

U.S. NUCLEAR REGULATORY COMMISSION

DOCKET NO. 52-047

EARLY SITE PERMIT FOR THE

CLINCH RIVER NUCLEAR SITE

DRAFT SUMMARY RECORD OF DECISION

BACKGROUND

By letter dated May 12, 2016, the U.S. Nuclear Regulatory Commission (NRC or Commission) received an application from Tennessee Valley Authority (TVA), for an early site permit (ESP) for the Clinch River Nuclear (CRN) Site located in Oak Ridge, Roane County, Tennessee. The 935-acre site is owned by the United States of America and managed by TVA. The site is not currently used for power-generating activities.

Section 102 of the National Environmental Policy Act of 1969, as amended (NEPA), directs that an environmental impact statement (EIS) be prepared for major Federal actions significantly affecting the quality of the human environment. The NRC's regulations in Title 10 of the *Code of Federal Regulations* (CFR) Part 51, were developed to implement the agency's responsibilities under Section 102 of NEPA. Pursuant to 10 CFR 51.20(b)(1), the NRC defines issuance of an ESP as an action for which the agency will prepare an EIS.

The NRC published a notice of acceptance of the Clinch River ESP application for docketing on January 12, 2017 (82 FR 3812) and subsequently published on April 13, 2017, a notice of intent to prepare an EIS and conduct a scoping process (82 FR 17885). The U.S. Army Corps of Engineers (USACE) is a cooperating agency with the NRC on the EIS to support a Department of the Army (DA) permit application that would be necessary to perform certain activities associated with ultimately building a facility at this site.¹ Should TVA submit a DA permit application at a future date, the USACE's participation in the development of the ESP EIS streamlines the regulatory review processes, avoids unnecessary duplication of effort, and ensures issues and concerns related to impacts on waters of the U.S. and navigable waters of the U.S. are identified and addressed early in the NRC's review process.

On May 15, 2017, the NRC held two public meetings in Oak Ridge, Tennessee to obtain public input on the scope of the environmental review. The NRC staff reviewed the oral and written comments received during the scoping process and contacted Federal, State, Tribal, regional, and local agencies to solicit comments. A Scoping Summary Report was issued in October 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17242A069).

The NRC and USACE developed a draft EIS, and on April 27, 2018, a 75-day comment period began to allow members of the public and agencies to comment on the results of the environmental review (83 FR 18354). On June 5, 2018, the NRC conducted two public meetings in Kingston, Tennessee to describe the results of the environmental review, respond to questions, and accept public comments. On April 3, 2019, the NRC issued the "Environmental Impact Statement for Early Site Permit at the Clinch River Nuclear Site, Final

¹ These building activities fall under the USACE's jurisdiction under Section 10 of the Rivers and Harbors Appropriations Act of 1899 and Section 404 of the Clean Water Act.

Report” (NUREG-2226), Volumes 1 and 2, prepared jointly with the USACE (ADAMS Accession Nos. ML19073A099 and ML073A109, respectively). All comments related to the environmental review during the draft EIS comment period are included in Appendix E of the final EIS.

Pursuant to 10 CFR 51.102 and 51.103(a)(1)-(4), the NRC staff has prepared this Summary Record of Decision (ROD) to accompany its action on the ESP application. This Summary ROD incorporates by reference materials contained in the final EIS. See 10 CFR 51.103(c).

DECISION:

[If the Commission’s mandatory hearing decision authorizes the NRC staff to issue the early site permit, the Decision section will state:]

The NRC makes the decision to approve or deny an ESP application based on whether the applicant has met all applicable requirements, including the NRC’s safety and environmental regulations. The NRC’s safety review of the application is documented in the final safety evaluation report issued June 14, 2019 (ADAMS Accession No. ML19162A157).

