have been no changes in permitted operations or facilities that required permit modifications. Hydrogen and ammonia emissions were not stated initially in Table 22, Section 4.12, because they are not a criteria pollutant or hazardous air pollutant. All permitted emissions have been added to Table 22.

NFS did add a new high enriched uranium process operation in Building 301 in 2009. The purpose of the CDL process operation is to recover and process highly enriched uranium materials, some of which are fluorinated. NFS submitted an air permit application on March 18, 2008 to the State of Tennessee for the CDL process. As defined in parts 1200-3-9-.04(2)(a)3 and 1200-3-9-.04(4)(d)9 of the Tennessee Air Pollution Control Regulations, the state determined on May 8, 2008, that the new CDL process would be constituted as an insignificant activity/emissions unit and not require an operating permit. Specifically, the process operations result in potential emissions of

less than five tons per year of each air contaminant and each regulated air pollutant that is not a hazardous air pollutant, less than one thousand pounds per year of each hazardous air pollutant, and less than 0.1 millirem per year of radionuclides. NFS must operate the CDL process as stated in the permit application that was submitted to the state.

See Enclosure H for referenced documentation.

RAI 13

Expand discussion of the ER Table 22 data and related information.

The information in Table 22, Section 4.12 of the ER provides a single set of emission estimates and asserts this demonstrates compliance. A broader discussion is needed to encompass the range of NFS emissions, allow for identification of trends, and present a compliance history over time. Please provide the following:

- (1) Annual emissions for the years since the last license renewal (1999)
- (2) Identification of any large variations or trends in these emissions levels
- (3) Identification of any permit violations since the last renewal and for any such violations, a discussion of the causes and corrective actions including the findings of the appropriate regulatory agency regarding compliance

NFS Response 13:

- (1) Annual emissions vary based on process throughput and operating hours. NFS controls annual emissions by limiting the process inputs and monitoring process throughput data and hours of operation to show compliance with emission levels stated in permit applications and permit conditions.
- (2) There have been no significant trends or large variations in emission levels.
- (3) There have been no permit violations since the last license renewal (1999). The last State of Tennessee air pollution inspection was conducted on April 13, 2010 with no violations. A copy of the inspection report is provided in Enclosure I.

See Enclosure I for reference documentation.

RAI 14

Clarify whether any Greenhouse Gas (GHG) regulations apply to NFS and provide estimated GHG emissions.

The ER has no discussion of greenhouse gas emissions. EPA published a final rule (October 2009) requiring mandatory reporting of GHG emissions. Clarify any applicability to NFS under this recent rule issued by EPA, or any other regulations regarding greenhouse gases. If this rule or other regulations apply to NFS, provide estimates of projections for GHG emissions and the basis for the emission levels.

NFS Response 14:

The Mandatory Reporting of Greenhouse Gases (GHGs) under 40 CFR Section 98 requires reporting of annual emissions of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), perfluorochemicals (PFCs), and other fluorinated gases expressed in carbon dioxide equivalents (CO₂e). Applicability of the rule depends on the source categories located at a facility and, for some source categories, the emission level or production capacity.

NFS is a "Stationary Fuel Combustion Source," 40 CFR Section 98.30, Subpart C, due to the use of natural gas fired steam boilers, comfort heating furnaces, water heaters, clothes dryers, and space heaters. As required under Subpart C, NFS had to inventory and then total the maximum rated heat input capacity for all the stationary combustion units to determine reporting applicability. Since the maximum rated heat input capacity is less than 50 million British thermal units (Btu) per hour, NFS emits less than 25,000 metric tons of CO₂e and is not subject to the GHG reporting rule at this time.

RAI 15

Provide updated information and clarify NAAQS classification.

The ER states that as of January 1995, the areas within the Eastern Tennessee-Southwestern Virginia Interstate Air Quality Control Region were classified as in attainment for NAAQS as specified in 40 CFR 81.343 (Section 3.6). The most recent information is necessary to accurately assess impacts with respect to air quality. Provide more up to date information specifically for nitrogen dioxide, ozone (1-hour and 8-hour standards), and particulate matter PM_{2.5} for the region as stated in ER. Clarify whether the region is still classified as in attainment, and should the attainment status for the region have changed, clarify whether there is any modification to the air quality impact assessment.

NFS Response 15:

The most updated attainment status information for the Eastern Tennessee-Southwestern Virginia Interstate Air Quality Region was taken from 40 CFR Parts 81.343 and 81.347, July 1, 2009 edition. Tables 1 and 2 provide the attainment status for the six criteria pollutants in the applicable counties. All six criteria pollutants in the Virginia counties had attainment status. In Tennessee, eight counties had non-attainment status for either Ozone (8-hour standard) or PM_{2.5}. These eight counties are located approximately 47 miles or greater from the NFS facility.

The geographic area nearest Unicoi County consists of Carter County, Hawkins County, Sullivan County, Washington County, TN., Scott, Washington County, VA, and City of Bristol, VA. As shown in Tables 1 and 2, all these counties, including Unicoi County, have attainment status for all six criteria pollutants. There is no modification to the NFS air quality impact assessment.

See Enclosure J for referenced Tables.

RAI 16

Provide information on local noise codes and ordinances.

In the environmental report, NFS states that neither the State of Tennessee nor Unicoi County have established specific environmental noise standards applicable to NFS (p. 3-12). However, NFS has not indicated whether the Town of Erwin has noise standards that may be applicable to the NFS site. Therefore, please provide one of the following:

(1) Erwin municipality codes and ordinances regarding permissible noise levels and time of day at which they apply or

(2) A statement from Town of Erwin officials stating that no codes or ordinances apply to activities at the NFS site.

NFS Response 16:

The Town of Erwin does not have a specific environmental noise standard that is applicable to NFS. Refer to Title 11, Municipal Offenses, Chapter 3, Offenses Against the Peace and Quiet, of the Code of Ordinances for the Town of Erwin.

See Enclosure K for referenced documentation.

RAI 17

Provide estimates of sound levels at site boundary and clarify if a zoning ordinance applies to NFS.

The environmental report indicates that noise emissions come from a variety of sources from plant operation (Section 3.7). Some of these include alarm systems, operating equipment, and traffic. However the ER does not indicate current noise levels. Provide estimated noise levels during operations at the site boundary. Clarify whether NFS is within a zoning ordinance, if so, provide a discussion of how these noise levels at NFS compare to those of similar industrial sites within the surrounding areas. This information is needed to fully evaluate the potential noise impacts.

NFS Response 17:

The Town of Erwin does have a noise ordinance in place to prohibit excessive noise but does not reference a decibel level indicating "excessive." Due to the need for employee notification, it is assumed that plant-wide alarms would provide the most potential for off-site noise exposure. Sound level surveys at the site boundary during alarm testing did not indicate any levels above OSHA limits. See **Enclosure L** for the results of the noise level during the Take Cover Alarm which is the loudest. The noise levels were measured at various locations on the outside perimeter of the plant. NFS has received no complaints from the Town of Erwin regarding excessive noise.

