

July 18, 2002

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. URANYL NITRATE STORAGE BUILDING  
ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT  
IMPACT (TAC NO. L31567)

Dear Ms. Moore:

Enclosed are copies of the Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) prepared to support the amendment of Materials License SNM-124. The FONSI, which was published in the Federal Register on July 9, 2002, also contains a Notice of Opportunity for Hearing in accordance with Subpart L of 10 CFR Part 2. If you have questions regarding this action, I can be reached on (301) 415-7249.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Mary T. Adams  
Fuel Cycle Licensing Branch  
Division of Fuel Cycle Safety and Safeguards  
Office of Nuclear Material Safety and Safeguards

Docket 70-143  
License SNM-124

Enclosures: 1. Federal Register Notice -Finding of No Significant Impact of License  
Amendment for Nuclear Fuel Services, Inc., and Notice of Opportunity to  
Request a Hearing.  
2. Environmental Assessment for Proposed License Amendments to Special  
Nuclear Material License No. SNM-124 Regarding Downblending and Oxide  
Conversion of Surplus High-Enriched Uranium.

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**NUCLEAR REGULATORY COMMISSION**

[Docket No. 70-143]

Environmental Assessment and Finding of No Significant Impact of License Amendment for Nuclear Fuel Services, Inc.

AGENCY: U.S. Nuclear Regulatory Commission

ACTION: Amendment of Nuclear Fuel Services, Inc., Materials License SNM-124 to authorize construction and operation of the Uranyl Nitrate Storage Building.

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The U.S. Nuclear Regulatory Commission is considering the amendment of Special Nuclear Material License SNM-124 to authorize construction and operation of the Uranyl Nitrate Storage Building at the Nuclear Fuel Services site in Erwin, Tennessee, and has prepared an Environmental Assessment in support of this action. The accession number for the Environmental Assessment is ML021790068.

**SUMMARY OF ENVIRONMENTAL ASSESSMENT**Identification of the Proposed Action:

The proposed action currently before the U.S. Nuclear Regulatory Commission (NRC) is to allow the licensee to construct and operate a Low-Enriched Uranyl Nitrate Storage Building (UNB) at the Nuclear Fuel Services, Inc. (NFS) site in Erwin, Tennessee, and to increase the <sup>235</sup>U possession limit. This action is part of the Blended Low-Enriched Uranium (BLEU) project described below. The other related future activities which were considered to contribute to the environmental impacts for this project are: construction and operation of an Oxide Conversion Building (OCB), construction and operation a new Effluent Processing Building (EPB), and relocation of downblending operations within the NFS protected area in a BLEU Preparation Facility (BPF).

On March 4, 2002, NRC issued a notice of intent to prepare an environmental assessment (EA) for amendment of Special Nuclear Material (SNM) License No. SNM-124 for NFS. To avoid segmentation of the environmental review, NFS has submitted environmental documentation for three proposed license amendments, which will impact the site over the next few years.

The Environmental Assessment (EA) for these actions does not serve as authorization for any proposed activities, rather it assesses the environmental impacts of the actions. As each amendment application is submitted, the NRC staff will perform a separate safety evaluation, which will be the basis for the approval or denial of the application. As part of the safety evaluation, the NRC will perform an environmental review. If the review indicates that this EA appropriately and adequately assesses the environmental effects of the proposed action, then no further assessment will be performed. However, if the environmental review indicates that this EA does not evaluate fully the environmental effects, another EA [or environmental impact statement (EIS)] will be prepared in accordance with the National Environmental Policy Act (NEPA).

Need for the Proposed Action:

The Blended Low Enriched Uranium (BLEU) Project is part of a Department of Energy (DOE) program to reduce stockpiles of surplus high enriched uranium (HEU) through re-use or disposal as radioactive waste. Re-use as low enriched uranium (LEU) is considered the favorable option by the DOE because (1) weapons grade material is converted to a form unsuitable for nuclear weapons (addressing a proliferation concern), (2) the product can be used for peaceful purposes, and (3) the commercial value of the surplus material can be recovered. An additional benefit of re-use is avoidance of unnecessary use of limited radioactive waste disposal space. Framatome ANP Inc. has contracted with NFS to downblend surplus HEU material to a LEU nitrate and to convert the LEU to an oxide form. The NFS LEU oxide product is expected to be fabricated into commercial reactor fuel at a separate facility, for use in a Tennessee Valley Authority (TVA) nuclear power reactor; however, the NFS proposed action is limited to the production of LEU oxide, receipt and storage of LEU nitrate, down blending of HEU to LEU, and conversion of LEU nitrate to LEU oxide.

