

DOCKET: 70-143

LICENSEE: Nuclear Fuel Services, Inc.
Erwin, Tennessee

SUBJECT: ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT
IMPACT FOR LICENSE AMENDMENT REQUEST DATED
OCTOBER 11, 2002, BLENDED LOW-ENRICHED URANIUM
PREPARATION FACILITY

1.0 INTRODUCTION

1.1 Background

The Nuclear Regulatory Commission (NRC) staff has received a license amendment request, dated October 11, 2002, to amend NRC Materials License SNM-124 to authorize processing operations in the Blended Low-Enriched Uranium Preparation Facility (BPF). Supplemental information was submitted by letter dated May 28, 2003. The purpose of this document is to assess the environmental consequences of the proposed license amendment.

The Nuclear Fuel Services (NFS) facility in Erwin, TN is authorized under SNM-124 to manufacture high-enriched nuclear reactor fuel. NFS is undertaking the Blended Low-Enriched Uranium Project (BLEU Project) to manufacture low-enriched nuclear reactor fuel. NFS is constructing a new complex at the Erwin site to house the operations involving low-enriched uranium. On July 27, 2003, Amendment 39 to License SNM-124 was issued to authorized storage of low-enriched uranium in the new complex. This was the first of three amendments planned for the BLEU Project. Manufacturing operations in the new complex have not been authorized yet.

NFS is requesting this amendment to authorize operations at the BPF. This is the second of the three amendments planned for the BLEU Project. The BLEU Project involves blending high-enriched uranium with unenriched (natural) uranium to produce low-enriched uranium. This is called "downblending." Much of the downblending will be performed at other facilities, but NFS plans to perform some downblending at its facility. The BPF operations will be located within the older facility because that facility is already authorized to handle high-enriched uranium. After the high-enriched uranium is downblended and converted to a low-enriched uranium liquid, it will be transferred from the BPF to the new complex.

NFS plans to submit a third amendment request to authorize manufacturing operations in the new complex. Only storage of low-enriched uranium is authorized in the new complex at this time.

1.2 Review Purpose

The purpose of this environmental assessment (EA) is to assess the environmental impacts of the proposed license amendment. It does not approve the request. This EA is limited to the proposed BPF operations at the Erwin Plant and any cumulative impacts on existing plant operations. The existing conditions and operations for the Erwin facility were evaluated by NRC for environmental impacts in a 1999 EA related to the renewal of the NFS license (Ref. 1) and a 2002 EA related to the first amendment for the BLEU Project (Ref. 2). Some of the operations proposed for the BPF were previously authorized in the 200 Complex and the impact of those operations was assessed in the 1999 EA. In addition, the 2002 EA assessed the impact of the entire BLEU Project (including BPF operations) using information available at that time. This assessment presents up-to-date information and analysis for determining whether to issue a finding of no significant impact (FONSI) or to prepare an Environmental Impact Statement (EIS). Should the NRC issue a FONSI, no EIS will be prepared.

1.3 Proposed Action

The proposed action is to amend NRC Materials License SNM-124 to authorize processing operations in the BPF. The BPF is being constructed within Building 333 in the protected area of the NFS site (formerly Building 301). The operations will convert high-enriched uranium materials to high-enriched uranyl nitrate (UN) solutions. The high-enriched UN solutions will be blended with natural UN solutions to produce low-enriched UN solutions. Blending of natural uranium and high-enriched uranium was previously authorized in the 200 Complex and some of the operations proposed for the BPF were assessed during the 1999 license renewal. However, some of the operations are new and require a license amendment. The 200 Complex is being decommissioned and the blending operation is being moved to Building 333. The building is already in place and most construction activities are associated with renovating the building. The duration of the project is five years from the time material is delivered to the site.

The BPF operations are composed of five processes - - the Uranium Metal Process, Uranium Aluminum Alloy Process, Solvent Extraction Process, Enrichment Downblending Process, and Uranium Recovery Process.

- The Uranium Metal Process involves the conversion of uranium metal to uranium oxide in a furnace, and the dissolution of the uranium oxide in nitric acid.
- The Uranium Aluminum Alloy Process involves: (1) dissolution of the aluminum with a caustic solution (sodium hydroxide), (2) separation of uranium solids, (3) dissolution of the uranium in nitric acid, (4) measurement of the special nuclear material (SNM) in the UN solution, and (5) measurement of the SNM in the used caustic solution.
- The Solvent Extraction Process involves (1) extracting the uranium from the impure UN solution with an organic solvent solution, (2) extracting the uranium from the organic solvent solution to produce a pure UN solution, (3) boiling the UN solution to adjust the concentration, (4) treatment of the stripped solvent for reuse, and (5) processing of waste solutions.

