NUCLEAR FUEL SERVICES, INC.
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21G-11-0184
GOV-01-55-04
ACF-11-0283

September 30, 2011

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

Reference:
1) Docket No. 70-143; SNM License 124
2) Letter from B. Marie Moore to the NRC, dated June 30, 2009, (21G-09-0104), Renewal of Special Nuclear Material (SNM) License 124
3) Letter from NRC to David C. Ward, dated March 15, 2010 (TAC #L32830), Request for Additional Information Regarding the Environmental Assessment for Nuclear Fuel Services, Inc. Materials License SNM-124 Renewal
4) Letter from NRC to Mark P. Elliott, dated June 15, 2010, (TAC No. L32830), Request for Additional Information Concerning License Renewal
5) Letter from Mark P. Elliott to NRC, dated August 16, 2010, (21G-10-0163), Response to the Request for Additional Information Concerning License Renewal for SNM-124
6) Letter from Mark P. Elliott to NRC, dated June 24, 2011, (21G-11-0118), Supplemental Information to Support Chapter 9 and the Environmental Assessment for Renewal of SNM License 124

Subject: Revised Chapter 9 for Renewal of License SNM-124

Nuclear Fuel Services, Inc. (NFS) hereby submits the revised Chapter 9, Environmental Protection, for the renewal of License SNM-124. The attachment contains proposed changes to incorporate the responses to the Request for Additional Information Concerning License Renewal for SNM-124 (Reference 5). Additionally, the proposed changes include information discussed with your staff during a conference call held on April 26, 2011, which was followed by the submittal of supplemental information (Reference 6) for items discussed during the conference call.

Changes are denoted with lines in the right margin of the attachment. A brief summary of the changes is included below.

NMSS01

- Introduction – updated in response to RAI 9.12
- Section 9.1.1 – updated in response to RAI 9.1 and 9.2
- Section 9.1.1.1 – updated in response to RAI 9.1
- Section 9.1.2 – updated in response to RAI 9.3 and 9.7
- Table 9-2 – updated in response to RAI 9.8

If you or your staff have any questions, require additional information, or wish to discuss this, please contact me, or Ms. Jennifer Wheeler, Licensing & ISA Manager, at (423) 735-5429. Please reference our unique document identification number (21G-11-0184) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.

Mark P. Elliott, Director
Quality, Safety, and Safeguards

DML/pj

Attachment: *SNM-124, Chapter 9, Revision 1*

COPY:
Regional Administrator
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Mr. Galen Smith
Senior Resident Inspector
U.S. Nuclear Regulatory Commission

Attachment

SNM-124, Chapter 9, Revision 1

(19 pages to follow)

SPECIAL NUCLEAR MATERIAL LICENSE
SNM-124
CHAPTER 9

ENVIRONMENTAL PROTECTION
Table of Contents

ENVIRONMENTAL PROTECTION

Introduction

Effluent releases from the NFS site can occur via two pathways: airborne or liquid. The control systems for each of these pathways are addressed in the following sections. In addition, periodic reviews of the radiation protection program, including effluent control and environmental monitoring, are described in Sections 4.1 and 4.2.

The action levels and the minimum detectable concentrations are documented in procedural guidance and technical basis documents. All documents are maintained current and are available for review at NFS.

Environmental Report - Summary of Environmental Data and Impacts

A complete revision of the NFS Environmental Report was submitted concurrently with the 2009 application for license renewal. The report includes radiological and non-radiological environmental summaries for the NFS site.

Effluent Control and Environmental Monitoring

Effluent controls and environmental monitoring are implemented through compliance with procedural guidance controlled by the Safety discipline. These procedures outline sampling techniques, sample processing and analysis methodologies, quality assurance, and other necessary information for maintaining a viable program. In addition, offsite samples are collected and analyzed routinely to verify the effectiveness of controls and provide data in the event of an emergency situation. Typical sampling locations are provided in Figure 9-1.

