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

(423) 743-9141

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

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

NMSS01

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.

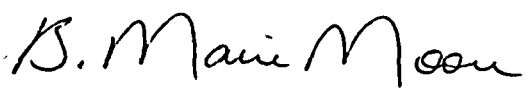
The Safety and Safeguards Review Council has reviewed and approved these changes. For your convenience, vertical lines in the right-hand margin of affected license pages denote changes.

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.



B. Marie Moore
Vice President
Safety and Regulatory

JSK/lsn
Attachment
cc:
Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, GA 30303

Mr. Daniel Rich
Senior Resident Inspector
U.S. Nuclear Regulatory Commission

Mr. William Gloersen
Project Inspector
U.S. Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, GA 30303

Attachment
Page Changes to SNM-124

Part I

Page Index
Pages 1-5

Chapter 5
Page 2
Page 7
Page 8
Page 9

Part II

Page Index
Pages 1-6

Chapter 13, Section A
Pages 1-9

Table 5.1 Summary Table of Environmental Radiological Monitoring Program

Sampling Point	Sample Type/ Collection Frequency	Parameters Analyzed	Action Level (μCi/ml, unless otherwise stated)	Typical MDC (μCi/ml, unless otherwise stated)
Airborne Effluents[1]				
Operating Radiological Stacks[2]				
Main Processing Stack	Continuous/Daily[3]	Gross Alpha	Cumulative > 16.5 mCi/12-months	
			Monthly Average > 2.0E-11	8.0E-14
		Gross Beta	Cumulative > 3800 mCi/12-months	
			Monthly Average > 4.7E-9	1.0E-13
Combined Releases from	Continuous/Daily[3]	Gross Alpha	Cumulative > 1.8 mCi/12-months	
Other Uranium Stacks			Monthly Average > 2.0E-12	8.0E-14
		Gross Beta	Cumulative > 270 mCi/12-months	
			Monthly Average > 2.9E-10	1.0E-13
Combined Releases from	Continuous/Weekly	Gross Alpha	Cumulative > 0.1 mCi/12-months	
Plutonium Stacks (Bldg. 234)			Monthly Average > 7.0E-13	8.0E-15
		Gross Beta	Cumulative > 0.3 mCi/12-months	
			Monthly Average > 1.9E-12	1.0E-14
Ambient Air	Continuous/Weekly	Gross Alpha	Quarterly Average > 5.0E-15	3.0E-15
		Gross Beta	Quarterly Average > 9.0E-11	1.0E-14
	Composite/Quarterly	Isotopic U	Total U > 5.0E-15	4.0E-16
	Composite/Annually	Isotopic Th	Total Th > 4.0E-16	1.0E-16
		Isotopic Pu	Total Pu > 2.0E-15	1.0E-16
Liquid Effluents				
Surface Water				
Martin Creek Upstream	Grab/Quarterly	Gross Alpha	Sample > 3.0E-8	1.0E-08
		Gross Beta	Sample > 3.0E-6	2.0E-08
Nolichuckey River Upstream	Grab/Quarterly	Gross Alpha	Sample > 3.0E-8	1.0E-08
		Gross Beta	Sample > 3.0E-6	2.0E-08
	Composite/Monthly	Isotopic U	Sample SOF > 1.0 (see note 4)	1.00E-09
Martin Creek Downstream	Grab/Weekly	Gross Alpha	Sample > 3.0E-7	1.5E-08
		Gross Beta	Sample > 6.0E-6	3.0E-08
Nolichuckey River Downstream	Grab/Quarterly	Gross Alpha	Sample > 3.0E-7	1.5E-08
Process Waste Water				
Waste Water Treatment Facility	Grab/each batch	Gross Alpha	Batch > 3E-7	1.5E-07
		Gross Beta	Batch > 6E-5	6.0E-07
	Composite/Monthly	Isotopic U	Semiannual Average SOF > 1.0 (see notes 4 and 7)	1.00E-09
NFS Sanitary Sewer	Continuous/Daily[3]	Gross Alpha	Sample > 3.0E-7	1.5E-08
(See Note 8)		Gross Beta	Sample > 6.0E-6	3.0E-08
	Composite/Monthly	Isotopic U	Sample SOF > 0.5 (see note 4)	1.0E-09
	Composite/Monthly[9]	Insoluble Radioactivity	> insoluble gross alpha or beta radioactivity in background water	alpha - 3.0E-08 beta - 5.0E-08
BLEU Complex Sanitary Sewer	Continuous/Daily[3]	Gross Alpha Gross Beta	Sample > 3.0E-7 Sample > 6.0E-6	1.5E-08 3.0E-08
	Composite/Monthly	Isotopic U	Sample SOF> 0.5 (see note 4)	1.0E-09
	Composite/Monthly[10]	Insoluble Radioactivity	> insoluble gross alpha or beta radioactivity in background water	Alpha – 3.0E-08 Beta – 5.0E-08
Other Environmental Media				
Sludge (Erwin POTW)	Grab/Quarterly	Isotopic U	Sample >30 pCi/g Total U	1 pCi/g
Soil	Grab/Quarterly	Gross Alpha	Sample > 25 pCi/g	5 pCi/g
		See note 5		
Silt/Sediment	Grab/Quarterly	Gross Alpha	Sample >25 pCi/g	5 pCi/g
		See note 5		
Vegetation	Grab/Quarterly	Gross Alpha	Sample >25 pCi/g	5 pCi/g
		See note 5		
Groundwater	Grab/Quarterly	Gross Alpha	Sample > 15 pCi/liter	10 pCi/L
		Gross Beta	Sample > 50 pCi/liter	15 pCi/L
		See note 5		