Environmental Impacts of the Proposed Action:

For the proposed license amendments, construction and processing operations will result in the release of low levels of chemical and radioactive constituents to the environment. Under accident conditions, higher concentrations of materials could be released to the environment over a short period of time.

*Normal Operations*

Radiological impacts from the proposed BLEU Project operations include release of small quantities of radioactive material to the atmosphere and surface water. Radionuclides that may be released include isotopes and some daughter products of the actinide elements uranium, thorium, plutonium, americium, actinium, and lesser quantities of fission products including technetium, cesium, and strontium. Based on source material properties and processing information, NFS has estimated the quantities of airborne and liquid effluents and used this information to estimate doses to the maximally exposed individual. While some effluents for the proposed action are increasing in relation to current releases, the total annual dose estimate for the maximally exposed individual from all planned effluents is 0.022 mSv (2.2 mrem). This result is well below the annual public dose limit of 1 mSv (100 mrem) in 10 CFR Part 20 and the 0.1 mSv (10 mrem) ALARA constraint. The estimated dose for a number of radionuclides is conservative, because the analysis assumed no pollution controls were in place.

Solid wastes generated by BLEU Project operations will be packaged into drums or boxes. Each container will be assayed for uranium content to verify that storage, shipment, and disposal requirements are met.

The potential for increase in dose to workers at NFS due to the BLEU project was evaluated. Operation of the BPF, OCB and UNB is not expected to increase the dose to workers at the NFS facility, because the types and quantity of material, and the processing, will be similar to what is already licensed at the site. NFS is committed to keeping doses as low as reasonable achievable (ALARA) by maintaining a radiation protection program that minimizes radiation exposures and releases of radioactive material to the environment. In order to accomplish this,

NFS has procedures for working with radioactive materials and monitoring programs to determine the doses received by employees.

Impacts from non-radiological contaminants to air, surface water, and groundwater were also assessed. Air quality is protected by enforcing emission limits and maintenance requirements for pollution control equipment, as required by several operating permits issued by the Tennessee Air Pollution Control Board, Department of Environment and Conservation. The primary non-radiological emissions are expected to include nitrogen oxides, hydrogen and ammonia. Normal emissions of gaseous effluents from the new processes are not expected to have a significant impact on offsite non-radiological air quality, because the estimated concentrations at the nearest site boundary are below the State of Tennessee primary air quality standards, with the exception of nitrogen oxides. For nitrogen oxides, NFS will exceed the current allowable limit; however, NFS is requesting modification to the existing air pollution control permit for the main stack. Modification of the permit is required because of changes in material input from the BPF and installation of additional process and ventilation equipment. This modified permit for the main stack has not been issued as of this EA; however, NRC expects that the State, under its authority to regulate air quality, will continue to set permit levels to limit environmental impacts from NFS effluents.

The proposed BPF and BLEU Complex are expected to produce liquid effluents. BPF waste streams will be sent to the NFS wastewater treatment facility and discharged into the Nolichucky River in accordance with the National Pollutant Discharge Elimination System (NPDES) permit and NRC radiological effluent limits in 10 CFR Part 20. This liquid effluent will consist of raffinate, condensate, scrubber waste solution, and sodium hydroxide. The basic and acidic waste streams will be treated using precipitation and ion exchange processes.

Surface water quality is expected to be protected from future site activities by enforcing release limits and monitoring programs, as required under the NPDES permit. No impact on NPDES permit limits is anticipated with respect to operations at the proposed BLEU Complex or downblending at the BPF. Surface water runoff from the proposed action will generally flow to the northwest across the proposed BLEU Complex. This runoff will drain to culverts at the northwest boundary of the NFS site, and then empty into Martin Creek. A storm water construction permit will be obtained from the Tennessee Department of Environment and Conservation prior to any construction activities that would disturb the land. Erosion and sediment control measures (e.g., straw bales and silt fences) will be employed to mitigate surface runoff into the drainage ditches and Martin Creek, thus reducing the impacts to surface water during the construction of the proposed BLEU Complex. Sluice gates will be installed at collection points within the proposed BLEU Complex for containment of any hazardous spills during the lifetime of BLEU operations.

