

**NUCLEAR REGULATORY COMMISSION**

**[Docket No. 70-7018]**

**[NRC-2008-0369]**

**Environmental Assessment and Finding of No Significant Impact for Special Nuclear  
Material License Application from Tennessee Valley Authority  
for Watts Bar Nuclear Plant, Unit 2, Spring City, Tennessee**

**AGENCY:** Nuclear Regulatory Commission

**ACTION:** Publication of environmental assessment and finding of no significant impact

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**SUPPLEMENTARY INFORMATION:**

**I. Introduction**

The U.S. Nuclear Regulatory Commission (NRC) is considering the issuance of a license to Tennessee Valley Authority (TVA), to authorize the receipt, possession, inspection, and storage of special nuclear material (SNM) in the form of 193 fresh fuel assemblies at TVA's Watts Bar site in Spring City, TN. This license would be subject to the requirements of Title 10

of the *Code of Federal Regulations* (10 CFR), Part 70. TVA plans to use this SNM in operating its proposed Watts Bar Nuclear Plant, Unit 2 (WBN2). TVA's request for authorization to operate WBN2 is the subject of a separate 10 CFR Part 50 licensing action being evaluated by the NRC. TVA's existing reactor at the Watts Bar site, Unit 1 (WBN1), has operated since 1996.

The NRC has prepared an environmental assessment (EA), set forth below, in support of the SNM storage license, in accordance with 10 CFR Part 51 (Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions), which implements section 102(2) of the National Environmental Policy Act (NEPA) of 1969, as amended 42 U.S.C. 4321, et seq. Based on the EA, the NRC has concluded that a Finding of No Significant Impact (FONSI) is appropriate regarding issuance of the SNM license.

## **II. Background**

NEPA requires a Federal agency to prepare an environmental impact statement (EIS) for any major federal action having the potential to significantly affect the quality of the human environment. Consistent with their responsibilities as Federal agencies under NEPA, both TVA and NRC previously prepared EISs regarding the operation of Units 1 and 2 at the Watts Bar Nuclear site. Some of the relevant history in this regard is briefly summarized below.

In 1978, the NRC published NUREG-0498, Final Environmental Statement Related to the Operation of Watts Bar Nuclear Plant Unit No. 1 and 2 (FES-OL). After safety issues were raised, TVA decided not to pursue its WBN reactor licenses for several years. Regarding operation of Unit 1, NRC prepared Supplement 1 to NUREG-0498 in April 1995 (ML081430592), to evaluate changes in environmental impacts that occurred as a result of changes made in the WBN Plant design and methods of operations after the 1978 FES-OL.

The TVA Final Supplemental EIS for Unit 2 was issued in June 2007 (ML080510469). The related Record of Decision by the TVA Board of Directors was published in the *Federal*

*Register* on August 15, 2007 (72 FR 45859), and the 2007 EIS was submitted to the NRC on February 15, 2008. Table 2-1 of the 2007 EIS provides a TVA summary of the potential environmental effects of operating WBN2.

On March 4, 2009, pursuant to 10 CFR Part 50, TVA submitted an updated application to the NRC for a power reactor operating license (OL) for WBN2 (ML090700378). The TVA Final Safety Analysis Report (FSAR) supporting the WBN2 OL request was submitted to the NRC on April 30, 2009 (ML091400067).

On September 11, 2009 (74 FR at 46799), the NRC published a notice of intent to prepare a second supplement to NUREG-0498 – the NRC EIS for WBN that was issued in 1978 and supplemented in 1995. NRC anticipates that the draft of this second supplement will be published for public comment in mid-2011. The scope of the EA below is limited to assessing the potential impacts of the receipt, possession, inspection, and storage of fresh reactor fuel at the Watts Bar site that would be used to operate WBN2 if such authorization is later granted. The EA's scope does not include completion of construction, or operation, of WBN2.

### **III. Environmental Assessment**

Pursuant to 10 CFR Part 70, Domestic Licensing of Special Nuclear Material, TVA applied for an SNM license by application dated November 12, 2009 (ML100120487). The license would authorize TVA to receive, possess, inspect, and store SNM (in the form of 193 fully-assembled fresh fuel assemblies) for potential future use in its proposed WBN2 reactor.

#### Description of the proposed action

The proposed action is to issue TVA a 10 CFR Part 70 license authorizing it to receive, possess, inspect, and store SNM in the form of 193 fully-assembled fuel assemblies that would later form the initial reactor core of WBN 2. The SNM in the fuel assemblies would be enriched

up to 5% in the isotope U-235. The fresh fuel assemblies for WBN2 would be received and stored in areas common to WBN1 and WBN2. Specifically, these assemblies would be stored either in the WBN1 storage racks within the WBN1 fuel storage vault, or in the WBN1 spent fuel pool. TVA requested that its SNM license term last until June 30, 2013, or until it receives an OL for WBN2. The safety and environmental reviews for the proposed WBN2 OL are not part of the proposed action evaluated in this EA.