Notes:

1. To minimize interference of radon progeny, air samples may be counted after a holding period (e.g., 7 days) or decay-corrected prior to comparing to action levels and reporting final results.
2. Radiological stacks and vents are considered to be those with a potential for releasing airborne activity at concentrations greater than or equal to 10% of the values in 10 CFR 20, Appendix B, Table 2, Column 1.
3. Daily means normal operating days, Monday-Friday, excluding holidays and weekends. On holidays and weekends samplers will continue to accumulate a sample; however, the sample will not be collected until the next normal operating day.
4. SOF = Sum of Fractions for the mixture of radionuclides. The SOF is determined by computing the sum of the ratios of various nuclides divided by their applicable effluent concentration value in Appendix B, Table 2, Column 2 to 10CFR Part 20.
5. If an action level is exceeded for this media, isotopic analysis will be performed on the sample (or a sample from the same location if the initial sample volume is insufficient).
6. The bases of all action levels and minimum detectable concentrations are documented and available for review.
7. If the SOF (WWTF) exceeds 1.0, results of a dose assessment to maximum exposed offsite receptor will be reported as indicated in paragraph 2 of Section 5.1.2.3.
8. Sampling is only required for disposal of process water containing licensed materials into the sanitary sewerage in accordance with 10 CFR 20.2003.
9. The compliance sampling location for insoluble radioactivity on this discharge point is the Ground Water Treatment Facility (GWTF), because this is the only stream that discharges radioactive material into the NFS Sanitary Sewer. Insoluble radioactivity sampling is not required on this discharge point when the GWTF is not operational.
10. The compliance sampling location for insoluble radioactivity on this discharge point is the Effluent Processing Building (EPB), because this is the only stream that discharges radioactive material into the BLEU Complex Sanitary Sewer. Insoluble radioactivity sampling is not required on this discharge point when the EPB is not ooperational.

NFS shall notify US NRC - Region II, Administrator of any violation of the NPDES permit in writing within 30 days of determination of the event.

When necessary for draw-down or treatment purposes, groundwater may be pumped and treated in the Groundwater Treatment Facility (GWTF). Water processed by this facility is discharged to the sanitary sewer. The specific process description is included in Chapter 15.

Discharges to the sanitary sewer system include: groundwater treatment facility effluents, BLEU Complex treated process wastewater, all plant bathrooms, and plant showers. Sanitary sewer discharges to the City of Erwin - Publicly Owned Treatment Works (POTW), are conducted in accordance with a formally issued pretreatment permit.