Previous operation of the plant has resulted in localized chemical and radiological contamination of groundwater, including beneath the BPF. Groundwater monitoring conducted by NFS indicates that plumes of uranium, tetrachloroethylene, trichloroethylene, 1,2-dichloroethylene, and vinyl chloride, from past operations, could migrate offsite in the direction of the Nolichucky River. To address potential environmental impacts from this contamination, NFS has removed much of the source contamination through extensive remediation projects including excavation of contaminated areas in the North Site. In addition, NFS is decommissioning the Radiological Burial Ground and the North Site to remove more of

the source of this contamination. NFS also is working with the Tennessee Department of Environment and Conservation and the U. S. Environmental Protection Agency to design remedial strategies and to investigate the off-site extent of existing plumes.

The addition of the BLEU Complex will expand the physical site of the Erwin plant. Current environmental monitoring stations do not provide adequate coverage of the expanded site area. In addition, the current monitoring program lacks adequate coverage for groundwater in the vicinity of the proposed BLEU Complex. NFS plans to expand the existing environmental monitoring program to cover the BLEU Complex. Additional monitoring locations (e.g., air, vegetation, soil, groundwater) will be proposed in a forthcoming license amendment request for the BLEU Project. For groundwater monitoring, NFS has indicated a minimum of one upgradient and three downgradient wells will be installed in the vicinity of the proposed BLEU Complex. NRC review of the proposed environmental monitoring program to determine compliance with 10 CFR Part 20 requirements provides assurance that an adequate program will be in place prior to making a decision on the license amendments.

For normal operations, the proposed action will not discharge any effluents to the groundwater; therefore, no adverse impacts to groundwater are expected. Accidental releases of contaminants to groundwater appear unlikely due to design and control measures implemented by NFS.

A field investigation was conducted on the proposed BLEU complex site to determine the absence or presence of rare, threatened, or endangered plants. The survey focused primarily on the twenty federally listed threatened and endangered plants, but the State of Tennessee listing of rare and endangered vascular plants was also used for this survey. The results of the survey were that none of the plants on the federal or state lists were found to be present on this site, and the proposed actions on this site are not likely to adversely affect state and federally listed rare, threatened, or endangered plant species.

Unicoi County, the area in which the NFS site is located, contains one Federally Endangered mussel species, Appalachian elktoe (*Alasmodonta raveneliana*) near the confluence of the Nolichucky River and South Indian Creek. Because this is upstream of the confluence of the Nolichucky River and Martin Creek and the NFS site, no impact is expected on this species. No other threatened or endangered species listed on the Federal or State Threatened or Endangered Species List for the Region of Interest are known to potentially reside on the NFS site.

No impacts are expected on land use, biotic resources, socioeconomic resources, or cultural resources.

#### *Accident Conditions*

The conversion of HEU materials to low-enriched uranium dioxide at the BLEU Project will require the handling, processing, and storage of radioactive material and hazardous chemicals. An uncontrolled release of these materials from accidents could pose a risk to the environment as well as to workers and public health and safety.

The evaluation of potential accidents is carried out at a general level of detail in the EA to establish that the proposed processes, as described by NFS, will function safely with no significant adverse impacts to safety or the environment. A more detailed evaluation of the proposed processes will be carried out by the NFS in its integrated safety analysis, summaries of which will be submitted in the forthcoming BLEU Project license amendment requests.

The dissolution and downblending of HEU feed materials to low-enriched uranyl nitrate (UN) solution will be carried out in the BLEU Processing Facility. Remaining operations will be performed in the BLEU Complex area. This will include the storage of low-enriched UN solution in the UNB followed by further processing into uranium dioxide powder in the OCB, and treatment of the liquid effluent stream from the OCB in the EPB.

The primary chemicals used in the dissolution and downblending processes taking place in the BPF are: Nitric acid (70 percent solution); hydrogen peroxide (30 percent solution); sodium hydroxide (30 percent solution); sodium nitrate (45 percent solution); barium oxide (BaO); tributyl phosphate  $[(C_4H_9)_3PO_4]$ ; normal paraffin fluid (Nopar 12 fluid); sodium carbonate ( $Na_2CO_3$ ). The radioactive feed materials used include HEU/aluminum alloy, HEU metal (buttons), and natural uranium oxide. Reaction products and intermediates include sodium diuranate and UN solutions.

