AGENCY: U.S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE) has prepared the "*Environmental Assessment, Sodium Residuals Reaction/Removal and Other Deactivation Work Activities, Fast Flux Test Facility Project, Hanford Site, Richland, Washington*" (DOE/EA-1547F, March 2006). In this EA, DOE addresses a different approach to accomplish the ongoing deactivation work at FFTF that was not extensively discussed in the DOE final *Environmental Assessment, Shutdown of the Fast Flux Test Facility* (referred to as the 1995 EA, DOE/EA-0993, May 1995). The 1995 EA analyzed that FFTF sodium residuals would be maintained in an inert environment (under an argon cover gas) to prevent any chemical reactions during long-term surveillance and maintenance. In DOE/EA-1547F, DOE proposes reaction and removal of radioactively contaminated sodium residuals left over from the drain of the Hanford Site radioactively-contaminated sodium inventory (i.e., FFTF, Hallam Reactor, and Sodium Reactor Experiment) by reacting the sodium metal with water (as superheated steam) to produce caustic sodium hydroxide; removal of associated equipment/components, as required; and removal/disposal/stabilization of the resulting miscellaneous hazards and waste streams. Alternatives considered in the DOE/EA-1547F include: the No Action Alternative; alternative process technologies for removal and reaction of sodium residuals and associated equipment, including the Proposed Action (i.e., superheated steam); and alternative locations of sodium residual reaction cleaning station(s).

The DOE/EA-1547F does not address FFTF decommissioning activities i.e., final end state of the FFTF. That scope of work will be addressed in the Tank Closure and Waste Management Environmental Impact Statement.

Based on the analysis in the EA, and considering preapproval comments received (Appendix A of DOE/EA-1547F), DOE has determined that the proposed action is not a major federal action significantly affecting the quality of the human environment within the meaning of the "*National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321, et seq.*" Therefore, the preparation of an Environmental Impact Statement (EIS) is not required.

ADDRESSES AND FURTHER INFORMATION:

Single copies of the EA and further information about the proposed action are available from:

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PURPOSE AND NEED: The DOE final *Environmental Assessment, Shutdown of the Fast Flux Test Facility* (referred to as the 1995 EA, DOE/EA-0993, May 1995) addressed leaving and maintaining the FFTF radioactively contaminated sodium residuals under an inert gas atmosphere to prevent any chemical reactions during long-term surveillance and maintenance. The purpose of this proposed action is to continue to support long-term, low cost surveillance and maintenance (Phase II) of the facility in a safer and more stable condition with reduced risk to plant workers, the public, and the environment, prior to the final decommissioning end state of the FFTF. It would also maintain the continuity and momentum of FFTF deactivation activities using the advantage of existing knowledge and skills of current FFTF staff who have worked for many years within the confines of FFTF with the attendant sodium hazard (i.e., liquid-metal handling/cleaning expertise). The activities DOE now proposes to undertake include reaction and removal of radioactively contaminated sodium residuals, removal of associated equipment/components, as required, and removal/disposal/stabilization of the resulting miscellaneous hazards and waste streams. The proposed activities would be able to rely on existing staff with expertise in liquid metal handling/cleaning, minimizing risks to directly involved workers and other facility staff. Furthermore, it would eliminate having to maintain the inert cover gas system during the surveillance and maintenance phase, thus reducing costs.

BACKGROUND: The FFTF is a DOE-owned, formerly-operating, 400-megawatt (thermal) liquid-metal cooled (sodium) research and test reactor located in the 400 Area of DOE's Hanford Site near the City of Richland, Washington. Built in the 1970's, it was used between 1982 and 1992 to develop and test advanced nuclear fuels, materials, equipment, and reactor safety designs for the Liquid Metal Fast Breeder Reactor Program. The FFTF was used in ancillary experimental activities to produce a variety of medical isotopes. In December 1993, DOE decided not to further operate FFTF due to a lack of an economically-viable mission at that time and ordered shutdown of the facility. The 1995 EA evaluated the potential impacts associated with actions necessary to place the FFTF in radiologically safe and industrially safe permanent shutdown and deactivation condition (Phase I), suitable for a long-term surveillance and maintenance (Phase II) prior to decommissioning (Phase III). The 1995 EA did not evaluate Phase III. The 1995 EA proposed the sodium residuals remain in the main portions of the FFTF's piping and equipment, and be maintained in an inert gas atmosphere to prevent any chemical reactions during long-term surveillance and

maintenance. DOE determined that an environmental impact statement (EIS) was not required for the permanent shutdown and deactivation of the FFTF, and issued a NEPA Finding of No Significant Impact (FONSI) decision with the 1995 EA.