Storm water drainage from NFS' main plant site drains into Banner Spring Branch. Storm water from NFS' BLEU Complex drains into a culvert which parallels the northwest plant boundary and subsequently empties into Martin Creek. Because there is a possibility for contamination outside the buildings during transport of contaminated material between buildings, through dispersion by people, and through fallout from gaseous effluents, these sources are considered as liquid effluent. Weekly samples are collected in Martin Creek at points downstream from all Plant inputs.

Liquid effluents that do not go through the Waste Water Treatment Facility shall meet the unrestricted area requirements of 10 CFR 20. See Table 5.1 for collection frequencies, analyses required, action levels, and minimum detectable concentrations.

5.1.2.1 Source-Point Sampling of Liquid Effluents

All process wastes liquids, except noncontact cooling water, are collected and treated, if necessary, prior to discharge.

During the operation of the Waste Water Treatment Facility, each batch is analyzed for gross alpha and gross beta radioactivity prior to discharge. A monthly composite sample is analyzed for isotopes of uranium. The monthly composite will be analyzed for other radionuclides if materials in addition to uranium are suspected to be present in process waste water at levels exceeding 10% of the concentration values in Appendix B, Table 2, Column 2, 10 CFR Part 20. The chemical parameters prescribed in the State of Tennessee NPDES permit are also analyzed at least on the frequency specified in the permit. Samples of the treated waste water are collected from the final neutralization or storage tank prior to discharge.

Sanitary sewer wastes are discharged through two main streams (one for the BLEU Complex and one for the remainder of the main NFS plant site), to the Erwin-POTW. When process water containing radioactive materials is disposed of by release into the sanitary sewerage, in accordance with 10 CFR 20.2003 requirements, samples representative of the total discharge from the applicable sanitary sewer discharge point will be collected and analyzed as outlined in Table 5.1. The monthly composite samples will be analyzed for additional radionuclides, when the concentrations of those radionuclides exceed 10% of the concentration values in 10 CFR 20, Appendix B, Table 2, Column 2. A method published by the American Public Health Association [i.e., Method 7110, "Gross Alpha and Beta Radioactivity (Total, Suspended, and Dissolved)" in Standard Methods for the Examination of Water and Wastewater, 18th Edition] will serve as the guidance for the insoluble radioactivity analyses.

The sewage sludge at the Erwin-POTW will be sampled quarterly, provided a blow-down sample is available. The sewage sludge samples will be analyzed in accordance with the specifications in Table 5.1.

With the exception of the BLEU Complex, the plant storm water drainage system runs into Banner Spring Branch. Subsequently, the flow enters Martin Creek, North Indian Creek, and then the Nolichucky River. The storm water drainage system at the BLEU Complex discharges into culverts which parallel the northwest plant boundary and empty into Martin Creek, and subsequently into North Indian Creek and then the Nolichucky River. Samples are taken at Banner Spring Branch (excluding runoff from the BLEU Complex), Martin Creek and the Nolichucky River, as outlined in Table 5.1.

Martin Creek downstream samples are collected and analyzed for gross alpha and gross beta radioactivity. The action levels for Martin Creek are stated in Table 5.1.

5.1.2.2 Action Levels for Liquid Effluents

Prior to final discharge from the Waste Water Treatment Facility, a gross alpha and beta radioactivity analysis is performed to determine the acceptability for discharge. The batch concentrations allowed to be released without prior approval of the environmental protection function are the action levels stated in Table 5.1. Waste solutions in which the alpha or beta concentration exceeds one of these action levels will be discharged only after approval by the environmental protection function manager. If it is found that any discharges over a twelve month period caused the dose to members of the public (from Waste Water effluents) to exceed the administrative dose constraint of 10 mrem (which is 10% of the dose limit specified in 10 CFR 20, Section 1301), the NRC will be notified of the event in writing within 30 days.

The results of the insoluble radioactivity measurements performed on the sanitary sewer samples will be compared to the amount of insoluble radioactivity present in similarly processed background water samples. If insoluble radioactive material is detected in sanitary sewer discharges at concentrations that are statistically greater than the concentrations measured in background samples, discharges of radioactive material to the appropriate sanitary sewer stream will be stopped until appropriate corrective actions are implemented.