9.1 Effluent Control Systems

The objective of the effluent control program is to ensure that radioactive air and liquid effluents are as low as reasonably achievable, and thus protective of the public and environment. This objective is supported by performing routine measurements and calculations, comparing results to action levels, and reporting results to plant management and the NRC, as appropriate. Internal action levels are implemented by procedural guidance to provide early identification of potential problems and prevent exceedance of guidelines set forth in 10 CFR 20.1301. For air effluents, action levels are maintained below the ALARA constraint set forth in 10 CFR 20.1101. For liquid effluents, action levels are

established to limit the total effective dose equivalent to less than 10% of the limit established in 10 CFR 20.1301.

Unless otherwise noted, if an action level is exceeded for airborne or liquid effluents, the following actions will occur: (1) the environmental protection function manager and the responsible process engineering control personnel will be notified, (2) an investigation will be undertaken to identify the cause of the exceedance, and (3) appropriate corrective action(s) will be initiated to reduce observed levels that are above the action levels and to minimize the likelihood of a recurrence. Corrective actions will be documented. If necessary, the environmental protection function manager may order processing activities in an area to be halted until appropriate corrective actions are implemented.

9.1.1 Airborne Effluents

Flow rates on all process ventilation stacks are checked annually and whenever any process changes occur that have the potential to significantly alter the flow rate. Each individual effluent discharge point is evaluated for isotopic distribution based upon process knowledge and historical characterization data. Any significant change to the materials processed will be re-evaluated using isotopic analysis to verify accuracy of characterization data.

Screening levels are based on the gross alpha and gross beta analyses performed onsite from the routinely collected gaseous and liquid effluents, as well as historical knowledge of the process and material. Characterization data is used to determine if there is a significant change in the primary dose contributors. An offsite isotopic analysis will re-evaluate the characterization data. When radionuclides are detected above the action levels, the following will occur: notification of the environmental protection function manager and the responsible process engineering personnel, an investigation will be undertaken to identify the cause of the exceedance, and appropriate corrective action(s) will be initiated to reduce observed levels that are above the action levels and to minimize the likelihood of a recurrence.

9.1.1.1 Source-Point Sampling of Airborne Effluents

Effluent sampling is representative of the total discharge. All process stacks and vents with the potential to release airborne radioactivity at concentrations greater than or equal to 10% of the values in 10 CFR 20, Appendix B, Table 2, Column 1, are sampled continuously, with the exception of equipment malfunctions, during processing of radioactive materials. Samples are collected daily from active processing areas and at least weekly from decommissioning areas and inactive processing areas.

To minimize effects of radon progeny on measured activity, air sample results may be decay-corrected for radon progeny or a waiting period may be used to eliminate the interference. Samples are routinely analyzed for gross alpha/beta activity and compared against action points for early detection and investigation of potential problems.

9.1.1.2 Action Level for Airborne Effluents

Gross alpha and beta activity data from the stack sampling program are compared to the action levels established by procedural guidance. Action levels within procedural guidance are specified for combined releases from stacks with similar physical and radiological release characteristics and include values for both the cumulative activity released in a 12-month period and the monthly average activity concentration.

The cumulative alpha and beta activities released in the previous 12-month period are calculated monthly for each indicated stack grouping and compared to action levels. The monthly average alpha and beta activity concentrations are determined for each group of stacks by dividing the total alpha and total beta activities released by the group by the total volume of air released by the group. The stack action levels as defined within procedural guidance were derived using a dose-based approach with the intent of preventing the maximally exposed off-site receptor from receiving an annual total effective dose equivalent from air effluents, greater than the ALARA dose constraint cited in 10 CFR 20.1101(d). Dose calculations are performed using ICRP 66 and ICRP 68 methodology, assuming an Activity Median Aerodynamic Diameter (AMAD) of one micrometer.

9.1.1.3 Reporting Method

Alpha and beta activity releases in airborne effluents are summarized in monthly and quarterly reports that are maintained as internal documents. These reports include information on both alpha and beta activity emissions for each individual stack and for the site as a whole.