In January 1997, DOE decided to maintain FFTF in standby pending an evaluation of a future role in DOE's national tritium production strategy. In December 1998, DOE decided FFTF should not play a role in production of the nation's tritium stockpile. Facility deactivation work continued under the 1995 EA, limited to activities that would not preclude reactor restart.

In December 2000, DOE published the *Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, Including the Role of the Fast Flux Test Facility* (NI-PEIS, DOE/EIS-0310F) This NI-PEIS evaluated the role of FFTF as an alternative nuclear irradiation services facility to accomplish civilian nuclear energy research and development, medical and industrial radioisotope production, and production of plutonium-238 to support future National Aeronautics and Space Administration space exploration missions. Also evaluated was an alternative to permanently deactivate the FFTF. Based on the NI-PEIS, DOE decided in the Record of Decision (ROD) [66 Federal Register (FR) 7877, January 26, 2001], that the permanent deactivation of FFTF was to be resumed, with no new missions. Since that time, deactivation has continued, consistent with the 1995 EA and FONSI and the 2000 NI-PEIS and 2001 ROD. Major deactivation activities underway at this time include: washing the FFTF fuel to remove sodium, placing the fuel into dry cask storage, draining sodium systems, and deactivating auxiliary plant systems.

In February 2006, DOE announced its intention to prepare a Tank Closure and Waste Management (TC & WM) EIS for the Hanford Site (71 FR 5655). DOE decided to merge the scope of the FFTF Decommissioning EIS (69 FR 50176) to further coordinate resources and ensure a comprehensive look at environmental impacts at Hanford. In the TC & WM EIS, the potential decision for final decontamination and decommissioning of the FFTF would identify the final end state for the above-ground, below-ground, and ancillary support structures.

The DOE/EA-1547F is an interim action EA that examines the environmental consequences on an expanded deactivation workscope that was previously analyzed in the 1995 EA to evaluate a different approach to sodium residuals management. The 1995 EA analyzed that FFTF sodium residuals (i.e., material that remains on the walls of piping and components, or remains in pumps or vessels and other locations not readily drained) would be maintained in an inert gas atmosphere to prevent any chemical reactions during long-term surveillance and maintenance. The 1995 EA provides the foundation for most of the analyses of environmental impacts included in the DOE/EA-1547F as there have been relatively minor changes in environmental conditions at the 400 Area of the Hanford Site since 1995. As such, DOE/EA-1547F supplements or adds to the 1995 EA analysis of deactivation actions. Under the criteria of 40 CFR 1506.1, these actions would not be expected to have an adverse

environmental impact or limit the choice of reasonable FFTF final decontamination and decommissioning alternatives under consideration in the TC & WM EIS.

PROPOSED ACTION: DOE proposes a different approach to accomplish the ongoing deactivation work at FFTF that was not extensively discussed and analyzed in the 1995 EA. DOE now proposes to remove radioactively-contaminated sodium residuals left over from the drain of the Hanford Site radioactively-contaminated sodium inventory (i.e., FFTF, Hallam Reactor, and Sodium Reactor Experiment) by reacting the sodium metal with water (as superheated steam) to produce caustic sodium hydroxide; remove associated equipment/components to allow removal of the sodium; and remove, dispose, and stabilize miscellaneous hazards and waste streams left over from the sodium drain. These activities will further support low cost, environmentally-safe, surveillance and maintenance activities at the FFTF.

Some of the specific issues discussed and evaluated in the DOE/EA-1547F include:

- the use of the superheated steam process (SSP) in-place or at designated cleaning locations to remove sodium residuals. [Superheated steam is where steam is superheated well above the boiling point of water before being injected into the preheated equipment/components (e.g., piping, valves, tanks, etc.) at controlled rates.]
- the locations where the reaction of sodium or sodium residuals associated with the sodium systems and equipment could be done (i.e., in-place or at designated cleaning locations), and the use of an alternative technology(s) in select situations for small-scale reaction of sodium residuals.