Sewer discharges, and other surface water effluents are monitored as indicated in Table 5.1. Samples of these effluents have action levels as stated in Table 5.1.

5.1.2.3 Reporting Methods

Radioactivity in liquid effluents are summarized in an internal quarterly liquid effluent report. This report includes information on both the gross alpha and gross beta radioactivity in each liquid effluent stream (i.e., Waste Water Treatment Facility (WWTF), NFS Sanitary Sewer, and BLEU Complex Sanitary Sewer).

Activity release data are accumulated and reported on a semiannual basis to the NRC as required by 10 CFR 70.59. A format similar to that presented in Regulatory Guide 4.16 is followed for this report. If semiannual average activity concentration for Waste Water Treatment Facility effluents exceed concentrations listed in Appendix B, Table 2, to 10 CFR Part 20, results of an assessment of the effective dose equivalent to the maximally exposed off-site receptor from these effluents will be included in this semiannual report to the NRC. The methods used to perform this assessment and additional action levels are discussed in Section 5.1.2.4.

CHAPTER 13

ENVIRONMENTAL PROTECTION

A. ENVIRONMENTAL PROTECTION

13.1 SUMMARY OF ENVIRONMENTAL DATA AND IMPACTS

Complete radiological and non-radiological environmental summaries for the NFS Erwin facility are included in the NFS Environmental Report, dated December 1996 (submitted to the NRC May 2, 1997). A summary of the NRC's Environmental Assessment and its Finding of No Significant Impact (FONSI) to the 1999 renewal of SNM-124 is included in a 1999 notice in the Federal Register (Vol. 64, No. 23, pp. 5681 - 5683).

A Supplemental Environmental Report provides a summary of radiological and non-radiological impacts attributable to the Blended Low-Enriched Uranium (BLEU) Project. This Supplemental Environmental Report specified the environmental impacts associated with constructing and operating the Uranyl Nitrate Building, BLEU Prep. Facility (BPF), Oxide Conversion Building, and Effluent Processing Building. The NRC noticed an EA/FONSI in the Federal Register (Vol. 67, No. 131, P. 45555-45559) concerning the license amendment needed to construct and operate the Uranyl Nitrate Building on July 9, 2002. Additionally, this EA/FONSI served to address the impacts associated with increasing the possession limit from 7,000 kilograms to 14,000 kilograms of ^{235}U and those attributable to the entire BLEU Project.

13.2 OFF-SITE DOSES

Since 1981, NFS has routinely calculated doses to members of the general public due to air effluents by operating stacks. These calculations utilize data from the air effluent monitoring program, along with site-specific meteorological data and physical characteristics of stacks. A summary of the results of these calculations for the maximally exposed individual for the period 1992 through the fourth quarter of 2002 are given in Table 13.1.

13.3 EFFLUENT CONTROL AND ENVIRONMENTAL MONITORING

Effluent monitoring and environmental monitoring are implemented through compliance with a number of Safety Department procedures. These procedures outline: sampling technique, sample processing and analysis methodologies, quality assurance, and other necessary information for maintaining a viable program.

Current sampling locations are identified in Table 13.2 and Table 13.3. These tables may also include sampling locations that are not required by license SNM-124 and applicable regulations. The minimum environmental protection sampling locations are identified in Chapter 5 of Part I. Action levels associated with effluent monitoring and environmental monitoring are provided in Table 5.1 of Chapter 5, Part I of this license.

13.3.1 Air Sampling

Airborne effluents from process ventilation stacks and vents are sampled continuously for radioactivity, during the processing of radioactive materials. Samples, representative of the total discharge, are routinely collected at frequencies specified in Safety Department procedures. All airborne effluent samples are analyzed for gross alpha and gross beta radioactivity.

Ambient air is continuously monitored at onsite and offsite locations. All environmental ambient air samples are analyzed for gross alpha and gross beta radioactivity, and are composited and analyzed for specific radionuclides.

13.3.2 Liquid Sampling

The Wastewater Treatment Facility (WWTF) treats and discharges process wastewater on a batch basis. Prior to discharge, each batch is sampled and analyzed for gross alpha and gross beta radioactivity as well as selected chemical parameters. The WWTF batches are discharged when they meet regulatory compliance parameters. The batch samples collected from the WWTF are composited and analyzed for specific radionuclides.