The main chemicals to be used and stored in the BLEU Complex are: low-enriched UN solution, anhydrous ammonia, aqueous ammonia (23 percent solution), nitric acid (50 percent solution), nitric acid (7 percent solution), liquid nitrogen, sodium hydroxide (50 percent solution), liquified petroleum gas (propane), and diesel fuel.

Many of the proposed process operations are patterned after existing NRC licensed processes, so operational experience and history build confidence that operations can be executed safely. Proposed process operations, such as the downblending of high-enriched UN to low-enriched UN, liquid-liquid extraction to purify UN solution, and HEU storage are very similar to corresponding processes licensed under NRC License SNM-124. The LEU solution will be converted to uranium dioxide powder in the OCB using the Framatome ANP Inc. process that is authorized by NRC License SNM-1227. Potential hazards associated with new operations were evaluated during the NRC review.

Primary hazards associated with the operation of the BLEU Project facilities involve: spill of chemical and or radioactive material in the building, leak in a storage tank or supply piping, release of gaseous and particulate effluents (chemical and/or radioactive materials) due to a malfunction of the process off gas treatment system, and upset in the control of process parameters leading to undesirable reactions and release of hazardous or explosive compounds such as hydrogen, hydrogen peroxide, ammonia, nitrogen oxides, nitric acid vapors. The loss of control of the process may include release of radioactive materials and nuclear criticality. These accidents can potentially impact worker safety, public health and safety, and the environment.

Primary controls relied upon to guard against inadvertent nuclear criticality in processing operations include concentration limits and use of favorable geometry process vessels. Measures to ensure chemical safety and safe handling of radioactive materials include the following:

- Tanks will be bermed for spill control and isolation
- Tanks will be equipped with level control for overfill protection
- Process off gases will be treated through scrubbers and HEPA filters prior to stack discharge
- Process parameters will be controlled, and concentrations of hazardous or explosive chemicals will be maintained at safe levels. For example, sodium nitrate will be used in the HEU aluminum alloy dissolution process to minimize the formation of hydrogen, and air will be used in the dissolver to dilute the small quantities of hydrogen formed to safe levels

Based on the information furnished in the NFS reports and summarized above, the safety controls to be employed in the processes for the BLEU Project appear to be sufficient to ensure planned processing will be safe.

#### *Cumulative Impacts*

The Studsvick Facility is located adjacent to the NFS property, just south of the proposed BLEU complex. This facility is licensed by the state to process radioactive wastes. Due to the proximity of the two facilities, the staff evaluated cumulative radiological impacts from air effluents, liquid effluents, and direct radiation. The annual average of NFS effluent data from 1996 through 2000 and the most recent effluent data (CY2000) from the operations at Studsvick adequately characterize the impacts from current operations. Foreseeable future impacts of the BLEU Project (including BLEU Preparation facility, additional Waste Water Treatment Facility effluents and BLEU Complex effluents) were also considered.

Future impacts from air emissions from NFS operations are estimated using environmental monitoring data from 1996 through 2000. The air emissions estimate for Studsvick, Inc., is based on year 2000 data. To bound the impacts, the baseline dose from NFS operations and current estimates of doses attributable to Studsvick are added to the foreseeable future impacts of BLEU Project operations. Though it is not likely that the same individual is the maximally-exposed individual for each of the facilities, the sum of these doses are considered to bound future impacts.

As demonstrated in semi-annual effluent reports, current liquid releases from the NFS site are well within the regulatory limits listed in 10 CFR Part 20. NFS has provided conservatively-derived estimates of future discharges from the BLEU Project which were estimated using NCRP 123. The dose from these effluents, which are dominated by contributions from the solvent extraction raffinate at the BLEU preparation facility, when added to existing effluents, remain within regulatory limits.

The staff evaluated cumulative impacts to the sewer system of combined NFS, BLEU Project and Studsvick by estimating bounding concentrations that would be present in individual streams. NFS estimated the discharge from the BLEU Complex to be 6,300 gallons per day. This daily discharge volume was used to convert estimated quantities of annual discharges



from the BLEU Complex (in units of curies) in terms of liquid concentration. Concentration values for Studsvick were also obtained from a year 2000 inspection report.