Activity release data are accumulated and reported on a semiannual basis to the NRC as required by 10 CFR 70.59. To meet the semiannual reporting condition in 10 CFR 70.59, a preliminary assessment may be performed if any sample results are pending. A format similar to that presented in Regulatory Guide 4.16 is followed for this report. If semiannual average activity concentrations in stack effluents exceed concentrations listed in Appendix B, Table 2, Column 1, to 10 CFR Part 20, results of an assessment of the maximum concentration at the site boundary and of the total effective dose equivalent to the maximally exposed off-

site receptor from air effluents will be included in this semiannual report to the NRC. The methods used to perform this assessment are discussed in Section 9.1.1.4.

9.1.1.4 Routine Assessment of Concentrations at Site Boundary and Off-site Dose

Each calendar quarter, stack sampling data is compiled and used to calculate the maximum concentration at the site boundary and the total effective dose equivalent (TEDE) to the potential maximally exposed off-site receptor due to air emissions. If the maximum concentration at the site boundary exceeds values in Appendix B, Table 2, Column 1, to 10 CFR Part 20, or if the resulting TEDE exceeds 25% of the annual ALARA constraint for air emissions cited in 10 CFR 20.1101, appropriate corrective actions will be identified and implemented to reduce future dose levels. Each calendar year, the annual dose to the maximally exposed off-site receptor is calculated. If the annual dose exceeds the ALARA constraint as listed in 10 CFR 20.1101, appropriate reports will be submitted to the NRC in accordance with 10 CFR 20.2203.

Assessment of the maximum concentration at the site boundary and maximum off-site dose is performed using the Comply Code (U.S. Environmental Protection Agency [EPA]), the CAP88-PC Computer Code 3.0 or higher (U.S. Department of Energy [DOE]), or an equivalent methodology. Site specific meteorological data is used in the assessment when available. Otherwise, conservative values are used for meteorological parameters. Air samples may be analyzed for uranium lung solubility class and enrichment in order to characterize the material released. Otherwise, conservative values are used for solubility class and enrichment. NFS follows procedural documents to perform the calculations. Parameter values used in modeling are based on data collected during the assessment period, previous monitoring history, or the professional judgment of an environmental scientist or health physicist.

9.1.2 Liquid Effluents

Typically, process waste water is collected in tanks in or near the various process buildings. Based upon the origin of the liquid waste, samples may be required to be collected and analyzed prior to transfer to the Waste Water Treatment Facility (WWTF) for treatment. Internal action limits are established to control concentrations of radionuclides transferred to the WWTF. The WWTF is operated in accordance with a State of Tennessee issued NPDES permit. Waste water is treated, analyzed, and released on a batch basis. Authorization to release the treated water to the Nolichucky River is procedurally controlled.

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 locally-issued pretreatment permit.

The NFS plant site has two storm water drainage pathways which empty into Martin Creek. Storm water from NFS and NFS' BLEU Complex is collected in a series of drains and directed into an open ditch which parallels the northwest plant boundary and empties into Martin Creek. The second storm water pathway directs drainage from the eastern portion of NFS property into an underground pipe which also empties into Martin Creek. The underground pipe was designed to carry the flow of Banner Spring around the North Site. The storm water permit is issued by the State of Tennessee and sampling is performed in accordance with the permit. In addition, storm water runoff is monitored by the weekly collection of grab samples from Martin Creek and the quarterly collection of samples of the two storm water pathways. Martin Creek empties into the Nolichucky River which is routinely sampled on a quarterly basis.

9.1.2.1 Source-Point Sampling of Liquid Effluents

The WWTF treats and discharges process waste water on a batch basis. Prior to discharge, each batch is sampled and analyzed for gross alpha and gross beta radioactivity. A monthly composite sample is collected and analyzed for isotopes of uranium. The monthly composite is 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 are collected and analyzed as identified in Table 9-1. The monthly composite samples are 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. Solubility is determined in accordance with 10 CFR 20.2003 and serves as the guidance for the insoluble radioactivity analyses.

The sewage sludge at the Erwin-POTW is sampled quarterly, provided a blow-down sample is available. The sewage sludge samples are analyzed in accordance with Table 9-1.

Martin Creek downstream samples are collected and analyzed for gross alpha and gross beta radioactivity and the action levels are implemented in procedures.