The NFS and BLEU Complex Sanitary Sewers continuously discharge to the City of Erwin – Publicly Owned Treatment Works (POTW), and each sanitary sewer's discharge point is sampled continuously using a proportional sampler. All sanitary sewer samples are collected and analyzed in accordance with the specifications of Table 5.1 in Chapter 5.

Radioactive material may be discharged under 10 CFR 20.2003 regulations to the NFS Sanitary Sewer from the Groundwater Treatment Facility (GWTF) and to the BLEU Complex Sanitary Sewer from the Effluent Processing Building (EPB). When operating, grab samples of the GWTF and EPB liquid effluents are collected. The grab samples are composited monthly, for each discharge stream, and analyzed for insoluble radioactivity. The grab samples from the EPB's batch discharges are also analyzed for gross alpha and beta radioactivity prior to discharging each batch into the BLEU Complex Sanitary Sewer. When gross

alpha or gross beta radioactivity results from a grab sample of the EPB's effluent batch exceed an action level, the batch will not be discharged until the elevated concentrations are lowered to acceptable levels.

Storm water is continually discharged to Banner Spring Branch. Storm water is sampled annually for chemical and radiological attributes.

NFS routinely collects grab samples from locations that are upstream and downstream of the NFS facility along Martin Creek and the Nolichucky River. Individual grab samples are analyzed for specific radionuclides, and the grab samples from the downstream locations are composited prior to analyzing them for specific radionuclides.

The site groundwater monitoring wells are shown in Figure 13.1. These site wells include those located inside of the protected area and those located in the former burial grounds, outside of the protected area to the north and the west. A number of wells are sampled both monthly and quarterly and analyzed for both chemical and radiological parameters. The routine radiological parameters are gross alpha and gross beta activity. If the action points of 15 pCi/liter alpha or 50 pCi/liter beta activity are exceeded, isotopic analysis will be performed.

Two leak detection wells are located to the north and west of the two underground 6000-gallon tanks. These wells, shown in Figure 13.2, will be sampled on a quarterly basis when the tanks are in use.

13.3.3 Soil, Sediment and Vegetation

Soil, sediment, and vegetation grab samples are routinely collected from the locations listed in Table 13.2. Soil sampling is typically restricted to the surface layer, which is indicative of the recent deposition of airborne radioacivity at a given location. Sediment sampling emphasizes shallow sediments, which is indicative of recent deposition from liquid effluents. Vegetation sampling relies primarily on annual plant growth, which is indicative of the radioactivity taken up through the roots and deposited on plant surfaces. In addition, sludge samples are routinely collected from the City of Erwin POTW and analyzed for uranium isotopes.

13.3.4 Environmental Dosimeters

Environmental dosimeters are at onsite and offsite locations to monitor ambient external doses and to assist with the assessment of potential accidents. Environmental dosimeter data are used to monitor external dose rates in unrestricted areas, determine doses to members of the public, and demonstrate compliance with regulatory dose limits. Doses to members of the public will be calculated per 10 CFR 20.1302(b)(1), and may include considerations for the amount of time a member of the public is actually present at or the amount of time a member of the public may be present at a given location.