RAI 18

Expand description and clarify socioeconomic resources, specifically for the Region of Influence (ROI).

NFS discusses socioeconomic resources in Section 3.10 of the environmental report. The following information is needed to completely and accurately describe the ROI in the socioeconomic impact analysis:

- (1) The ER identifies four Tennessee counties for the ROI (Section 3.10). Unicoi County sits next to the North Carolina border. Provide a discussion of why only Tennessee counties are within the ROI.
- (2) The ER provided population data for the year 2000, (Table 14, Section 3.10). Population projections were not provided. Provide projections for population, as well as any expected trends with respect to population in the ROI for the proposed license renewal period.
- (3) The ER provided no information on educational data to support a socioeconomic analysis. Provide current education trends for the ROI. This should include the main schools present in ROI and the schools capacity for students.
- (4) The ER provides no information on health and social services for the ROI. Provide a brief description of health and social services in the ROI. This description should include but is not limited to law enforcement officials, and emergency services present in the ROI.
- (5) Table 14, Section 3.10 of the ER, lists the number of people in the ROI for 2000, but the source listed is: U.S. Census 2005. Additionally, in Table 14, no year is given for the percent employed by NFS. Clarify if the data given for the percent employed by NFS is for the same year as the population column in Table 14. Clarify as to which year the data was collected (2000 or 2005).

NFS Response 18:

- (1) The Region of Interest (ROI) chosen by NFS is the four Tennessee counties of Carter, Sullivan, Unicoi, and Washington. This ROI was chosen because it is where over ninety percent of the NFS employees reside.
- (2) The Tri-Cities area population growth rate is expected to be thirteen percent between 2000 and 2025. However, Washington County is expected to grow more than ten percent by 2025. Carter County is anticipated to have the lowest population growth rate of less than three percent. The projected growth rate in each county is shown in Table 1 (ROI Population Growth).

- (3) The ROI school district information is presented in Table 2 (School District Data) The educational attainment in the ROI is shown in Table 3 (ROI Educational Attainment)
- (4) Table 4 (ROI Healthcare) depicts health care potential in the ROI. Table 5 (ROI Social Services) shows the social services available in the ROI.
- (5) A revision to Table 14 (Population Distribution and Percent Employment by NFS in Region of Interest), Section 3.10, of the NFS Environmental Report is being submitted to clarify the data. The population data and the percent of the population employed by NFS is 2007 data.

See Enclosure M for referenced tables.

RAI 19

Provide projections for NFS employment.

Historical data was provided for the number of NFS employees from 2004 to 2008, in the ER (Table 19, Section 4.10), but no projected employment levels were provided. Provide the NFS projected employment levels for (a) the proposed license renewal period (40-years), and (b) over the next 10 years of proposed operations.

NFS Response 19:

Although the ability of NFS to predict new business opportunities is difficult, significant expansion of operations is limited due to the existing footprint of the facility. Based upon the current business forecast, the total site population is not expected to fluctuate plus or minus 150 personnel over the next 10 or 40 years.

RAI 20

Provide information on occupational injury and fatality rates, and summarize health effects studies (radiation and chemical hazards combined).

NFS did not provide, in its ER, occupational health data for workers at the NFS site. As part of its environmental review, NRC considers occupational worker injury rates and fatality rates at licensed facilities. Therefore, NFS should provide the following and note whether the information is for a particular location or for the entire NFS site:

- (1) The total recordable incident rate and lost time incident rate over the past 5 calendar years (cy).
- (2) Occupational fatality rates or fatalities over the course of the NFS site's operating history.
- (3) A summary of any health effects studies specific to the NFS operations for the past 5 cy.
- (4) A discussion of industrial hygiene surveillance activities for the past 5 years, including information on workplace environmental monitoring, engineering controls, personal protective equipment, and respiratory protection (as required) to assure that exposures to combined radiation and chemical hazards are maintained well below applicable regulatory limits.

NFS Response 20:

(1)

	2005	2006*	2007	2008	2009
LTIR	0.43	0	0.46	0.66	0.61
TRIR	3.58	1.81	3.20	2.90	3.92

LTIR – Lost Time Incident Rate TRIR – Total Recordable Incident Rate

* - Year of Work Stoppage

- (2) There have been zero fatalities of NFS employees over the course of the NFS site's operating history.
- (3) While NFS performs routine Bioassay samples and radiation exposure assessments for employees as outlined in SNM-124, Chapter 4, Radiation Protection, NFS has not performed or sponsored health effects studies (radiation and chemical combined).

In the past 5 years, there have been two documented assessments specific to NFS performed by government agencies. A Public Health Assessment for

Nuclear Fuel Services, Inc. was issued by the Agency for Toxic Substances and Disease Registry with a date of May 29, 2007. There is also an undated earlier draft version on the website. This Health Assessment was due to a petition from an individual to evaluate the NFS site for inclusion on the Superfund list. The petition listed concerns due to the contamination of the local groundwater with volatile organic compounds (VOCs) and the use of radioactive materials. Other concerns included cancer rates in the local community and the contamination of the Nolichucky River as well as releases to the air from plant operations. Site visits were conducted in February and August of 2006 to compile public concerns.

The public health assessment was limited to issues related to the presence of volatile organic compounds. Issues related to radioactive materials were not addressed due to regulatory authority limitations. The ATSDR reached the following conclusions:

- ATSDR considers the site an Indeterminant Public Health Hazard in regard to past conditions due to the fact that there is no verifiable information that groundwater was not used prior to the 1980s.
- ATSDR ranks the site as No Apparent Public Health hazard for current and future conditions since there are no completed exposure pathways existing where the groundwater would be used as a source of public water. The report states that there is insufficient data to determine if the contaminants associated with groundwater could impact public wells in the future. The contaminants are a mixture of many volatile organic compounds and no available studies directly characterize the health effects of the whole mixtures. Also, interactions of heavy metals with other heavy metals or organic compounds are also unknown.
- The report states that based on available information, the agency concludes that although some exposure might be occurring as a result of site conditions through atmospheric exposure, this is not a level likely to cause adverse health effects.
- The conclusions of the report do not apply to radioactive materials.

The other identified study was performed by the ORAU Team as part of a Dose Reconstruction Project for NIOSH. It provided technical basis information used to evaluate the total occupational radiation dose that could be expected from a worker's radiation exposure at the W.R. Grace and Company plant. The report mainly provides information on worker exposure during the period of the late 1950s through 1970, during the AEC contract years.