Other deactivation work activities discussed and evaluated in the DOE/EA-1547F include removal of associated equipment/components to facilitate removal of the sodium residuals; and removal, disposition, and stabilization of miscellaneous hazards and waste streams resulting from the sodium drain. These activities include:

- clean in-place vessels, components, and large-bore pipe (greater than or equal to 8-inch diameter) in primary and secondary sodium cooling systems
- remove small-bore pipe (less than 8-inch diameter), valves, and other components for reaction in a cleaning station
- remove large components for cleaning
- remove and package FFTF remote-handled special components (cesium trap, primary cold trap, and two vapor traps) for storage in the 400 Area pending final disposition
- remove/dispose of asbestos
- remove/stabilize existing hazards in conjunction with deactivating systems and equipment associated with sodium residuals
- remove/recycle/dispose excess deactivated equipment and components as necessary, and

- remove depleted uranium and/or lead shielding for recycling, reuse, or storage in the 400 Area.

ALTERNATIVES CONSIDERED: DOE/EA-1547F addresses a variety of alternatives to the proposed action, which included the No-Action alternative, alternative process technologies for removal and reaction of sodium residuals, and alternative locations of the sodium residual reaction station(s).

No Action Alternative. Under the No Action Alternative, the FFTF would continue to be deactivated as described under the 1995 EA. This alternative would leave the FFTF radioactively contaminated sodium residuals in place and maintained under an inert gas atmosphere to prevent any chemical reactions during long-term surveillance and maintenance.

Alternative Process Technologies for Removal and Reaction of Sodium Residuals and Associated Equipment Including the Proposed Action. Alternative process technologies for removal/reaction of FFTF sodium residuals were considered. These included water vapor, moist carbon dioxide, evaporation, and dissolution of sodium in ammonia (i.e., solvated electron solution).

Alternative Locations of Sodium Residual Reaction Station(s). Alternatives to the proposed locations of the sodium residual reaction stations (i.e., mobile unit, FSF stationary unit, and LDCV in MASF) were considered.

ENVIRONMENTAL IMPACTS: DOE/EA-1547F evaluates the potential environmental impacts of the proposed action and alternatives considered. Key impact areas are summarized below.

Impacts from Siting and Construction. Potential nonsubstantial impacts from siting and construction activities were considered similar to those associated with routine industrial activities. The areas associated with sodium residual cleaning stations are within the FFTF property protected area (PPA), which is already a highly disturbed area. The expected siting activities and their land use designation (i.e., industrial) were considered consistent with applicable DOE NEPA decisions. Specific ecological resource review(s) would be conducted, as appropriate, before any construction activities, with restrictions possibly applied, as appropriate. If cultural or paleontologic (i.e., fossils) resources were encountered during construction, all work would stop immediately and the Hanford Cultural Resource Center would be notified. Construction and operational activities would be consistent with Hanford Site biological resources management and mitigation strategy. No harmful radiological or toxicological exposure to workers or the general public are expected to occur, with construction materials handled consistent with routine industrial construction activities. Temporary particulate emissions would likely result from use of heavy equipment for excavation or materials transport; these emissions would be controlled using appropriate dust control measures compliant with applicable air quality standards.

Impacts from Routine Operations. The potential for release of radioactive emissions during routine activities exists. However, the emissions would be in compliance with DOE and other applicable guidelines and regulations. Some nonsubstantial radiological exposure for workers involved in the proposed activities could occur. Essentially no public exposure above that currently experienced from Hanford Site operations is anticipated as a result of activities. Furthermore, routine operations are not anticipated to provide additional exposure of toxic or noxious vapors to workers or members of the general public.

Waste Management: Essentially no environmental impacts from the transportation of liquid wastes would be anticipated as a result of the proposed action. Environmental impacts from the treatment/disposal of an estimated large quantity of waste water would be expected. The waste water meeting waste acceptance criteria would be disposed of at LERF/ETF in the 200 Areas (there would be no waste water discharged to the environment in the 400 Area). This waste stream would be treated and disposed of in a similar fashion as typical day-to-day operations at the existing LERF/ETF. The ETF routinely is used to remove toxic metals, radionuclides, and ammonia, and destroy organic compounds. No modifications to the existing LERF/ETF would be required to support the proposed action. Radioactive material, radioactively contaminated equipment, and radioactive mixed wastes would be appropriately packaged, stored, and disposed of at existing facilities on the Hanford Site. None of the materials would be anticipated to be generated in substantial quantities when compared to the annual amount routinely generated throughout the Hanford Site. Hazardous materials (e.g., asbestos) which may be removed or stabilized would be managed and reused, recycled, stored, or disposed of in accordance with applicable federal and state regulations.