TABLE 13.1

RESULTS OF QUARTERLY DOSE ASSESSMENTS FOR THE MAXIMALLY EXPOSED OFF-SITE INDIVIDUAL

Period	Maximum TEDE (mrem)	Maximum CDE (mrem)	Maximally Exposed Organ	Location of Maximum Exposure	
				Sector	Distance (m)
1st Qtr. 1993		0.21	Child-Lung	S	405
2nd Qtr. 1993		0.29	Child-Lung	S	405
3rd Qtr. 1993		0.21	Child-Lung	S	405
4th Qtr. 1993		0.11	Child-Lung	S	405
1st Qtr. 1994		0.01	Child-Lung	SSW	210
2nd Qtr. 1994		0.02	Child-Lung	SSW	210
3rd Qtr. 1994		0.02	Child-Lung	SSW	210
4th Qtr. 1994		0.02	Child-Lung	ESE	300
1st Qtr. 1995		0.05	Child-Lung	ESE	300
2nd Qtr. 1995		0.02	Child-Lung	ESE	300
3rd Qtr. 1995		0.02	Child-Lung	ESE	300
4th Qtr. 1995		0.02	Child-Lung	ESE	300
1st Qtr. 1996		0.05	Child-Lung	SE	215
2nd Qtr. 1996		0.03	Child-Lung	ESE	300
3rd Qtr. 1996		0.04	Child-Lung	SE	215
4th Qtr. 1996		0.05	Child-Lung	SE	215
1st Qtr. 1997		0.07	Child-Lung	SE	215
2nd Qtr. 1997		0.03	Child-Lung	SE	215
3rd Qtr. 1997		0.05	Child-Lung	NNE	210
4th Qtr. 1997		0.04	Child-Lung	NNE	210
1st Qtr. 1998	0.004	0.03	Lung	NNE	250
2nd Qtr. 1998	0.073	0.43	Lung	NNE	650
3rd Qtr. 1998	0.013	0.10	Bone Surfaces	NNE	200
4th Qtr. 1998	0.011	0.07	Lung	NNE	550
1st Qtr. 1999	0.009	0.06	Bone Surfaces	NNE	500
2nd Qtr. 1999	0.012	0.13	Bone Surfaces	NNE	300
3rd Qtr. 1999	0.013	0.14	Bone Surfaces	NNE	300
4th Qtr. 1999	0.020	0.07	Bone Surfaces	NE	100
1st Qtr. 2000	0.014	0.09	Bone Surfaces	SSE	900
2nd Qtr. 2000	0.013	0.13	Bone Surfaces	NNE	300
3rd Qtr. 2000	0.006	0.06	Bone Surfaces	NNE	300
4th Qtr. 2000	0.005	0.04	Bone Surfaces	NNE	300
1st Qtr. 2001	0.005	0.05	Bone Surfaces	NNE	300
2nd Qtr. 2001	0.010	0.06	Lung	NNE	250
3rd Qtr. 2001	0.007	0.05	Lung	NNE	300
4th Qtr. 2001	0.009	0.06	Lung	NNE	250
1st Qtr. 2002	0.012	0.11	Bone Surfaces	NNE	250
2nd Qtr. 2002	0.007	0.05	Lung	NNE	250
3rd Qtr. 2002	0.009	0.07	Bone Surfaces	NNE	250
4th Qtr. 2002	0.005	0.04	Bone Surfaces	NNE	250

NOTES:
TEDE is the total effective dose equivalent from air emissions for period (NFS began reporting TEDE the 1st Qtr 1998).
CDE is the committed dose equivalent to the maximally exposed organ from air emissions during period.
All dose predictions represent 50-year dose commitments for internal exposure pathways.
As of the 1st quarter of 1998 assessment techniques changed and doses are now computed using the CAP88-PC computer code.

Table 13.2
ROUTINE ENVIRONMENTAL MONITORING SAMPLING LOCATIONS

SURFACE WATER	GROUND WATER	AMBIENT AIR	VEGETATION	SOIL/SEDIMENT
Martin Creek Upstream Sampling Point		NW Perimeter Air Sampling Sta #170	Asheville Highway Sampling Point	Asheville Highway Sampling Point (soil)
Martin Creek Downstream Sampling Point	Well LD-1A[1] West of two underground 6,000-gallon tanks	W Perimeter Air Sampling Sta #171	Banner Hill Rd Sampling Point	Banner Hill Rd Sampling Point (soil)
		S Perimeter Air Sampling Sta #172	Little Mountain Sampling Point	Little Mountain Sampling Point (soil)
	Well LD-2A[1] North of two underground 6,000-gallon tanks	NE Perimeter Air #1 Sampling Sta #173	Burial Ground Sampling point	Highland Ave/First St Sampling Point (soil)
	Well 52 Background Well		Highland Ave/First St Sampling Point	Burial Ground at Sampling Point (soil)
Nolichucky River Upstream Sampling Point	Wells 98A, 99A, 100A 100B, 101A 102A, 103A	E Perimeter Air #1 Sampling Sta #174		Nolichucky River Upstream Sampling Point (sediment)
Nolichucky River Downstream Sampling Point	104A, 105A, 106A, Quarterly Downgradient Wells	E Perimeter Air #2 Sampling Sta #218		Nolichucky River Downstream Sampling Point (sediment)
		NE Perimeter Air #2 Sampling Sta #217		Martin Creek at Upstream Sampling Point (sediment)
	Other[2]	Near Ponds 1 & 2 Air Sampling Sta #555		Martin Creek at Downstream Sampling Point #1 (sediment)
				Martin Creek at Downstream Sampling Point #2 (sediment)
		W Perimeter Air Sampling Sta #668		
		Banner Hill Rd Air Sampling Sta #323		
		Prk. Lot/Ent Air Sampling Sta #372		
		B. Hill/Stalling Air Sampling Sta #381		