- (4) Workplace and environmental monitoring is the responsibility of multiple groups and takes place in a variety of ways. Radiation Protection deals with onsite radiological monitoring, both workplace and individual. Workplace surveys and individual sampling are performed for routine, operational, and special conditions as outlined in SNM-124, Chapter 4. Environmental Protection deals with offsite radiological monitoring, including sampling of liquid effluents, air, soil, and groundwater, as outlined in SNM-124, Chapter 9, while Industrial Safety deals with worker occupational non-radiological exposures.

The NFS Environmental Report includes both radiological and non-radiological environmental summaries. Monitoring is performed in accordance with state permits, including the State of Tennessee NPDES permit, and the NFS Air Permit issued by the State of Tennessee.

In buildings where special nuclear materials are processed, design features include building negative pressure to the outside, process enclosures and exhaust ventilation, hoods and glove boxes, and filtration system specifications. Routine and repetitive work performed in these areas is governed by the use of operating procedures, letters of authorization, or special work instructions. These documents include requirements for personnel protective equipment for routine tasks where needed. Non-routine activities not covered by documented procedures involving significant hazards may require a Safety Work Permit. This may be due to a radiological hazard, an industrial safety hazard, or a combination. These permits specify the necessary safety controls, as appropriate, including personnel monitoring devices, protective clothing or equipment, respiratory protection, air sampling, and additional measures required.

See Enclosure D for ATSDR, 2007.

RAI 21

Provide results of the direct radiation dose monitoring program for the previous 5 years.

In Section 4.12.2.2 of its ER, NFS did not provide the results from its offsite direct radiation monitoring program. These data are needed to adequately evaluate the radiological impacts on public health and safety. Therefore, NFS should provide the results of direct radiation monitoring at the site boundary and other offsite locations for the most recent 5-year period.

NFS Response 21

The enclosed table lists the deep-dose equivalent as measured offsite and at the site boundary from dosimeters. The occupancy adjusted column uses general occupancy factors based on values provided in Table 4 of NCRP Report No. 49. The total deep-dose equivalent column uses an occupancy factor of one (1).

See Enclosure N for referenced documentation.

RAI 22

Provide additional information on monitoring for non-radiological constituents.

In Table 22 of its ER, NFS provides estimated emissions of hazardous air pollutants and compares these to limits apparently in effect for NFS air permits. NFS should provide the basis for estimating the emission levels (e.g., based on operational experience) and provide copies of the most recent air permits for the NFS site.

NFS Response 22:

The non-radiological emissions at NFS are estimated based on process throughputs, engineering knowledge, equipment manufacturer's data, and/or usage of EPA AP-42 emission factors. NFS air permits require air pollution control devices and/or throughput restriction to ensure only acceptable levels of air pollutants are emitted from the facility.

See Enclosure Q for copies of the most recent air permits for the NFS site.

RAI 23

Provide quantities of wastes generated that require offsite disposal.

In the ER, NFS describes the types of wastes that it generates (Section 3.12) but does not provide estimates of the volumes of waste that would require offsite disposal at another permitted facility. This information is needed to assess the potential impacts for proposed activities. Provide the following:

- (1) Annual waste generation volume totals for radioactive, non-radioactive hazardous, mixed wastes and non-radioactive non-hazardous wastes for the past ten years.
- (2) Estimated waste generation volumes for all waste categories identified above for (a) the proposed 40-year license renewal period and (b) the first 10 years of the proposed 40-year license renewal period.

NFS Response 23:

- (1) Annual waste generation volume (estimated in gallons) totals for (CY2000-CY2009):
 - a) Non-radioactive Hazardous – Estimated total = 5,566 gallons or 557 gallons per year
 - b) Radioactive (non-D&D) – Estimated total = 1,950 gallons or 195 gallons per year
Radioactive (D&D) – Estimated total = 4,649,057 ft³
Radioactive (Commercial) – Estimated total = 242,145 ft³
 - c) Non-radioactive non-hazardous – Estimated total = 26,997 gallons or 2,700 gallons per year
 - d) Mixed Waste - Estimated total = 13,479 gallons or 1,348 gallons per year
- (2) a) The proposed 40-year license renewal period – No change anticipated from the estimated quantities given in response to RAI 23 Question 1 with the exception of the values for Radioactive (D&D) delineated in 1.a.1., which is expected to decrease significantly due to the completion of the D&D Northsite Project.

- b) The first 10 years of the proposed 40-year license renewal period - No change anticipated from the estimated quantities given in response to RAI 23 Question 1 with the exception of the values for Radioactive (D&D) delineated in 1.a.1., which is expected to decrease significantly due to the completion of the D&D Northsite Project.

RAI 24

Clarify and expand on the containment measures for storage of liquid wastes.

In the ER (Section 2.1.2.2), NFS states that "... the majority of the secondary containment structures are designed to hold the contents of the largest structure, or they are administratively limited." Clarification is needed for the staff to completely and accurately describe any potential impacts from liquid waste storage. Provide the following:

- (1) Clarify whether all liquid waste storage tanks have secondary containment structures or administrative controls
- (2) Provide a list of tanks that do not have containment controls and the basis for why such containment is not needed
- (3) Provide the nature of the "administrative controls" that serve to provide containment assurance

NFS Response 24:

- (1) Secondary containment is provided around oil and hazardous substances per NFS Spill Control and Countermeasures (SPCC) Plan, Revision 8, dated May 9, 2008, Section III, which states the following:

"...Secondary containment around storage areas for oil and hazardous substances is provided by diked areas and/or sump systems. The diked areas were designed to hold 100 percent of the capacity of the largest tank in the area. Exceptions include:

- (1) The dike area around the ammonium hydroxide tanks.
 - (2) The dike area for the two nitric acid tanks and the sodium hydroxide tank at the BLEU Facility. Administrative controls and overflow alarms are in place to prevent storage of greater volume than 4,656 gallons for the nitric acid tanks and 4,971 gallons for the sodium hydroxide tank.
 - (3) The uranyl nitrate tanker is staged over a 500-gallon sump during and between loading activities prior to shipment."
- (2) Bulk chemicals are stored in secondary containment, which can hold 100% of the capacity of the largest tank in the area. NFS has four tanks which are stored in containments that do not meet the 100% capacity guideline. The four exceptions are: ammonium hydroxide tank, two nitric acid tanks, sodium hydroxide tank, and uranyl nitrate tanker. To safeguard the ammonium hydroxide tank, nitric acid tanks, and sodium hydroxide tank, an administrative quantity control limit is in place. Only a set quantity of the chemicals can be purchased. Table 1 (Bulk

Chemical Management Control Measures) lists additional safeguards for these tanks and the uranyl nitrate tanker.

- (3) The nature of the administrative control is a quantity limitation. Only a set quantity of ammonium hydroxide, nitric acid and sodium hydroxide can be purchased. The uranyl nitrate tanker containment is safeguarded by the controls listed in Table 1.