The final EIS presents the NRC staff’s analyses of the environmental impacts that could result from building and operating two or more small modular reactors (SMRs) with characteristics that fall within the plant parameter envelope (PPE) at the CRN Site. In accordance with 10 CFR 51.50(b)(2) and 51.75(b), the NRC did not address in the final EIS the benefits and costs of the proposed action and did not evaluate energy alternatives because these analyses were not required to be, and were not, provided in TVA’s ESP application for the CRN Site. After considering reasonable available alternatives, the NRC concluded that issuance of the ESP subject to the conditions for protection of the environment set forth in the permit, is in accordance with NEPA and the NRC’s implementing regulations in Subpart A of 10 CFR Part 51, and that all applicable requirements have been satisfied. The final EIS as well as the Commission’s Order dated [date], document these conclusions.

Accordingly, the NRC issued ESP-006 on [date], approving CRN Site located in Oak Ridge, Roane County, Tennessee, as a site suitable for constructing and operating two or more SMRs. In accordance with 10 CFR 52.26, the permit is valid 20 years from the date NRC issues the ESP.

AGENCIES’ ROLES AND RESPONSIBILITIES:

The final EIS includes information on a broad range of issues that may be regulated by other Federal, State, Tribal, or local authorities. In the event the Clinch River ESP is referenced in a future application to build and operate two or more SMRs at the CRN Site, the applicant would need to obtain and maintain other permits and authorizations from Federal, State, Tribal, and local authorities.

Role of the NRC

The NRC was the lead agency for the environmental review of the Clinch River ESP application, including the development of the final EIS. The NRC evaluated the impacts of building and operating, at the CRN Site, two or more SMRs with characteristics that fall within the PPE documented in the final EIS. The NRC contacted Federal, State, Tribal, regional, and local agencies to solicit comments. In addition to considering the environmental effects of the proposed action, the NRC considered alternatives to the proposed action, including the no-

action alternative, siting locations, and system designs. The NRC also documented applicable requirements and necessary permits of other Federal, State, Tribal, and local agencies in considering the environmental monitoring and mitigation that TVA may implement if it subsequently applies for and receives authorization to build and operate a nuclear power facility at the CRN Site. The NRC staff ensured that the NEPA process was properly conducted and completed before recommending that the Commission approve this permit.

Role of the USACE

The USACE participated with the NRC in the preparation of the EIS as a cooperating agency and participated collaboratively on the review team. As part of the review team, the USACE was included in all aspects of the environmental review, including scoping, public meetings, and public comment resolution.

PURPOSE AND NEED:

As identified in Section 1.3, "Purpose and Need for the Proposed Action," of the final EIS, the NRC's purpose and need for the proposed action, issuance of the ESP, is to provide for early resolution of site safety and environmental issues, which provides stability in the licensing process. The NRC's purpose and need is further informed by TVA's objective to demonstrate the capability of SMR technology. TVA's project objectives include the use of power generated by SMRs to address critical energy security issues for TVA Federal direct-served customers (which included only Department of Defense or Department of Energy facilities). The use of SMRs on or immediately adjacent to Department of Defense or Department of Energy facilities could address national security needs by providing reliable electric power in the event of a major grid disruption.

PROPOSED FEDERAL ACTION:

The proposed NRC Federal action is issuance, under the provisions of 10 CFR Part 52, of an ESP for the CRN Site, thereby approving the site as suitable for building and operating two or more SMRs, with a maximum total electrical output of 800 MW(e) and characteristics that fall within the PPE, to demonstrate the capability of SMR technology. The location for the proposed CRN Site is in Oak Ridge, Roane County, Tennessee. An ESP does not authorize NRC-regulated construction activities. In order to construct and operate a nuclear power plant, TVA would be required to request further authorization from the NRC (i.e., applying for a construction permit and operating license, or a combined license).

The final EIS provides the review team's analyses of the environmental impacts that could result from building and operating two or more SMRs with characteristics that fall within the PPE at the CRN Site or at the three alternative sites. These impacts are analyzed by the review team to determine if the proposed site is suitable for nuclear facilities falling within the PPE and whether there is an alternative site that is obviously superior to the proposed site. In addition, the review team assessed mitigation measures available for reducing or avoiding adverse environmental effects.

Environmental impacts that may arise from building and operating two or more SMRs with characteristics that fall within the PPE were examined for the following resource areas: land use; surface water and groundwater hydrology; terrestrial and aquatic ecology; socioeconomics; environmental justice; historic and cultural resources; meteorology and air quality; human health; radiological health; transportation of radiological materials; and postulated accidents.