Table 9-1
Summary Table of Environmental Radiological Monitoring Program

Sampling Point	Sample Type/ Collection Frequency	Parameters Analyzed
Liquid Effluents		
Surface Water		
Martin Creek Upstream	Grab/Quarterly	Gross Alpha Gross Beta
Nolichucky River Upstream	Grab/Quarterly	Gross Alpha Gross Beta
Martin Creek Downstream	Grab/Weekly	Gross Alpha Gross Beta
Nolichucky River Downstream	Grab/Quarterly	Gross Alpha Gross Beta
Process Waste Water		
Waste Water Treatment Facility	Grab/each batch	Gross Alpha Gross Beta
	Composite/Monthly	Isotopic U
NFS Sanitary Sewer[2]	Continuous/Daily[1]	Gross Alpha Gross Beta
	Composite/Monthly	Isotopic U
	Composite/Monthly[3]	Insoluble Radioactivity
BLEU Complex Sanitary Sewer[2]	Continuous/Daily[1]	Gross Alpha Gross Beta
	Composite/Monthly	Isotopic U
	Composite/Monthly[4]	Insoluble Radioactivity
Environmental Media		
Sludge (Erwin POTW)	Grab/Quarterly	Isotopic U
Storm Water Pathway		
Banner Spring Branch	Grab/Quarterly	Gross Alpha Gross Beta Isotopic U
Perimeter North West Ditch	Grab/Quarterly	Gross Alpha Gross Beta Isotopic U

NOTES:

[1] 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.

[2] Sampling is only required for disposal of process water containing licensed materials into the sanitary sewerage in accordance with 10 CFR 20.2003.

[3] 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.

[4] 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 operational.

9.1.2.2 Action Levels for Liquid Effluents

Prior to final discharge from the WWTF, 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 procedural guidance. These action levels are at or below concentrations listed in 10 CFR 20 Appendix B, Table 2 Column 2.

Waste solutions in which the alpha or beta concentration exceeds one of these action levels is discharged only after approval by the environmental protection function manager or designated individual. If it is found that any discharges over a 12-month period caused the dose to members of the public (from WWTF effluents) to exceed 10% of the dose limit specified in 10 CFR 20.1301, 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 are 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.

Action levels for sewer discharges, and other surface water effluents are at or below concentrations listed in 10 CFR 20, Appendix B, Table 2, Column 2 and are monitored as indicated in Table 9-1.

9.1.2.3 Reporting Methods

Radioactivity in liquid effluents is summarized in a quarterly liquid effluent report that is maintained as an internal document. This report includes information on both the gross alpha and gross beta radioactivity in each liquid effluent stream (i.e., 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. To meet the semiannual reporting condition in 10 CFR 70.59, a preliminary assessment may be performed if any sample results are pending. A format similar to that presented in Regulatory Guide 4.16 is followed for this report. If the semiannual average activity concentration exceeds the SOF[1] of one for WWTF effluents, 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 9.1.2.4.

1. 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 10 CFR Part 20. If the SOF for WWTF exceeds 1.0, results of a dose assessment to the maximally exposed off-site receptor will be reported as indicated above.

9.1.2.4 Routine Assessment of Maximum Concentration and Off-Site Dose from WWTF Effluents to the Maximally Exposed Off-Site Receptor

Each calendar quarter, WWTF liquid effluent data is compiled and used to calculate the concentration of radioactive materials at the location of the maximally exposed off-site receptor and the dose (TEDE) to the maximally exposed off-site receptor. Each calendar quarter, the dose for the four previous (consecutive) quarters is calculated. If the calculated dose for this annualized period exceeds 10% of 10 CFR 20.1301, corrective actions will be implemented and the NRC will be notified in writing within 30 days.

Assessment of the maximum concentration and TEDE to the maximally exposed off-site receptor is performed using: (1) National Council on Radiation Protection and Measurements (NCRP) Report No. 123, "Screening Models for Releases of Radionuclides to Atmosphere, Surface Water, and Ground," or (2) pathway analysis models that consider all exposure pathways and accurately reflect site conditions. Site-specific characteristics of the surface waters receiving liquid effluents are assessed. NFS follows written procedures to perform these calculations. Parameter values are based on information contained in NCRP Report No. 123, data collected during the assessment period, publicly available information (e.g., stream flow data compiled by the U.S. Geological Survey (USGS)), previous monitoring history, or the professional judgment of the environmental protection function manager.