See Enclosure O for referenced table.

RAI 25

Provide a description of practices used for temporary onsite storage of solid wastes.

In the ER (Section 2.1.2.2), NFS generally states that wastes are temporarily stored onsite and that measures are taken to ensure containment of some liquid waste storage. However, it does not describe containment measures taken for storage of radioactive and hazardous solid wastes. Provide a general description of the measures taken to ensure containment of these solid wastes temporarily stored onsite prior to disposal.

NFS Response 25:

All radioactive and hazardous mixed wastes stored in the 310 Warehouse Part B Storage Area are labeled, sealed and containerized in locked and controlled storage. Further, all liquid RCRA waste containers are stored on containment skids to provide secondary containment and containers with solids are stored on pallets, except for burial boxes. The storage area is inspected weekly or when in use by authorized personnel.

RAI 26

Identify any substantive maintenance activities necessary to support current and future operations and describe the associated impacts.

In the ER, NFS does not identify the activities (i.e., replacement or major maintenance of facilities or equipment) that NFS 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.

NFS Response 26:

Capital projects are planned based on the availability of funds which fluctuate with the renewal of existing contracts and obtaining new contracts. Therefore, it has been best practice to not plan for substantive maintenance activities beyond 5-10 years.

Significant NFS infrastructure replacements and improvements planned during the next five years are listed below.

1. Replace the 105 Lab HVAC system
2. Replace the WWTF ammonia stripping tower
3. Replace section(s) of the fire water supply line
4. Replace the 134/134A electrical substations
5. Construct a new shipping/receiving warehouse
6. Construct a new entry/exit control point (EECP)
7. Construct new parking areas
8. Complete the construction of security barrier walls
9. Replace the process ventilation fans and 308 fan-house
10. Replace the main process ventilation stack
11. Construct a new pipe bridge to relocate piping and utilities off Building 111

NFS plans to construct a retention pond to control storm water drainage during excavation and site preparation for the new warehouse, EECP and parking areas (items 5, 6 and 7). Potential impacts from these construction activities will be controlled in accordance with the State of Tennessee storm water permit requirements.

RAI 27

Provide the results of other federal or state agency assessments of environmental conditions for the NFS site.

To aid NRC's environmental review, NFS should provide copies of or references to recent (i.e., within the past 10 years) environmental evaluations or determinations made by other federal (i.e., non-NRC) and state agencies with respect to the NFS facility operations and site.

NFS Response 27:

The Division of Solid Waste Management for the State of Tennessee prepared the Environmental Indicator Evaluation Memo which demonstrates the facility met both Environmental Indicators.

The 1996 DOE Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement is also included for review.

See Enclosure P for referenced documentation.

RAI 28

Provide copies of all current permits that NFS has with federal or state agencies.

In its ER discussion of the various effluents from the NFS facility and site, NFS references and discusses permits that it has currently with other federal (i.e., non-NRC) and state agencies. To aid in the NRC's environmental review, NFS should provide copies of all current effluent monitoring permits (i.e., concerning air, surface and ground water, sewer) that it has with non-NRC federal agencies and with relevant state agencies. Additionally, NFS should identify the changes to those permits since 1999, and identify any anticipated future modifications to the permits over the next 10 years.

NFS Response 28:

Sewer, surface and ground water permits have been updated to reflect operating conditions and EPA changes. There have been no changes to the air permits. Copies of all current permits that NFS has with federal or state agencies are attached in **Enclosure Q**.

21G-10-0110
GOV-01-55-04
ACF-10-0143

Attachment II
Enclosures A – Q

Attachment II

Enclosure Table of Contents

Enclosure	Document Description	Associated RAI
A	1994-2009 Storm Water Data	4
	License Amendment Request	
B	NFS and State of TN Nitrate and Magnesium Correspondence	5
C	Remedial Alternatives Analysis – Source Control Project, August 1999	7
	1 st Semi-annual 2009 Full Scale Data Package, February 23, 2010	
	BOS 100 Injection Services, March 30, 2007	
	2010 Facility Action Plan, January 2010	
	2009 Facility Action Plan, January 2009	
	Railroad Well Capture Zone Analysis	
D	Environmental Indicator Memorandum	8 & 20
	ATSDR, 2007	
	Groundwater Risk Assessment	
E	Hydrogeologic Characterization Study	9
	1992/1993 NFS Hydrogeologic Investigation and Monitoring Well Installation Program	
	Final Project Report Groundwater Flow and Constituent Transport Modeling	
	Revised Groundwater Flow and Solute-Transport Modeling Report, February 1999	
	Revised Groundwater Flow and Solute-Transport Modeling Report, February 2010	
	Final Project Report Maps	
F	NFS Wetland Area	10
	NFS Site	
	Photos of Wetland A	
	Photos of Wetland B	
	Photos of Wetland A and Adjacent Area	
	Photos of Wetland B and Adjacent Area	
	Photos of Wetland A Soil	
	Photos of Wetland B Soil	
	Department of the Army Letter to B.M. Moore	
G	Wetland A Data Form	10 & 11
	Wetland B Data Form	
H	NFS Air Permits	12
	NFS Permitted and Actual Emissions	
I	Air Inspection Report, April 2010	13

Enclosure	Document Description	Associated RAI
J	Attainment Status – TN Counties	15
	Attainment Statuses – VA Counties	
K	Town of Erwin Code of Ordinances	16
L	NFS Noise Level Survey	17
M	ROI Population Growth	18
	School District Data	
	ROI Education Attainment	
	ROI Healthcare	
	ROI Social Services	
	Population Distribution and Percent Employment by NFS in Region of Interest	
N	Summary of Environmental Dosimeter Data	21
O	Bulk Chemical Management Control Measures	24
P	Environmental Indicator Evaluation Memorandum	27
	1996 DOE Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement	
Q	NFS Current Effluent Monitoring Permits	12, 22 & 28

Enclosure A

- 1 – 1994 – 2009 Storm Water Data
- 2 – License Amendment Request
- 3 – Approval of License Amendment Request

Table 1
1994-2009 Storm Water Data

Attribute	1994 – 1995 (mg/l)	1995 – 1996 (mg/l)	1998 (mg/l)	2000 (mg/l)	2002 (mg/l)	2003 (mg/l)	2004 (mg/l)	2005 (mg/l)	2006 (mg/l)	2007 (mg/l)	2008 (mg/l)	2009 (mg/l)	Benchmark Concentration ^d (1998 – 2009) (mg/l)
Cyanide (mg/l)	<0.005	0.005	<0.004	N/A	0.00723	N/A	0.00207	0.00285	<0.00250	<0.00150	0.00461	<0.00166	0.064
Nitrate/Nitrite as N (mg/l)	<0.100	0.28	1.075	1.32	0.950	1.23	1.24	1.20	0.798	0.110	2.56	129	0.68 ^a
Copper (mg/l)	0.008	0.031	N/A	N/A	0.0114	N/A	0.00512	0.0319	0.0174	0.025	0.00948	0.0131	0.64 ^b
Zinc (mg/l)	0.238	0.832	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.117 ^c