- The Enrichment Downblending Process involves blending high-enriched UN solution with natural UN solution to produce low-enriched UN solution.
- The Uranium Recovery Process involves taking items contaminated with high-enriched uranium and rinsing them with nitric acid to removed the uranium. The resulting solution is transferred to the Solvent Extraction Process.

1.4 Need for Proposed Action

Framatome ANP Inc. has contracted with NFS to downblend surplus high-enriched uranium material to a low-enriched uranium product. The NFS product is expected to be converted to commercial reactor fuel for a Tennessee Valley Authority (TVA) nuclear power reactor; however, the NFS proposed action is limited to the production of low-enriched UN solutions as feed material to the new BLEU Complex. The BLEU Project is part of a U.S. Department of Energy (DOE) program to reduce stockpiles of surplus high-enriched uranium through re-use or disposal as radioactive waste. Re-use 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 (Ref. 3). An additional benefit of re-use is to avoid unnecessary use of limited radioactive waste disposal space.

1.5 Alternatives to the Proposed Action

The only alternative available to the NRC is no action (i.e., deny the amendment request). Other alternatives to the proposed action are addressed in the DOE Environmental Impact Statement (Ref. 3) and are not re-analyzed in this EA.

2.0 AFFECTED ENVIRONMENT

The affected environment for the proposed action and the alternative is the NFS site. A full description of the site and its characteristics is given in the 1999 EA related to the renewal of the NFS license (Ref. 1) and a 2002 EA related to the first amendment for the BLEU Project (Ref. 2). The NFS facility is located in Unicoi County, Tennessee, about 32 km (20 mi) southwest of Johnson City, Tennessee. The plant is about 0.8 km (0.5 mi) southwest of the Erwin city limits. The site occupies about 28 hectares (70 acres). The site is bounded to the northwest by the CSX Corporation (CSX) railroad property and the Nolichucky River, and by Martin Creek to the northeast. The plant elevation is about 9 m (30 ft) above the nearest point on the Nolichucky River.

The area adjacent to the site consists primarily of residential, industrial, and commercial areas, with a limited amount of farming to the northwest. Privately owned residences are located to the east and south of the facility. Tract size is relatively large, leading to a low housing density in the areas adjacent to the facility. The CSX railroad right-of-way is parallel to the western boundary of the site. Industrial development is located adjacent to the railroad on the opposite side of the right-of-way. The site is bounded by Martin Creek to the north, with privately owned, vacant property and low-density residences.

3.0 EFFLUENT RELEASES AND MONITORING

A full description of the effluent monitoring program at the site is provided in the 1999 EA related to the renewal of the NFS license (Ref. 1) and a 2002 EA related to the first amendment for the BLEU Project (Ref. 2). The NFS Erwin Plant conducts effluent and environmental monitoring programs to evaluate potential public health impacts and comply with the NRC effluent and environmental monitoring requirements. The effluent program monitors the airborne, liquid, and solid waste streams produced during operation of the NFS Plant. The environmental program monitors the air, surface water, sediment, soil, groundwater, and vegetation in and around the NFS Plant.

Airborne, liquid, and solid effluent streams that contain radioactive material are generated at the NFS Plant and monitored to ensure compliance with NRC regulations in 10 CFR Part 20. Each effluent is monitored at or just before the point of release. The results of effluent monitoring are reported on a semi-annual basis to the NRC in accordance with 10 CFR 70.59.

Airborne and liquid effluents are also monitored for nonradiological constituents in accordance with State discharge permits. For the purpose of this EA, the State of Tennessee is expected to set limits on effluents under its regulatory control that are protective of health and safety and the local environment. On October 10, 2002, the Tennessee Air Pollution Control Board issued a discharge permit for airborne effluents from the BPF.

4.0 ENVIRONMENTAL IMPACTS OF PROPOSED ACTION AND ALTERNATIVES

4.1 Impact of Proposed Action

A full description of the environmental impacts of the proposed action is provided in the 1999 EA related to the renewal of the NFS license (Ref. 1) and a 2002 EA related to the first amendment for the BLEU Project (Ref. 2). The previously authorized operations are analyzed in the 1999 EA and the new operations are analyzed in the 2002 EA. For the proposed action, 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. Based on the information provided by NFS and summarized in the EA's referenced above, the safety controls to be employed for the proposed action appear to be sufficient to ensure planned operations will be safe. Detailed accident analyses have been performed by NFS in an integrated safety assessment (ISA). NRC's review of the ISA will ensure compliance with the performance requirements in 10 CFR Part 70. This will provide additional confidence that potential accidents have been adequately evaluated before making a decision on the proposed action.