9.2 Environmental Surveillance Program

In addition to the effluent monitoring and reporting requirements of this chapter, NFS maintains an Environmental Surveillance Program. The program is established to provide:

1. Additional validation of effluent monitoring systems.
2. Early detection and response to a negative trend in environmental data.
3. Support data in the event of a release of radioactive material.

The monitoring program is detailed in written procedures. The site environmental monitoring program is dynamic, and changes are made as dictated by changes in operations and/or the emergence of new-found information. Typical sampling locations are provided in Figure 9-1.

In the event that a sample(s) specified in Table 9-2 cannot be taken, the manager of the environmental protection function will be notified. An investigation will be initiated to include an assessment of the significance of the event, the cause of the deviation from plan, and determine what corrective action is needed.

Table 9-2
Summary Table of Environmental Radiological Surveillance Program of Environmental Media

Sampling Point	Sample Type/ Collection Frequency	Parameters Analyzed
Ambient Air	Continuous/Weekly	Gross Alpha Gross Beta
	Composite/Quarterly	Isotopic U
	Composite/Annually	Isotopes of concern
Soil	Grab/Quarterly	Gross Alpha[1] Gross Beta
Silt/Sediment	Grab/Quarterly	Gross Alpha[1] Gross Beta
Vegetation	Grab/Quarterly	Gross Alpha[1] Gross Beta
Groundwater	Grab/Quarterly	Gross Alpha[1] Gross Beta

NOTE:
[1] If an action level specified by procedural guidance 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).