NOTES:

N/A: Sample Not Required

a: No Cut-Off Concentration in 1994-1996

b: 1994-1995 Cut-Off Concentration: 0.018 mg/l

1995-1996 Cut-Off Concentration: 1.0mg/l

c: 1994-1995 Cut-Off Concentration: 0.117 mg/l

1995-1996 No Cut-Off Concentration

d: Benchmark (Cut-Off) Concentrations are pollutant concentrations above which the EPA determined represents a level of concern. The benchmark concentrations are not effluent limitations and should not be interpreted or construed as such.¹

¹ State of Tennessee NPDES Permit, 2009, Tennessee Storm Water Multi-Sector General Permit for Industrial Activities, Rationale, May.



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AIRBORNE EXPRESS

21G-04-0031
GOV-01-55-04
ACF-04-0045

April 5, 2004

Director
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

References: 1) Docket No. 70-143; SNM License 124

**Subject: License Amendment Request to Remove Sampling Requirements
for Banner Spring Branch**

Dear Sir:

Nuclear Fuel Services, Inc. (NFS) hereby requests an amendment to the referenced license to authorize the removal of Banner Spring Branch sampling requirements. This request is being made because Banner Spring Branch has been relocated and enclosed inside a pipe. The relocation and total enclosure of Banner Spring Branch in a concrete culvert eliminated the silt deposits, and thus the upstream and downstream silt collection points. Access to Banner Spring Branch waters is limited due to the encapsulation of the stream in a concrete pipe. The upstream water collection point has also been eliminated. This change has removed the potential for release of radioactive materials due to decommissioning activities. Additionally, Banner Spring Branch does not have the potential for release of radioactive materials from process effluent, because the noncontact cooling water loop for Building 233 no longer exists. The only inflow into Banner Spring Branch is storm water runoff, which is maintained in accordance with NPDES Permit No. TNR050873. Due to the stated Banner Spring Branch modifications, NFS requests that all Banner Spring Branch sampling points be removed from the license. Page changes to Parts I and II of the referenced license are described in the Attachment.

A summary of the proposed changes to License SNM-124 follows:

Chapter 5 – Environmental Protection: Revisions to this chapter were necessary to delete Banner Spring Branch sampling points.

Chapter 13, Section A – Environmental Protection: This section was revised to reflect deletion of Banner Spring Branch sampling and storm water discharges.
In accordance with License Condition S-25, NFS is requesting this license amendment since this

activity requires a change to the conditions of Part I of the license application. However, the proposed change will not exceed any of the four criteria specified in Title 10, Code of Federal Regulations, Part 51.22 (c)(11). As such, the proposed change, as contained herein, is commensurate with a Categorical Exclusion as defined in the aforementioned regulation.

The Safety and Safeguards Review Council has reviewed and approved these changes. For your convenience, vertical lines in the right-hand margin of affected license pages denote changes.

NFS requests the license amendment be issued by July 1, 2004. NFS appreciates the efforts of your staff in supporting the licensing of this very important project.

If you or your staff have any questions, require additional information, or wish to discuss this, please contact me, or Mr. Rik Droke, Licensing and Compliance Director at (423) 743-1741. Please reference our unique document identification number (21G-04-0031) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.



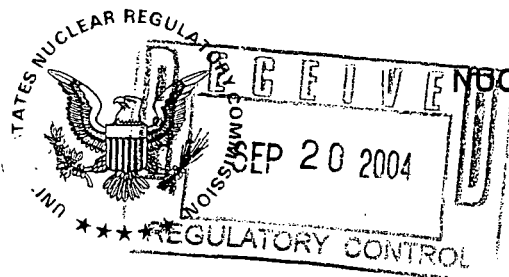
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Vice President
Safety and Regulatory

JSK/Isn
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NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 13, 2004

15N040195
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SNM 124
AMEND 52

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JWN,SKirk,GLH,DR

Ms. B. Marie Moore, Vice President
Safety and Regulatory
Nuclear Fuel Services, Inc.
P.O. Box 337, MS 123
Erwin, TN 37650

SUBJECT: NUCLEAR FUEL SERVICES, INC. - AMENDMENT 52 - REMOVE SAMPLING
REQUIREMENTS FOR BANNER SPRING BRANCH

Dear Ms. Moore:

In accordance with your application dated April 5, 2004 (NFS No. 21-G-04-0031), and pursuant to Part 70 to Title 10 of the Code of Federal Regulations (CFR), Materials License SNM-124 is hereby amended to reflect your revision to your environmental monitoring program which deletes the requirement to sample at Banner Spring Branch. Accordingly, Safety Condition S-1 has been revised to include the date April 5, 2004.

All other conditions of this license shall remain the same.

Enclosed are copies of the revised Materials License SNM-124 (Enclosure 1) and the Safety Evaluation Report (Enclosure 2), which includes the Environmental Review.

If you have any questions regarding this matter, please contact Julie Olivier of my staff at (301) 415-8098 or via e-mail to jao@nrc.gov.

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Exemption number 2
Nuclear Regulatory Commission review required before public release.

Gerry Ignosko, FCSS/NMSS
Name and organization of person making determination

Date of Determination 9-13-04

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B. Marie Moore

2

This letter contains sensitive, unclassified information, and is therefore deemed Official Use Only and will not be placed in the Public Document Room nor the Publicly Available Records component of the NRC's ADAMS document system.

Sincerely,



Gary S. Janosko, Chief
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Docket No.: 70-143
License No.: SNM-124
Amendment 52

Enclosures:

1. Materials License SNM-124
2. Safety Evaluation Report

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DOCKET: 70-143

LICENSEE: Nuclear Fuel Services, Inc.
Erwin, Tennessee

SUBJECT: SAFETY EVALUATION REPORT FOR NUCLEAR FUEL SERVICES, INC. -
AMENDMENT 52 - REMOVE SAMPLING REQUIREMENTS FOR BANNER
SPRING BRANCH

BACKGROUND

By a letter dated April 5, 2004 (ML041050155), Nuclear Fuel Services, Inc., (NFS) submitted a letter outlining revisions to their environmental monitoring program. The revision removes Banner Spring Branch sampling points requirements.

DISCUSSION

The surface water stream called Banner Spring Branch which used to cut across the NFS property has been relocated and enclosed inside a pipe. Therefore, the sampling requirements for the stream are no longer needed.