These resource areas were also considered within a defined region of influence with other developments or activities that affect the resources cumulatively.

NRC EVALUATION OF THE PROPOSED ACTION:

Section 102(2)(C)(iii) of NEPA states that EISs are to include a detailed statement analyzing alternatives to the proposed action. Accordingly, the review team evaluated the proposed action and several alternatives to the proposed action. Evaluation criteria for the alternative sites included land use, air quality, water use and quality, ecology, waste management, socioeconomics, human health, historic and cultural resources, and environmental justice. Alternatives were evaluated against the proposed action to determine if any of the alternatives presented were obviously superior.

To guide its assessment of the environmental impacts of the proposed action and alternatives, the NRC has established a standard of significance for impacts based on Council on Environmental Quality guidance (40 CFR 1508.27). Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, provides the following definitions of the three significance levels established by the NRC:

SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The final EIS presents the review team's analysis that considers and weighs the environmental impacts of the proposed action at the CRN Site. Impacts associated with building and operating two or more SMRs within the PPE at the CRN Site were considered to be SMALL for most resource areas, with the exception of impacts to land use and terrestrial ecology from building activities (MODERATE); socioeconomic impacts associated with increased physical impacts (SMALL to MODERATE) and vehicle traffic (MODERATE to LARGE) during building activities; increased socioeconomic impacts to aesthetics and recreation (SMALL to MODERATE) during operation; impacts to historic and cultural resources from building activities (MODERATE TO LARGE); and impacts to nonradiological waste from building and operation activities (SMALL to MODERATE).

EVALUATION OF ALTERNATIVES

Chapter 9, "Environmental Impacts of Alternatives," of the EIS addresses the following four categories of alternatives to the proposed action: (1) the no-action alternative, (2) alternative sites, and (3) system design alternatives. As summarized below, none of the potential alternatives is environmentally preferable to the proposed action.

i. *No-Action Alternative*

The no-action alternative, discussed in Section 9.1 of the final EIS, refers to the scenario in which the NRC would not issue an ESP. There are no environmental impacts associated with not issuing the ESP, and the impacts predicted in this EIS associated with building and

operating two or more SMRs at the CRN Site or at any one of the alternative sites would not occur. In this context, the no-action alternative would accomplish none of the benefits intended by the ESP process, which would include the following: (1) early resolution of siting issues prior to large investments of financial capital and human resources in new plant design and construction; (2) early resolution of issues related to the environmental impacts of construction and operation of new nuclear units with characteristics that fall within the PPE; (3) the ability to bank sites on which nuclear plants might be located; and (4) the facilitation of future decisions about whether to construct new nuclear power-generation facilities.

ii. Alternative Sites

The NRC independently evaluated TVA's process for screening the potential sites, which was based on guidance in the Electric Power Research Institute's Siting Guide, which is consistent with the siting process in the NRC's NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan" and in NRC's Regulatory Guide 4.7, "General Site Suitability Criteria for Nuclear Power Stations." NRC's site-selection process guidance calls for identification of a Region of Interest (ROI), followed by successive screening to identify candidate areas, potential sites, candidate sites, and the proposed site. The ROI is the geographic area considered by the applicant in searching for candidate areas and potential sites for a new nuclear power plant. The ROI is typically the State in which the proposed site is located or the relevant service area for the applicant.

The NRC staff evaluated TVA's methodology for selecting its ROI and candidate areas and its evaluation of potential sites, candidate sites, and alternative sites. For its ROI, TVA chose the TVA Power Service Area, which is consistent with guidance in NUREG-1555. The NRC staff also concluded that the method used to identify candidate areas, potential sites, candidate sites, and alternative sites was reasonable, logical and adequately satisfied applicable NRC guidance.

Candidate areas for siting a new nuclear power plant in the TVA Power Service Area were identified by TVA after considering the following criteria: seismology considerations, cooling water availability, population density, and proximity to targeted customers. Further review of the candidate areas by TVA included availability of land, proximity to a water source, proximity to sensitive resources such as wetlands, proximity to transmission lines and existing transportation infrastructure, obvious topographic concerns, and flexibility to optimize site layout and design for environmental and cost mitigation purposes. Ultimately, four candidate sites were chosen for additional site suitability analyses, which resulted in the CRN Site (Oak Ridge Reservation Site 3) being chosen as the preferred site.