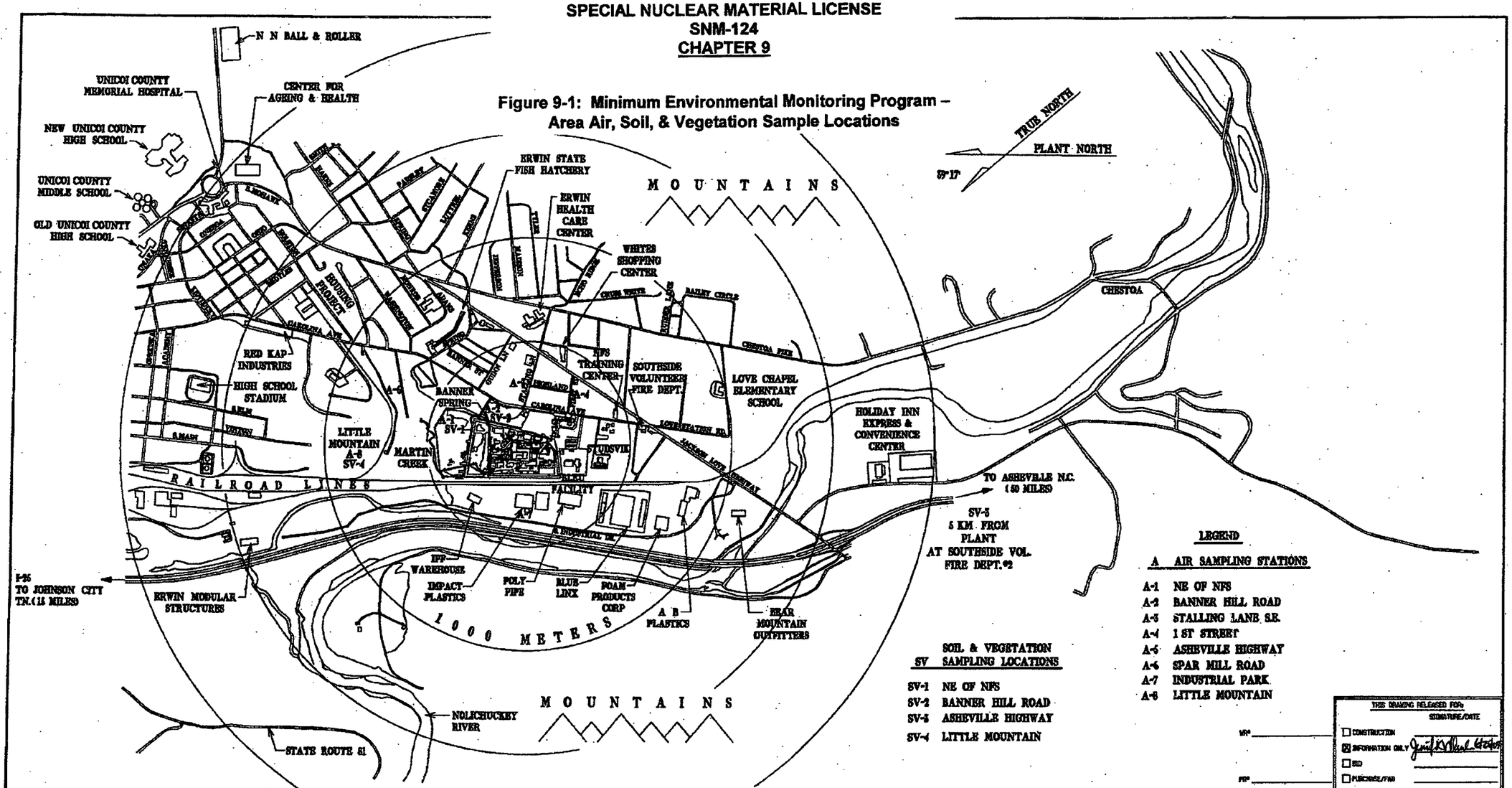
9.2.1 Air Monitoring

Air samples are collected and analyzed to monitor airborne radioactivity concentrations attributable to plant operations. The locations of these stations are concentrated along the predominant wind directions. Detailed locations are specified in appropriate written procedures.

Air samples are collected continuously, exchanged weekly, and analyzed for gross alpha and beta activity weekly. In addition, air samples are analyzed for isotopic U on a quarterly basis and additional isotopes of concern (based upon characterization data of material processed) on an annual basis for the sampling station nearest the predicted maximally exposed off-site receptor.

Ambient air sampling results are reviewed quarterly and compared to the action levels implemented by procedural guidance. If an action level is exceeded, the environmental protection function manager will be notified and an investigation will be undertaken to determine the cause of the exceedance. Depending on the severity of the event, corrective actions may be initiated to reduce air emissions from the plant.

Figure 9-1: Minimum Environmental Monitoring Program – Area Air, Soil, & Vegetation Sample Locations



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WGH / TKH	8-18-98	ORIGINAL ISSUE RMG-1274B	—

TOLERANCE UNLESS SPECIFIED: FRACTIONAL ± 1/64"; ANGULAR ± 1/2°; DECIMAL .XX ± .01, .XXX ± .001

NUCLEAR FUEL SERVICES, INC.
ERWIN, TENNESSEE

TYPICAL ENVIRONMENTAL MONITORING PROGRAM - AREA AIR, SOIL & VEGETATION SAMPLE LOCATIONS

DRAFTER W.G. HENSLEY — SCALE 1"=1500' — DATE 5-18-09

DRAWING NO. 000-C0328-B

CONFIGURATION CONTROL YES ____ NO ☒

9.2.5 Surface Water Sampling

Surface water sampling is part of the liquid effluent program as described in Section 9.1.2. The Nolichucky River is the final receiving stream for treated waste water discharged from the facility and surface water runoff from the plant drainage system. Table 9-1 lists the applicable surface water systems which are sampled and analyzed for gross alpha and gross beta levels to establish radioactivity concentrations at upstream and downstream locations from the site.