The relocation and total enclosure of Banner Spring Branch in a concrete culvert eliminates the silt deposits, and thus the upstream and downstream silt collection points. This change has removed the potential for release of radioactive materials due to decommissioning activities because the new pipe routes the stream outside the area being decommissioned. Additionally, Banner Spring Branch does not have the potential for release of radioactive materials from process effluents, because the noncontact cooling water loop for Building 233 no longer exists. This was the only building on-site which could have potentially contaminated the stream with process effluents.

The only inflow to Banner Spring Branch is now storm water runoff, which is maintained in accordance with the State of Tennessee's National Pollutant Discharge Elimination System (NPDES), permit No. TNR050873. Water samples will continue to be taken weekly at a point downstream of Banner Spring Branch to confirm compliance with the NPDES permit.

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May be exempt from public release under the Freedom of Information Act (5 U.S.C. 552)	
Exemption number	<u>2</u>
Nuclear Regulatory Commission review required before public release	
<u>Gary Janesko, FCSS/NMSS</u>	
Name and organization of person making determination	
Date of Determination	<u>9-13-04</u>

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ENVIRONMENTAL REVIEW

These changes are considered a change in process operations and do not affect the scope or nature of the licensed activity. 10 CFR 51.22(c)(11) allows for a categorical exclusion if the following requirements have been satisfied:

- i. There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.
- ii There is no significant increase in individual or cumulative occupational radiation exposure.
- iii There is no significant construction impact.
- iv There is no significant increase in the potential for or no consequences from radiological accidents.

The modifications to the Banner Spring Branch have removed the potential for release of radioactive materials due to decommissioning activities. In addition, the removal of Building 233 eliminates the potential for release of radioactive materials from process effluents. Therefore there is no change in the types of effluents nor are there any increases in the amounts of effluents. Occupational exposure is expected to remain the same, or slightly decrease due to the enclosure of the stream. The enclosure of the stream does not affect the potential for radiological accidents. The changes to the environmental monitoring program involve no additional construction activity, therefore there will be no construction impact.

The staff has determined that the proposed changes do not adversely affect public health and safety or the environment and are categorically excluded from the requirement to prepare a site-specific environmental assessment. Therefore, in accordance with 10 CFR 51.22(c)(11), neither an environmental assessment nor an environmental impact statement is warranted for this action.

CONCLUSION

The NRC staff finds that the requested amendment will not endanger life, property, common defense or security, and is in the public interest. Modifications to the Banner Spring Branch remove potential for radiological accidents through relocation and enclosure of the stream within a pipe. Silt deposits are eliminated, only storm water runoff enters the stream, and current decommissioning activities will not release radioactive materials into the pipe. Therefore, the staff approves the amendment deleting the requirement to sample at Banner Spring Branch.

PRINCIPAL CONTRIBUTORS

Julie Olivier
David Kerske

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Enclosure B

NFS and State of TN

Nitrate and Magnesium
Correspondence



Nuclear Fuel Services, Inc.
1205 Banner Hill Road
Erwin, TN 37650

(423) 743-9141

www.atnfs.com

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

21G-02-0410
GOV-05-01-01
ACF-02-0364

January 2, 2003

Mr. Andrew Tolley
Environmental Field Office Manager
Johnson City Environmental Assistance Center
2305 Silverdale Road
Johnson City, Tennessee 37601-2162

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Subject: Elevated Storm Water Sampling Results

- References:
- 1) NFS NPDES TMSP No. TNR050873
 - 2) *TN Storm Water Monitoring Report* (21G-99-0014), Letter from T.S. Bear to Sims Crownover, dated 2/23/99
 - 3) *Storm Water Monitoring for Magnesium* (15N990216), Letter from Saya Qualls to T.S. Bear, dated 12/2/99
 - 4) *TN Storm Water Monitoring Report* (21G-01-0017), Letter from B.M. Moore to Sims Crownover, dated 1/31/01

Dear Mr. Tolley:

In accordance with reference 1, Nuclear Fuel Services, Inc. (NFS) is providing notification within thirty (30) days of receiving storm water sampling results indicating that nitrate/nitrite as nitrogen, total recoverable magnesium, and total recoverable aluminum are above the cut-off concentrations. The results of the annual storm water sampling event, conducted on November 21, 2002, were received by NFS on December 6, 2002. These results identified the following elevated concentrations:

Parameter	Sampling Results (mg/l)	Permit Cut-Off Concentrations (mg/l)
Nitrate/Nitrite as Nitrogen	0.950	0.68
Total Recoverable Magnesium	4.8	0.0636
Total Recoverable Aluminum	3.9	0.75

An investigation into these elevated concentrations was conducted December 6 - 10, 2002. While the specific contributors could not be identified during the investigation, historical data reveals that these same constituents were elevated during the February 1998 - December 2000 storm water sampling events. Research has indicated that the nitrate and magnesium concentrations are due to naturally occurring background levels in surface water and groundwater in the vicinity of the NFS site. Attachment I provides details of previous

B.M. Moore to Mr. Andrew Tolley

21G-02-0410
GOV-05-01-01
ACF-02-0364

Page 2

correspondence related to this matter. The issue of the storm water cut-off concentrations for nitrate/nitrite and magnesium being greater than background has been identified to TDEC. A request was made by NFS to TDEC for a modification of these cut-off concentration limits; however, no such modification was issued. The aluminum contributor remains unidentified, as it did in the 1998 Storm Water Report.

The following corrective action has been taken: The NFS Storm Water Pollution Prevention Plan was reviewed to determine if any revisions were necessary to reduce the introduction of nitrates, magnesium, and aluminum to storm water. No revision was required.

The following corrective action will be taken and completed by January 30, 2003: NFS will reinstruct construction personnel in the protection of storm water and storm water ditches from pollutants.

If you or your staff have any questions or need further information, please contact Ms. Janice Greene, Environmental Safety Manager, at (423) 743-1730, or me. Please reference our unique document identification number (21G-02-0410) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, Inc.

A handwritten signature in dark ink, appearing to read "BMM", is written over a horizontal line.

B. Marie Moore
Vice President
Safety & Regulatory

B.M. Moore to Mr. Andrew Tolley
January 2, 2003
Page 3

21G-02-0410
GOV-05-01-01
ACF-02-0364

Attachment I

Correspondence between NFS and TDEC 1999 - 2001



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Nuclear Fuel Services, Inc.
1205 Echner Hill Road
Erwin, TN 37650
(423) 743-9141

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21G-99-0014
GOV-05-01-01
ACF-99-0023

February 23, 1999

Mr. Sims Crownover
Compliance and Enforcement Section
TN Department of Environment and Conservation
Division of Water Pollution Control
L&C Annex, 6th Floor
401 Church Street
Nashville, Tennessee 37243-1534

Subject: TN STORM WATER MONITORING REPORT

Dear Mr. Crownover:

Attached is the Nuclear Fuel Services, Inc. (NFS) Storm Water Monitoring Report and analytical results for monitoring year January 1, 1998 to December 31, 1998. All values were indicated by the laboratory analyses to be within respective permit conditions, with the exception of aluminum, nitrate as nitrogen and magnesium. Aluminum exceeded the cut-off concentration in the 3rd quarter; however, the yearly average was less than the cut-off concentration. Nitrate as nitrogen exceeded the cut-off concentration in the 1st and 4th quarters, and the average of the four quarters was greater than the cut-off concentration. Magnesium exceeded the cut-off concentration in each quarter, therefore, the yearly average was also exceeded.