#### Need for the proposed action

TVA anticipates receiving the initial core of WBN 2 before NRC would issue the OL for the Unit 2 reactor. TVA needs this SNM license to authorize WBN 2 to receive, possess, inspect, and store the fresh fuel during the time period before the OL is issued. If an OL is issued, the OL would authorize use of the fresh fuel as well as the receipt, possession, storage, and use of additional fresh fuel that would be needed for operating WBN2. Thus, a separate Part 70 license would no longer be required and would be terminated.

#### Alternatives to the proposed action

TVA needs this SNM license to authorize WBN2 to receive, possess, inspect, and store the fresh fuel assemblies during the time period before the issuance of any WBN2 OL. An alternative to the proposed action is for NRC not to issue the SNM license. In that case, TVA would be unable to receive the fresh fuel for the initial WBN2 reactor core, causing a start-up delay if the OL for WBN2 were later granted.

#### Environmental impacts of the proposed action and alternatives

Section 1.3 of the November 12, 2009, SNM license application describes the affected environment, including site geography, demographics, meteorology, hydrology, and geology. The proposed activity is limited to the receipt, possession, inspection, and storage of SNM in the form of 193 fuel assemblies, and would have no significant impact on any of these site features. Issuance of a license to receive, possess, inspect, and store SNM in the form of 193 fresh fuel assemblies at the Watts Bar site is thus not expected to have any significant impact on the environment. Table 2-1 in TVA's 2007 EIS provides a summary of the potential environmental effects of operating WBN2. TVA's EIS considers the impacts of WBN2 operation, including surface water quality; groundwater quality; aquatic ecology; terrestrial quality; threatened and endangered species; wetlands; natural areas; cultural resources; socioeconomics, environmental justice, and land use; floodplains and flood risk; seismic effects; climatology and meteorology; nuclear plant safety and security; radiological effects; radiological waste; and spent fuel transportation and storage. The impacts of the activities that would be authorized by the SNM license are a very small part of the overall impacts of the operation of WBN2.

As discussed above, the fresh fuel would be received and stored in an existing auxiliary building containing a storage vault and a spent fuel pool where WBN1 fuel is currently stored. The uranium in fresh fuel decays primarily by alpha emission; alpha particles cannot escape the fuel cladding, so there are no worker exposures or environmental effluents from the alpha decay. Uranium also decays by spontaneous fission at a very low rate, thereby generating neutrons that escape the cladding and would result in an extremely low dose to an individual standing close to the fuel. Although fresh fuel emits neutrons, the neutrons do not become environmental effluents. There will be no change to radioactive effluents that affect radiation exposures to plant workers and members of the public because the WBN2 fuel is in the form of sealed fuel rods in finished assemblies.

Part 20 of 10 CFR establishes standards for the protection of workers and members of the public against ionizing radiation resulting from activities conducted under licenses issued by the NRC. Under Part 20, the annual total effective dose equivalent must not exceed 1 mSv [0.1 rem] (100 mrem / 1 mSv) for members of the public. The effluent limits in 10 CFR Part 20, Appendix B, ensure that the effluent discharges are kept within the annual Part 20 dose limits. In addition to meeting the annual dose limits, an NRC licensee is required to have a program with the goal of achieving doses that are as low as reasonably achievable (ALARA). The worker protection and environmental protection programs that are currently used for the receipt and storage of WBN1 fuel would also be used for the receipt and storage of WBN2 fuel, and will ensure that there would be no significant exposure to workers and members of the public under the proposed action. Thus, the proposed action is not expected to have a significant environmental impact.

The proposed action does not result in changes to land use or water use, or result in changes to the quality or quantity of non-radiological effluents. No changes to the National Pollution Discharge Elimination System permit are needed. No effects on the aquatic or terrestrial habitat in the vicinity of the plant, or to threatened, endangered, or protected species under the Endangered Species Act, or impacts to essential fish habitat covered by the Magnuson-Stevens Fishery Conservation and Management Act are expected from the receipt and storage of fresh fuel at WBN2. There are no impacts to the air or ambient air quality. There are no impacts to historical and cultural resources. There would be no impact to socioeconomic resources.

Section 3.16 of TVA's 2007 EIS quantifies the impacts of transportation of fresh fuel, enriched to 5% in the U-235 isotope. Transport of the 193 fresh fuel assemblies from a fuel fabrication facility would require approximately 20 truck trips. Un-irradiated new fuel assemblies will be shipped in packages that comply with the regulations in 10 CFR 71, Subpart E, Package Approval Standards. The only human exposure from the shipment of

fresh fuel assemblies would be to those in direct view of the unpackaged assemblies and to assigned truck drivers. The exposure in the cab of a fuel transport truck was estimated to be 0.1 millirem per hour from neutrons, and exposure to transportation personnel was estimated to be less than 1 millirem per shipment. This level would not cause any significant health effects.