For normal operations, the effluent air emissions from the BPF will be discharged through the existing main NFS stack. While some effluents for the proposed action are expected to increase, the total annual dose estimate for the maximally exposed individual from all planned effluents is less than 0.01 milliseivert (mSv) or 1 millirem (mrem). This result is well below the annual public dose limit of 1 mSv (100 mrem) in 10 CFR 20.1301, and the constraint on air emissions to the environment of 0.1 mSv (10 mrem) in 10 CFR Part 20.1101. BPF operations are 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. Surface water quality at the NFS site is currently protected by enforcing release limits and monitoring programs. No significant change in surface water impacts is expected from BPF

operations. The proposed action will not discharge any effluents to the groundwater; therefore, no adverse impacts to groundwater are expected. BPF operations will be conducted in existing facilities; therefore, no adverse impacts to local land use, biotic resources, or cultural resources are expected. The proposed action involves transportation of feed material to the NFS site. All transportation will be conducted in accordance with the applicable NRC and U.S. Department of Transportation regulations; therefore no adverse impacts from transportation activities are expected.

4.2 Impact of No Action Alternative

Under the no action alternative, NFS would not be able to carry out its contract obligations to produce a commercial product from U.S. Government surplus, weapons-usable, high-enriched uranium. Failure to fulfill its role in the DOE program could cause DOE to select other alternatives for disposition of the surplus material that may be less cost effective and incur greater environmental impacts. For example, the disposal option would incur additional costs and consume available disposal space that may be better utilized for non-reusable wastes. If NFS were not able to fulfill its contract, DOE may transfer the downblending work to other facilities.

Based on its review, the NRC staff has concluded that the environmental impacts associated with the proposed action are insignificant.

5.0 AGENCIES AND PERSONS CONTACTED

On May 31, 2002, the NRC staff contacted the Director of the Division of Radiological Health in the Tennessee Department of Environment and Conservation (TDEC) concerning the 2002 EA (Ref. 2) and the potential impact of the BLEU Project on the environment. On August 6, 2003, the NRC staff contacted the Director of the TDEC Division of Radiological Health concerning the revised environmental impacts in this EA. On August 22, 2003, the Director responded that they had reviewed the draft EA and had no comments.

On May 22, 2002, the NRC staff contacted the Tennessee Historical Commission, Division of Archeology concerning the 2002 EA (Ref. 2) and the potential affect of the BLEU Project on historical resources. No additional consultation was made because the proposed action is entirely within existing facilities and the facility description in the amendment request (Ref. 4) is not significantly different from the facility description in the 2002 EA.

On June 6, 2002, the NRC staff contacted the Fish and Wildlife Service concerning the 2002 EA (Ref. 2) and the potential affect of the BLEU Project on endangered species. No additional consultation was made because the proposed action is entirely within existing facilities and the facility description in the amendment request (Ref. 4) is not significantly different from the facility description in the 2002 EA.

6.0 REFERENCES

Unless otherwise noted, a copy of this document and the references listed below 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/reading-rm/adams.html> (the Public Electronic Reading Room).

1. U.S. Nuclear Regulatory Commission, "Environmental Assessment for Renewal of Special Nuclear Material License No. SNM-124," January 1999, ADAMS No. ML031150418.
2. U.S. Nuclear Regulatory Commission, "Environmental Assessment for Proposed License Amendments to Special Nuclear Material License No. SNM-124 Regarding Downblending and Oxide Conversion of Surplus High-Enriched Uranium," June 2002, ADAMS No. ML021790068.
3. U.S. Department of Energy, "Disposition of Surplus High Enriched Uranium Final Environmental Impact Statement", DOE/EIS-0240, Volume 1, June 1996. This document is available to the public from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.
4. B.M. Moore, Nuclear Fuel Services, Inc., Letter to U.S. Nuclear Regulatory Commission, "License Amendment Request for BLEU Preparation Facility," October 11, 2002, ADAMS No. ML023380210.
5. B.M. Moore, Nuclear Fuel Services, Inc., Letter to U.S. Nuclear Regulatory Commission, "ISA Summary for BLEU Preparation Facility Processes," October 14, 2002, ADAMS No. ML023090172.
6. B.M. Moore, Nuclear Fuel Services, Inc., Letter to U.S. Nuclear Regulatory Commission, "Supplemental Information to Complete an Environmental Review for the BLEU Preparation Facility," May 28, 2003, ADAMS No. ML031560494.

7.0 FINDING OF NO SIGNIFICANT IMPACT

Pursuant to 10 CFR Part 51, the NRC staff has considered the environmental consequences of amending NRC Materials License SNM-124 to authorize operation of the BPF. On the basis of this assessment, the Commission has concluded that environmental impacts associated with the proposed action would not be significant and the Commission is making a finding of no significant impact. Accordingly, the preparation of an Environmental Impact Statement is not warranted.

8.0 PRINCIPAL CONTRIBUTORS

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