The bounding contributions from either NFS baseline operations or future BLEU operations are used to compare against the 10 CFR 20, Appendix B sewer discharge limits. These impacts, along with the discharge fractions from Studsvick operations, are summed for comparison using the unity rule. The value of 0.059 is considerably less than 1, which indicates that sewer discharges will remain a low cumulative impact.

Direct radiation monitoring data are available for both Studsvick, Inc. and NFS operations. Both licensees and the State of Tennessee Department of Environment and Conservation monitor direct radiation. Because the direct radiation monitored at the fenceline is a cumulative value (dose from both sites), the monitoring program ensures that this dose will not exceed regulatory limits. Both facilities have successfully demonstrated compliance in the past. Due to the nature of the materials in the BLEU complex, direct radiation is not expected to increase as a result of this project.

#### Agencies and Persons Consulted:

The following agencies were consulted during the preparation of the EA:

- Tennessee Historical Commission, Division of Archaeology
- U.S. Fish and Wildlife Service, and
- State of Tennessee, Department of Environment and Conservation, Division of Radiological Health.

#### Conclusion:

The NRC has concluded that the proposed action to construct and operate the UNB at the NFS site will not result in significant impact to human health or the environment.

### **FINDING OF NO SIGNIFICANT IMPACT**

The Commission has prepared an Environmental Assessment, as summarized above, related to the amendment of Special Nuclear Material License SNM-124. On the basis of the assessment, the Commission has concluded that environmental impacts associated with the proposed action would not be significant and do not warrant the preparation of an Environmental Impact Statement. Accordingly, it has been determined that a Finding of No Significant Impact is appropriate.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," the Environmental Assessment and the documents related to this proposed action will be available electronically for public inspection from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), accession number ML021790068. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

## Notice of Opportunity for Hearing

The NRC hereby provides notice of an opportunity for a hearing on the license amendment under the provisions of 10 CFR Part 2, Subpart L, "Informal Hearing Procedures for Adjudications in Materials and Operator Licensing Proceedings." Pursuant to §2.1205(a), any person whose interest may be affected by this proceeding may file a request for a hearing. In accordance with §2.1205(d), a request for hearing must be filed within 30 days of the publication of this notice in the Federal Register. The request for a hearing must be filed with the Office of the Secretary, either:

(1) By delivery to the Docketing and Service Branch of the Office of the Secretary at One White Flint North, 11555 Rockville Pike, Rockville, MD 20852; or

(2) By mail or telegram addressed to the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch.

In accordance with 10 CFR 2.1205(f), each request for a hearing must also be served, by delivering it personally or by mail, to:

(1) The applicant, Nuclear Fuel Services, 1205 Banner Hill Road, Erwin Tennessee, 37650-9718; and

(2) The NRC staff, by delivery to the Executive Director for Operations, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852, or by mail addressed to the Executive Director for Operations, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

In addition to meeting other applicable requirements of 10 CFR Part 2 of the NRC's regulations, a request for a hearing filed by a person other than an applicant must describe in detail:

(1) The interest of the requestor in the proceeding;

(2) How that interest may be affected by the results of the proceeding, including the reasons why the requestor should be permitted a hearing, with particular reference to the factors set out in §2.1205(h);

(3) The requestor's areas of concern about the licensing activity that is the subject matter of the proceeding; and

(4) The circumstances establishing that the request for a hearing is timely in accordance with §2.1205(d).

The request must also set forth the specific aspect or aspects of the subject matter of the proceeding as to which petitioner wishes a hearing.

In addition, members of the public may provide comments on the subject application within 30 days of the publication of this notice in the Federal Register. The comments may be provided to Micheal Lesar, Chief, Rules Review and Directives Branch, Division of Administration Services, Office of Administration, U.S. Nuclear Regulatory Commission, Washington DC 20555.

Dated at Rockville, Maryland, this 28th day of June 2002.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

**/RA/**

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Daniel M. Gillen, Chief  
Fuel Cycle Facilities Branch  
Division of Fuel Cycle Safety  
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Office of Nuclear Material Safety  
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Docket 70-143  
License SNM-124