As required by the permit, the Johnson City Field Office (Mr. Steve Layne) was notified of the presence of magnesium in stormwater at concentrations greater than the cut-off limit. As discussed with Mr. Layne, NFS believes the source of magnesium in stormwater at concentrations greater than the cut-off limit can be attributed to background levels. A study of magnesium concentrations in groundwater and surface water in the vicinity of the plant site indicates magnesium concentrations ranging from approximately 3 to 10 mg/L. Based on this study, NFS has requested that the cut-off concentration for magnesium be revised to reflect background concentrations.

As required by the permit, unless industrial operations change substantially, NFS will monitor stormwater in the fourth year for nitrate as nitrogen. Monitoring for magnesium in the fourth year is pending TDEC's response to NFS' request.

21G-01-0017

B. M. Moore to Mr. Sims Crownover, TDEC

Page 2

January 31, 2001

If you or your staff have any questions, require additional information, or wish to discuss this, please contact me or Ms. Janice Greene, Environmental Safety Manager, at (423) 743-1730. Please reference our unique document identification number (21G-01-0017) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.



B. Marie Moore
Vice President
Safety and Regulatory

JMG/rcy

Attachments

xc: U. S. Nuclear Regulatory Commission
Region II, Atlanta Federal Center
61 Forsyth Street, S. W.
Suite 23T85
Atlanta, GA 30323

Mr. Andrew Tolley, Manager
Johnson City Basin
TN Division of Water Pollution Control
2305 Silverdale Road
Johnson City, TN 37601-2162

DEC - 6 1999



15N990216
GOV-05
NPDES
TNR050873

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

L & C Annex, 6th Floor
401 Church Street
Nashville, Tennessee 37243-1534

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December 2, 1999

Mr. Thomas S. Baer, Ph.D.
Nuclear Fuel Services, Inc.
1205 Banner Hill Road
Erwin, Tennessee 37650

Re: NPDES Permit No. TNR050873
Nuclear Fuel Services
Storm Water Monitoring for Magnesium

Dear Mr. Baer:

In response to your letter of February 18, 1999, we agree with your request, and grant that NFS is exempted from magnesium sampling in the fourth year of the permit (year 2000).

It seems obvious that background magnesium concentrations in your area are much higher than the permit cutoff concentration in our TMSP permit. The concentrations of magnesium you have found in your storm water discharges appear to be the result of background levels and not the result of your industrial activities.

Also, the magnesium cutoff concentration of 0.0636 mg/l seems unnecessarily low, and we are considering modifying the TMSP to change this number. In the meantime, you are exempted from monitoring magnesium for the the year 2000.

Please keep a copy of this letter in your files as record of our decision. If you have any questions about this matter, you may call Robert Haley at 615-532-0669, or e-mail at rhaley@mail.state.tn.us.

Sincerely,

Saya A. Qualls
Saya A. Qualls, P.E.
Manager, Permit Section
Division of Water Pollution Control

Cc: Environmental Assistance Center - Johnson City
Central Office Storm Water File 0873

R:\hcm\mgsp\216\magnesium.at

01122 nuclear fuels magnesium



Nuclear Fuel Services, Inc.
P.O. Box 337, MS 123
Erwin, TN 37650

(423) 743-9141

E-Mail : <http://www.atnfs.com>

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21G-01-0017
GOV-05-01-01
ACF-01-0017

January 31, 2001

Mr. Sims Crownover
Compliance and Enforcement Section
TN Department of Environment and Conservation
Division of Water Pollution Control
L & C Annex, 6th Floor
401 Church Street
Nashville, Tennessee 37243-1534

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Reference: Nuclear Fuel Services, Inc. NPDES Permit No. TNR050873

Subject: TN Storm Water Monitoring Report

Dear Mr. Crownover:

Attached is the Nuclear Fuel Services, Inc. (NFS) Storm Water Monitoring Report and analytical results for the monitoring year January 2000 to December 31, 2000. The analytical data identifies that the nitrate cut-off concentration was exceeded in each of the four (4) quarters and thus in the quarterly average.

As required by the permit, the Johnson City Field Office (Mr. Joseph S. Lane) was notified of the presence of nitrate in excess of the cut-off concentration limit and an investigation was conducted. The investigation could not identify any nitrate contributors; however, it did identify that surface water and the background monitoring well on the NFS site are 2.5 times higher in nitrate than the permit cut-off concentration of 0.68 mg/l.

NFS requests that the State of Tennessee evaluate the nitrate cut-off concentration in relationship to NFS' surface water and groundwater nitrate levels instead of evaluating it against the Nation Urban Runoff Program (NURP) median concentration. NFS requests that the nitrate cut-off concentration be revised to reflect NFS' surface water nitrate average level of 1.72 mg/l (1998, 1999, and 2000 Banner Spring Branch nitrate average).

21G-01-0017

B. M. Moore to Mr. Sims Crownover, TDEC

Page 2

January 31, 2001

If you or your staff have any questions, require additional information, or wish to discuss this, please contact me or Ms. Janice Greene, Environmental Safety Manager, at (423) 743-1730. Please reference our unique document identification number (21G-01-0017) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.



B. Marie Moore
Vice President
Safety and Regulatory

IMG/rcy

Attachments

xc: U. S. Nuclear Regulatory Commission
Region II, Atlanta Federal Center
61 Forsyth Street, S. W.
Suite 23T85
Atlanta, GA 30323

Mr. Andrew Tolley, Manager
Johnson City Basin
TN Division of Water Pollution Control
2305 Silverdale Road
Johnson City, TN 37601-2162

21G-01-0017
GOV-05-01-01
ACF-01-0017

Attachment I
to letter dated January 31, 2001

2000 Storm Water Monitoring Report

(five pages to follow)



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
TENNESSEE MULTI-SECTOR GENERAL PERMIT (TMSP)
STORM WATER MONITORING REPORT

FACILITY NAME Nuclear Fuel Services, Inc. TMSP NUMBER TNR05 0873
ADDRESS 1205 Banner Hill Road PHONE NUMBER (423) 743-9141
CITY Erwin, TN 37650 COUNTY Unicoi CONTACT PERSON B. Marie Moore

Indicate whether this storm water monitoring report (SWMR) is being submitted for the 2nd year's monitoring requirements or the 4th year's monitoring requirements: ☐ 2nd year ☒ 4th year

List the industry sector(s) which apply(ies) to this outfall's storm water discharge (i.e., A, B, C, D, etc.): ☐ C ☐ K ☐ L ☐ T

Outfall No.: S, O, 4,

Note: Read instructions on back before completing this form.