9.2.6 Ground Water Monitoring

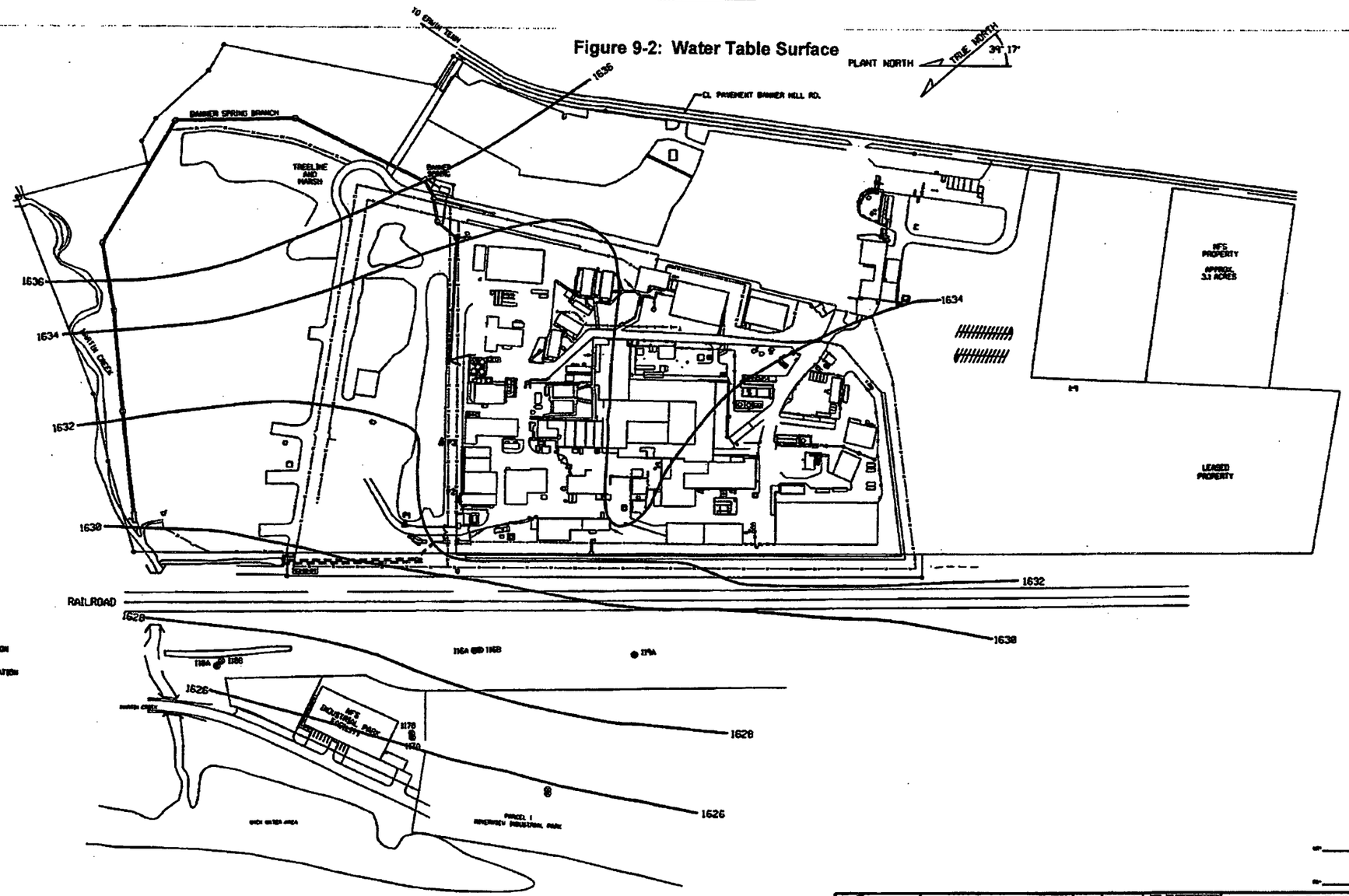
Groundwater flow at the NFS site is to the north-northwest. Figure 9-2 depicts the water table surface for June 2008 and is representative of overall groundwater flow. To determine the impact of NFS operations on downgradient groundwater quality, one upgradient well and ten downgradient wells are monitored quarterly at a minimum for gross alpha and gross beta activity. Current monitoring well locations are depicted in Figure 9-3. These monitoring well locations may be changed based upon the judgment of a qualified hydrologist/geologist employed or contracted by NFS and approval by the site environmental protection function manager or designee. Table 9-2 provides information on the sample type, collection frequency, and analysis.