Table 13.2 (Cont.)
ENVIRONMENTAL MONITORING
SAMPLING LOCATIONS

SURFACE WATER	GROUND WATER	AMBIENT AIR	VEGETATION	SOIL/SEDIMENT
		Stalling Ln SE Air Sampling Sta #382		
		Highland/1st St Air Sampling Sta #383		
		Spar Mill Rd Air Sampling Sta #384		
		Security Fence SE Air Sampling Sta #385		
		Asheville Hwy Air Sampling Sta #324		
		North NFS Mound Air Sampling Sta #553		
		Images West Sampling Sta #581		
		NFS Training Center Sampling Sta #582		
		Little Mountain Air Sampling Sta #322		
		E of North NFS Burial Ground Sampling Station #677		
		NE of North NFS Burial Ground Sampling Station #678		
		N of North NFS Burial Ground Sampling Station #679		
		SW Burial Trench Area Sampling Station #685		

NOTES:

(1) Wells LD1A and LD2A are routinely collected when the underground storage tanks are in use.

(2) In accordance with established procedures, a number of well samples are collected on a routine basis. At a minimum, these are analyzed for gross alpha and beta radioactivity (see Figure 13.1).

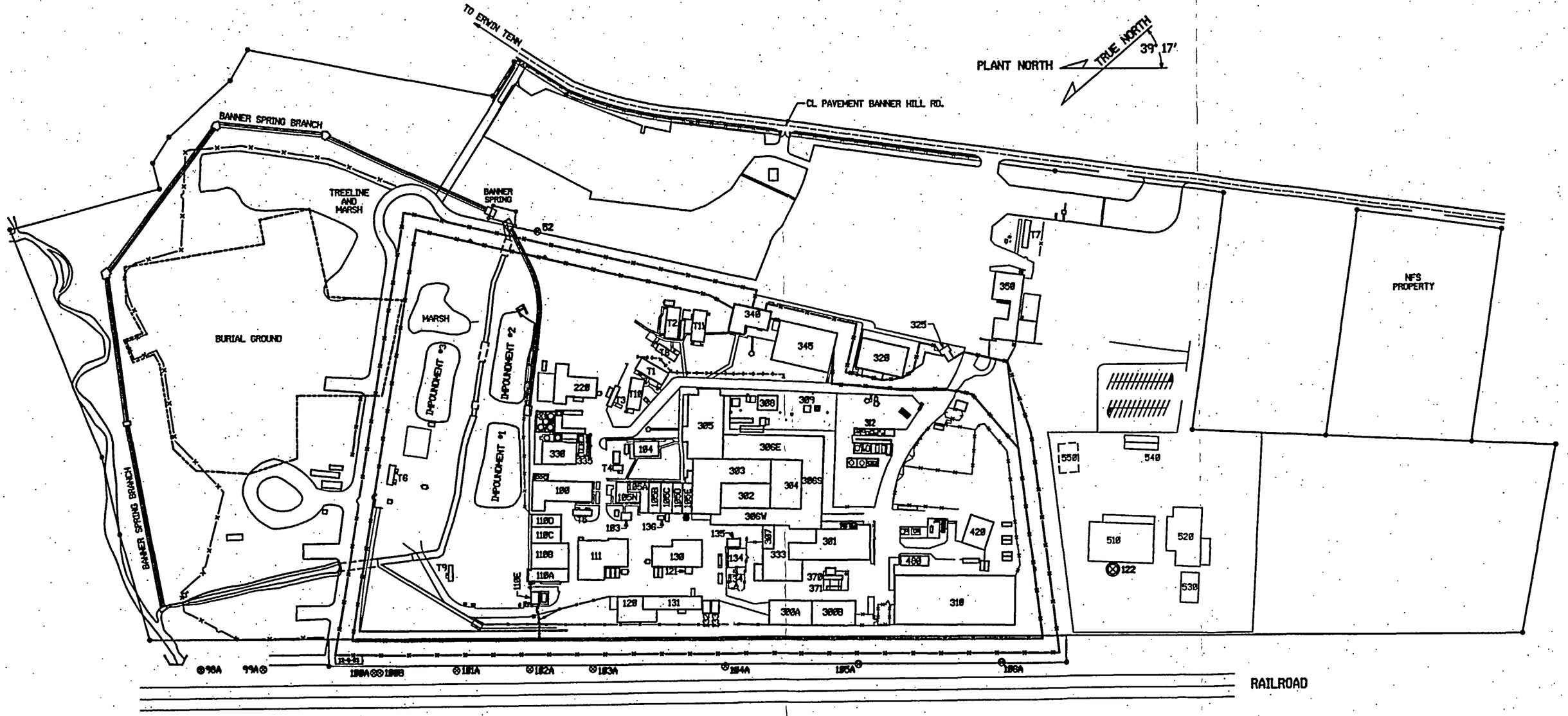
Table 13.3
EFFLUENT SAMPLING LOCATIONS[1]