Designate the outfall with a three-character code (e.g., 001 or SW1, etc.). In the spaces below, provide the results of quarterly storm water monitoring for the designated outfall. The parameters for which monitoring must be conducted depend on which industry sector(s) of the Multi-Sector General Permit apply to this discharge. Look up your sector(s) in the permit, and check the parameters which apply.

Effluent Characteristic	Cut-Off Concentration	Units	Sample Type	Quarterly Monitoring Results (mg/l)				Average of four quarters
				1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
Aluminum, Total Rec.	0.75	mg/l	Grab					
Ammonia	4.0	mg/l	Grab					
Arsenic, Total Rec.	0.17	mg/l	Grab					
BOD, 5-Day	30	mg/l	Grab					
Cadmium, Total Rec.	0.016	mg/l	Grab					
Chemical Oxy. Demand	120	mg/l	Grab					
Chromium, Total Rec.	0.200	mg/l	Grab					
Copper, Total Rec.	0.064	mg/l	Grab					
Cyanide, Total	0.064	mg/l	Grab					
Fluoride	n/a	mg/l	Grab					
Iron, Total Rec.	5.0	mg/l	Grab					
Lead, Total Rec.	0.082	mg/l	Grab					
Magnesium, Total Rec.	0.064	mg/l	Grab					
Mercury, Total Rec.	0.0024	mg/l	Grab					
Nitrate plus Nitrate Nitr.	0.68	mg/l	Grab	1.82	0.977	0.691	1.78	1.32
Oil and Grease	15	mg/l	Grab					
pH	5.0-9.0	s.u.	Grab	7.64 s.u.	7.00 s.u.	6.52 s.u.	6.50 s.u.	6.92 s.u.
Phosphorus	2.0	mg/l	Grab					
Phosphorus, Total (as P)	n/a	mg/l	Grab					
Selenium, Total Rec.	0.24	mg/l	Grab					
Silver, Total Rec.	0.032	mg/l	Grab					
Total Suspended Solids	200	mg/l	Grab					
Zinc, Total Rec.	0.117	mg/l	Grab					

MEMORANDUM

JMG-00-012

TO: J. E. Greene
FROM: J. M. Griffith *JMG*
DATE: July 18, 2000
SUBJECT: Storm Water Nitrate Notification

On June 28, 2000 Mr. Joseph S. Lane, with the Johnson City Environmental Assistance Center, Division of Water Pollution Control was notified of the elevated nitrate concentrations in the First and Second Quarter 2000 Storm Water Results. I explained to Mr. Lane that background nitrate levels in Banner Springs, Martin Upstream and Martin Creek Downstream are above NFS' NPDES Storm Water cut-off concentration (0.68 mg/l). Mr. Lane suggested collecting a sample from Martin Creek Upstream above the Fish Hatchery and analyzing it for nitrates. This is to determine if the Fish Hatchery is a large contributor to the nitrate level in Martin Creek.

MEMORANDUM

JMG-01-002
ENV-03

TO: J. E. Greene
FROM: J. M. Griffith *JMG*
DATE: January 19, 2001
SUBJECT: 2000 Storm Water Results

NFS storm water was sampled quarterly during the year 2000. Nitrate and was the only parameter required to be sampled in accordance with the State of Tennessee Storm Water Permit, however NFS sampled for radioactivity, pH, and temperature. All sample attributes were within permit limits, except for nitrate concentrations (see Attachment I). The nitrate cut-off concentration of 0.68 mg/l was exceed each quarter.

An investigation into the elevated nitrate concentrations was conducted. The investigation identified the following:

- 1) NFS could not identify any process stream contributors, except minimal grass fertilization.
- 2) Review of historical surface water and groundwater nitrate data from 1998 to May 2000 (see Attachment II) identified average surface water nitrate levels of approximately 1.5 mg/l.
- 3) Martin Creek above the Fish Hatchery was sampled for nitrate concentration per a request from Steve Lane, State of Tennessee, Johnson City Field Office. The nitrate concentration was 0.465 mg/l.

As demonstrated by Attachment II nitrate levels in excess of 0.68 mg/l occur naturally in surface water and groundwater on the NFS site. Based on this data NFS will request that the State of Tennessee revise the cut-off concentration for nitrates to reflect natural background concentrations.

As required by section 7.2 of the NFS Storm Water Pollution Prevention Plan the plan was reviewed to determine if any modifications or additions were required due to elevated nitrate concentrations. No modifications or additions to the plan are currently necessary.

Attachment I
2000 Storm Water Sampling Results

Monitoring Parameters	Monitoring Cut-Off Concentrations	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Average
Nitrate as Nitrogen	0.68 mg/l	1.82 mg/l	0.98 mg/l	0.69 mg/l	1.78 mg/l	1.32 mg/l
Gross Alpha	N/A	*	52.25 pCi/l	116.67 pCi/l	-4.50 pCi/l	54.81 pCi/l
Gross Beta	N/A	*	0.00 pCi/l	3.60 pCi/l	28.82 pCi/l	10.81 pCi/l
U-234	N/A	8.28 pCi/l	15.80 pCi/l	43.30 pCi/l	3.37 pCi/l	17.69 pCi/l
U-235	N/A	0.33 pCi/l	2.05 pCi/l	2.63 pCi/l	0.11 pCi/l	1.28 pCi/l
U-238	N/A	0.77 pCi/l	2.06 pCi/l	8.17 pCi/l	0.21 pCi/l	2.80 pCi/l
pH	5.0-9.0 s.u.	7.64 s.u.	7.00 s.u.	6.52 s.u.	6.50 s.u.	6.92 s.u.
Temperature	N/A	54.90 °F	72.10 °F	57.80 °F	57.60 °F	60.60 °F
Visual Observation		Clear	Silt & Cloudy	Slight Oil Sheen & Floating Vegetation	Clear	

NOTE:

N/A - Not Permit Required

* - No Data Available

Attachment II

Nitrate Levels in Surface Water and Groundwater

Body of Water	1998 Average (mg/l)	1999 Average (mg/l)	2000 Average* (mg/l)
Banner Spring Branch (Downstream)	1.805	1.722	1.656
Martin Creek (Downstream)	1.251	1.249	1.198
Groundwater Monitoring Well No. 52 (Background Well)	1.88	ND	ND

NOTE:

* - Jan. 1, 2000 - May 22, 2000

ND - No Data exist for time period