The remaining three sites examined are listed as alternative sites in Section 9.3, "Alternative Sites," of the final EIS:

- Redstone Arsenal Site 12 in Madison County, Alabama
- Oak Ridge Reservation Site 8 in Roane County, Tennessee
- Oak Ridge Reservation Site 2 in Roane County, Tennessee.

Although there are differences and distinctions between the environmental impacts of building and operating two or more SMRs at the CRN Site and the impacts that would occur at one of the alternative sites, the review team concluded that none of the alternative sites would be environmentally preferable or obviously superior to the proposed site.

iii. Alternative System Designs

The review team considered a variety of alternatives for heat-dissipation systems, intake and discharge water systems, and water supplies.

About two-thirds of the heat from a commercial nuclear reactor is rejected as heat to the environment. The remaining one-third of the reactor's generated heat is converted into electricity. Normal heat-dissipation systems transfer this rejected heat into the atmosphere as evaporation and/or heated discharge water to mix with nearby water bodies. In TVA's proposed system, the majority of heat dissipation for the proposed plant at the CRN Site would be via evaporation of water in mechanical draft (wet) cooling towers. The review team considered several alternative heat-dissipation systems, but found none to be environmentally preferable to the proposed mechanical draft (wet) tower cooling system.

Circulating water systems withdraw water from the source water body and return water to the receiving water body. One of the main interactions a nuclear power plant has with the environment typically occurs at the intake and discharge structures. The review team considered alternatives to the proposed intake and discharge systems, but found none to be environmentally preferable to the proposed systems. Lastly, the review team considered alternative water supplies including groundwater, the City of Oak Ridge municipal supply, and reclaimed wastewater; but none of the supplies were environmentally preferable to the proposed water supply from the Clinch River adjacent to the proposed site. The alternative system designs considered are discussed in Section 9.4, "System Design Alternatives," of the final EIS.

MITIGATION MEASURES

Because an ESP does not provide NRC authorization to conduct construction activities, there are no necessary mitigation measures for NRC regulated activities at this stage. However, the review team evaluated the impacts of building and operating two or more SMRs at the CRN Site under NEPA, and accordingly, considered reasonably foreseeable mitigation measures to address the impacts of building and operation. Accordingly, these mitigation measures (discussed in Tables 10.1 and 10.2 of the final EIS and summarized below) refer to the impacts of such potential future building and operation. In the event the Clinch River ESP is referenced in a future application to build and operate two or more new SMRs at the CRN Site, the applicant would be subject to permitting conditions from other Federal, State, and local agencies based on applicable requirements associated with certain project activities (e.g., issues related to wetlands mitigation, land-use and construction management, and species conservation).

Water Use and Quality

TVA would be required to obtain a Clean Water Act (33 USC 1251 et seq) Section 401 certification before commencing any Federally authorized construction activities that would result in discharge to navigable waters. TVA would comply with Federal and State regulations and permits. TVA would also implement best management practices (BMPs) and a site-specific Stormwater Pollution Prevention Plan.

Land Use

TVA would minimize land disturbance and comply with requirements of applicable Federal, State, and local permits, regulations, and zoning.

Terrestrial and Wetland Resources

TVA would minimize land disturbance, implement BMPs, and comply with requirements of applicable Federal and State permits and regulations. TVA would revegetate temporarily disturbed areas. Any conditions required by the USACE, such as compensatory mitigation, would be addressed in a USACE permit, if issued. Mitigation may only be used after all appropriate and practical steps to avoid and minimize adverse impacts to aquatic resources, including wetlands and streams, have been taken. All remaining unavoidable impacts must be mitigated to the extent appropriate and practicable. Onsite, in-kind mitigation such as wetland creation and enhancement would be used. TVA would implement BMPs to limit potential impacts from vegetation control, road maintenance, and other activities.