Gaseous Effluents (Stacks/Vents)	Liquid Effluents (Streams)
Stack 416, Main Stack	Wastewater Treatment Facility (WWTF)
Stack 185, Building 131	
Stack 234, Building 234	NFS Sanitary Sewer
Stack 327, Building 330	BLEU Complex Sanitary Sewer
Stack 332, Building 120	EPOTW Sludge
Stack 376, Building 301	
Stack 421, Building 100	
Stack 503, Building 530	
Stack 504, Building 520	
Stack 547, Building 100	
Stack 573, Building 306-W	
Stack 600, Building 110	
Stack 615, Building 306-W	
Stack 646, Building 110	
Stack 649, Building 330	
Stack 667, Building 410	
Stack 703, Building 307	
Stack 704, Building 307	
Stack 510, Building 510	

Note:

1 – Normally, samples are only collected from these locations when discharges occur (i.e., stack/vent operates or facility discharges liquid effluents).

FIGURE 13.1
SITE GROUNDWATER MONITORING WELL LOCATIONS



				TOLERANCE UNLESS SPECIFIED	NUCLEAR FUEL SERVICES, INC. ERWIN, TENNESSEE
		ADDED REV LOCATION OF BANNER SPRING BRANCH	A	FRACTIONAL ± 1/64"	SNM-124 GROUNDWATER MONITORING PROGRAM MONITORING WELL LOCATIONS
JDK JDK	02-19-02	ORIGINAL ISSUE	—	ANGULAR ± 1°	
BY	DATE	REVISION	LET	DECIMAL .XX ± .01 .XXX ± .005	DRAWN M.D. KEEVER; PROPOSED APPROVALS; REQ.
THIS DRAWING, INCLUDING ALL INFORMATION CONTAINED HEREON, IS THE PROPERTY OF NUCLEAR FUEL SERVICES, INC. (NFS). THIS DRAWING IS LOANED SUBJECT TO RETURN ON DEMAND AND IS NOT TO BE COPIED REPRODUCED, MADE AVAILABLE OR DISCLOSED IN WHOLE OR PART TO THIRD PARTIES WITHOUT PRIOR WRITTEN CONSENT OF NFS.					PROPOSED COMPLETION DATES; DRAFTER; AS-BUILT APPROVALS; REQ.
					SCALE 1"= 200' DATE 02-20-04; 005-C0132-B1 DRAWING NO.
					CONFIGURATION CONTROL YES ____ NO ☒