If WBN2 is licensed to operate, TVA would comply with all NRC, State, and Federal requirements for the transport of un-irradiated fuel, as it currently does for fuel deliveries to WBN1. Therefore, based on the above, the NRC finds that the impacts of WBN2 fresh fuel transport and delivery on human health and the environment would be minimal.

An alternative to the proposed action is for NRC not to issue the SNM license. In that case, TVA would be unable to receive, possess, and store the fresh fuel until and unless NRC issues the OL for WBN2 under 10 CFR Part 50, which would authorize these activities. Denial of the SNM application would result in no change in current environmental impacts.

#### Fuel handling accident analyses

The November 12, 2009, SNM license application includes analyses of three dropped fuel assembly accident scenarios and one dropped gate scenario. These analyses are part of the TVA FSAR (Section 9.0, Auxiliary Systems; 9.1, Fuel Storage and Handling; 9.1.1, New Fuel Storage; Section 9.1 9.1.1.3, Safety Evaluation) supporting its Part 50 application for a WBN2 OL (ML091400648), which TVA incorporated by reference in its SNM license application. Therein, TVA described the fresh fuel storage conditions and concluded that a criticality accident during receipt, inspection, possession, and storage is not credible. TVA determined, and NRC review confirmed, that there would be no significant environmental impacts from these accident scenarios. The radiation safety, criticality safety, and fire safety

aspects of the proposed activities are evaluated in Chapters 3, 4, and 5, respectively, of the Safety Evaluation Report supporting issuance of the SNM license.

The NRC staff concluded that the proposed action to authorize WBN2 to receive, possess, inspect, and store fresh fuel under 10 CFR, Part 70 would not significantly affect the environment.

#### Alternative use of resources

The proposed action does not involve the use of any different resources than those considered in the NRC's Final Environmental Statement for the WBN1 and WBN2, NUREG-0498, dated December 1978, and the NRC's supplement to the Final Environmental Statement (NUREG-0498 Supplement 1), dated April 1995 (ML081430592).

#### List of agencies and persons consulted and identification of sources used.

In accordance with Consultation Procedures in Appendix D of NUREG-1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, August 2003, on September 30, 2010, the NRC staff consulted with Ruben Crosslin of the Tennessee Bureau of Radiological Health, regarding this EA. The State official had no comments on the draft EA.

#### FINDING OF NO SIGNIFICANT IMPACT

The NRC reviewed the documents submitted by TVA in support of its Part 70 license application for the WBN2 facility – including those incorporated by reference from its Part 50

operating license application for the WBN2 facility -- and found no significant environmental impacts from the proposed fresh fuel assembly storage and handling. On the basis of this EA, the NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined not to prepare an EIS for the proposed action.

#### **IV. Further Information**

Documents related to this action, including the application for license and supporting documentation, are available electronically at the NRC's Electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. From this site, you can access the NRC's Agencywide Documents Access and Management System (ADAMS), which provides text and image files of NRC's public documents. The ADAMS accession numbers for the documents related to this Notice are:

TVA Application for a Special Nuclear Material License for Watts Bar Nuclear Plant Unit 2 in Accordance with 10 CFR 70, "Domestic Licensing of Special Nuclear Material," dated November 12, 2009 (ML100120487).

TVA Watts Bar Nuclear Plant (WBN) – Unit 2 – Final Safety Analysis Report (FSAR), Amendment 93, dated April 30, 2009 (ML091400067).

TVA Watts Bar Nuclear Plant (WBN) – Unit 2 – Final Supplemental Environmental Impact Statement for the Completion and Operation of Watts Bar Nuclear Plant Unit 2, dated June 2007 (ML080510469).

NRC Generic Environmental Impact Statement, License Renewal of Nuclear Plants, Main Report, Section 6.3 – Transportation, Table 9.1 Summary of findings on NEPA issues for license renewal of nuclear power plants NUREG-1437, Volume 1, Addendum 1, dated August 1999 (ML040690720).

NRC Final Environmental Statement related to the operation of Watts Bar Nuclear Plant Units 1 and 2, dated April 1995 (ML081430592).

If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737 or by email to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov).

These documents may also be viewed electronically on the public computers located at the NRC's PDR, O1F21, One White Flint North, 11555 Rockville Pike Rockville, MD 20852. The PDR reproduction contractor will copy documents for a fee.

Dated at Rockville, Maryland this 7<sup>th</sup> day of June, 2011.

For the Nuclear Regulatory Commission.

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