Aquatic Ecosystem

TVA, to the extent feasible, would avoid any disturbance to sensitive aquatic habitats and species, implement BMPs and TVA procedures, and comply with requirements of applicable Federal and State permits and regulations.

Socioeconomics and Environmental Justice

TVA would implement standard noise-control measures for construction equipment and limit the types of construction activities to minimize noise impacts to residences in the vicinity. TVA would control fugitive dust through BMPs and control vehicle emissions through regularly scheduled maintenance. TVA would install traffic controls and roadway modifications and additional turning capacity to mitigate traffic delays; and the construction workforce would be spread into shifts to minimize additional construction traffic volume on local roads.

Historic and Cultural Properties

TVA has executed a Programmatic Agreement (PA) (ADAMS Accession No. ML17296A399) with the Tennessee Historical Commission and consulting American Indian Tribes in accordance with Section 106 of the National Historic Preservation Act (NHPA, 54 U.S.C. § 306101) to avoid, minimize, mitigate, and resolve adverse effects from building activities to historic properties and deeply buried deposits within the direct and indirect areas of potential effects. The PA also outlines NHPA Section 106 requirements and inadvertent discovery and notification provisions in the Native American Graves Protection and Repatriation Act (NAGPRA, 25 U.S.C. § 3001 et seq.) .

In addition to adhering to the stipulations as outlined in its PA, as a Federal land-managing agency, TVA is also required to comply with other Federal historic and cultural resource protection requirements. This includes NHPA Section 110, Archaeological Resources Protection Act (ARPA, 16 U.S.C. § 470aa et seq.), Archeological and Historic Preservation Act of 1974 (AHPA, 54 U.S.C. § 312501 et seq.), American Indian Religious Freedom Act (AIRFA, 42 U.S.C. § 1996 et seq.), NAGPRA, Executive Order (EO) 13007 "Indian Sacred Sites," EO

13175 “Consultation and Coordination with Indian Tribal Governments,” as well as implementing regulations governing the curation of artifacts as articulated in 36 CFR Part 79.

TVA would conduct operation and maintenance activities in compliance with NHPA Section 106 and would avoid, minimize, or mitigate potential operation related impacts on historic and cultural resources. TVA also maintains procedures and management plans that consider impacts on historic and cultural resources during operations. If archaeological resources or human remains are encountered during operations, TVA has NHPA Section 106 and NAGPRA inadvertent discovery procedures requiring TVA to stop work and notify consulting parties.

Air Quality

TVA would comply with Federal, State, and local regulations governing construction activities and construction vehicle emissions that may affect air quality. Air emission sources associated with a new nuclear power site would be managed in accordance with Federal, State, and local air-quality control laws and regulations. A new plant at the CRN Site would comply with all regulatory requirements of the Clean Air Act, as well as the Tennessee Department of Environment and Conservation requirements to minimize impacts on state and regional air quality.

Radiological Health

TVA would meet NRC and U.S. Environmental Protection Agency standards to maintain doses to members of the public and workers below the NRC limits and as low as is reasonably achievable. Mitigative actions instituted for members of the public would also ensure that doses to biota other than humans would be below National Council on Radiation Protection and Measurements and International Atomic Energy Agency guidelines during operation activities.

Nonradiological Health

TVA would comply with Federal, State, and local regulations governing: 1) construction activities and construction vehicle emissions; 2) noise from construction activities and increased traffic in the local area; and 3) occupational safety and health regulations. TVA would also implement a traffic management plan.

Nonradiological Waste

TVA would manage hazardous and nonhazardous solid wastes according to Federal, State, and local handling and transportation regulations; implement recycling and BMPs to minimize waste generation; establish procedures for, and perform audits to verify, waste disposal according to applicable regulations such as the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. § 6901 et seq.-TN1281); and establish a waste-minimization program.

DETERMINATION:

Based on an independent review, analysis and evaluation contained in the final EIS; careful consideration of all the identified social, economic and environmental factors; the input received from other agencies, organizations, and the public; the factors and mitigation measures outlined above; and the input received during the mandatory hearing, it is determined that the standards for issuance of an ESP as described in 10 CFR 52.24, have been met and the requirements of Section 102 of NEPA have been satisfied.

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