All groundwater analytical results are reviewed and evaluated. If the gross alpha activity in a well exceeds 15 pCi/L, then at a minimum, isotopic analysis for uranium will be performed. In addition, isotopic plutonium and/or isotopic thorium analysis will be performed when the well contains these contaminants at levels significantly greater than background, or if potential contamination in the area indicates isotopic plutonium and/or thorium analysis should be conducted. Wells which routinely exceed 15 pCi/L gross alpha and have no history for plutonium or thorium contamination are sampled annually for plutonium and thorium to confirm their continued absence. If gross beta activity in any well exceeds 50 pCi/L, then analysis for Tc-99 will be performed.

9.2.7 Environmental Dosimeters

Environmental dosimeters are located both onsite and offsite 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 are 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 or potentially present at a given location.

Figure 9-2: Water Table Surface



NUCLEAR FUEL SERVICES, INC.
Erwin, Tennessee

2ND QUARTER 2008
POTENTIOMETRIC SURFACE MAP
COLLECTED IN JUNE 2008

ORIGINAL ISSUE

BY	DATE	REVISION	LET

DRAWN BY B CAMPBELL
SCALE 1" = 250'
DATE 4/15/09
DRAWING NO. 005-C0383-8
CONFIGURATION CONTROL YES ____ NO ☒

Figure 9-3
Site Groundwater Monitoring Well Locations

This drawing is "Official Use Only" and has been moved to the "Sensitive Information" ADDENDUM.

9.3 Quality Assurance of Radiation Measurements

All radiological measurements are performed with the objective of providing information that is accurate and precise, thus allowing valid assessments of plant impacts. Details of the NFS Quality Assurance Program are provided in appropriate procedures. These procedures incorporate the applicable elements of Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - - Effluent Streams and the Environment," and Regulatory Guide 4.16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants." A brief summary of program elements is provided in the following sections:

9.3.1 Operating Procedures/Instructions

Procedures and/or other guidance documents are utilized to maintain the various components of a viable QA program. Procedures cover, but are not limited to, sample collection, preparation and analysis; calibration and maintenance of counting equipment and monitoring systems; reduction, evaluation, and reporting of data; quality control considerations; and general auditing concerns.

9.3.2 Records

Records are generated, updated, and retained to adequately document and ensure a reasonable QA program.

9.3.3 Quality Control in Sampling

Sampling of environmental media is undertaken in a manner to assure accuracy and representativeness of the samples. Samples are adequately labeled to guarantee proper identification. Processing and analysis of samples are conducted on a timely basis to ensure that proper sample integrity is maintained. Where storage is necessary, proper measures are taken to preserve the sample in consideration for the analyses that will later be required. Sampling systems are properly maintained and, as required, calibrated to assure operability.

9.3.4 Quality Control in the Laboratory

Laboratory instrumentation is maintained and calibrated in a manner that assures quality measurements. This includes, but is not limited to, the following: the use of NIST traceable standards (or their equivalent) which are appropriate for the

type of analysis undertaken, utilization of check sources on a reasonable basis to verify calibration and counter efficiency, background checks, usage of quality control samples (blanks, duplicates, and spiked samples) as appropriate to verify accuracy of measurements, interlaboratory analysis crosschecks as considered prudent, and a program for computational overchecks. Further, all contract laboratories must maintain adequate, verifiable QA programs.

9.3.5 Data Analysis and Review

Data from analysis of actual samples and QC measurement data are surveyed for accuracy and precision. When systems (either plant process systems or measurements analysis systems) are considered to be out of control on the basis of these data assessments, relevant investigations will be undertaken and steps taken to correct the problem(s).

9.3.6 Audits

Audits are performed to verify implementation of the quality assurance program.

9.4 Waste Minimization

It is the policy of NFS management to eliminate and/or minimize the generation of waste during planning, design, and operation of plant activities. All employees are expected to participate in waste reduction practices. Materials are recycled when judged to be reasonable and economical. The NFS Hazardous and Mixed Waste Reduction Plan is updated on an annual basis.