Impacts from Postulated Accidents: DOE/EA-1547F discusses a range of reasonably foreseeable accident scenarios that could lead to environmental impacts. Based on current plant conditions, the residual volume of sodium remaining of approximately 15,000 liters or 4000 gallons remaining in portions of the FFTF plant systems is a small fraction of the bulk sodium inventory evaluated in the 1995 EA. Scenarios were related to sodium drain, storage, and reaction. These events include both high consequence and low probability and low consequence and high probability scenarios for the onsite (100 meters, 0.062 miles) worker and the maximally exposed individual offsite (i.e., approximately 7 kilometers or 4.5 miles).

The Maximum Reasonably Foreseeable Accident is postulated to be a large leak (due to growth of a metal defect in a storage tank) in the sodium storage facility. This accident is considered bounding, as it involves bulk sodium and not the residuals remaining after draining. In addition, the assumed 400 Area population of 1,000 persons considered in this 1995 EA analysis is now estimated at 400 persons. The entire inventory of the tank was assumed to discharge onto the steel floor of the secondary containment and to burn, releasing a sodium hydroxide aerosol plume. The calculated onsite dose consequence is 2.5 E-04 rem. The calculated offsite dose consequences is 3.9 E-04 rem. No latent fatalities due to radiation from this non-credible accident would be expected.

Of greater potential impact are the toxicological consequences of the sodium hydroxide plume from the postulated fire associated with the maximum reasonably foreseeable

accident. The calculated onsite (100 meters [330 feet]) sodium hydroxide concentration is approximately 166 milligrams per cubic meter. The sodium hydroxide concentration at the site boundary (approximately 7 kilometers [4.5 miles]) was calculated to be approximately 0.05 milligrams per cubic meter. Based on the extremely low probability of occurrence, even if the consequences of such an event are as severe as calculated for the onsite worker, the extremely low probability of occurrence and administrative training and controls make the risks of a sodium fire from the proposed action small. The calculated offsite toxicological consequences of approximately 0.05 milligrams sodium hydroxide per cubic meter fall well below the applicable guidelines for offsite exposure. Further, it is noted that the projected effects from the maximum reasonably foreseeable accident are considered bounding for the proposed sodium residuals removal activities evaluated in this EA. While large quantities of sodium currently are being stored in the sodium storage facility, the sodium is not in molten form, thereby minimizing the probability of release.

Impacts from Transportation. No unique circumstances associated with the proposed transfer of waste water and solid wastes (predominantly low-level waste piping and components) from FFTF to the 200 Areas have been identified. The residual contamination associated with the rinsed piping and components is in a less dispersible form than the liquid sodium hydroxide solution, and therefore would be less likely to present an adverse impact to workers or the public.

Socioeconomic Impacts and Environmental Justice. The proposed action would not result in substantial socioeconomic impacts. There would be no discernible impact to employment levels within Benton and Franklin counties. Based on the analyses in this EA, it is not expected that there would be any disproportionately high and adverse impacts to any minority or low-income populations.

Cumulative Impacts: The proposed actions would contribute minimal risks in addition to those associated with routine Hanford Site operations. The proposed actions also would reduce the potential for, and consequences of, inadvertent releases of radioactive and hazardous materials from FFTF. The proposed actions would result in a long-term decrease in radiation exposure, due to removal of residual sodium and the attendant radioactivity. The proposed action would involve existing operations personnel to the extent practicable; therefore, no substantial change in the Hanford Site workforce would be expected. There would be no adverse socioeconomic impacts or any disproportionately high and adverse impacts to any minority or low-income population of the community. The proposed action would result in radioactive air emissions consisting predominantly of tritium. Minimal public exposure to radiation above that currently experienced from routine Hanford Site operations would be anticipated as a result of these proposed actions. The low doses associated with the radioactive inventory within the scope of this EA would not result in substantial offsite public exposure. No adverse health effects to the public would be expected. The proposed action would result in minimal nonradioactive air emissions. No long-term groundwater impacts are anticipated. No long-term radionuclides would be present in waste waters generated from FFTF deactivation activities. The proposed action would result in liquid wastes that would be treated and disposed of in accordance with

applicable regulations and a state waste discharge permit. Minimal impacts are anticipated from disposition of solid wastes and existing Hanford Site disposal facilities have the capacities to receive the estimated amount of cleaned piping and components associated with the proposed action. Hazardous materials (e.g., solvents, glycols, PCBs, asbestos) which may be removed or stabilized would be managed and reused, recycled, or disposed of in accordance with applicable federal and state regulations. None of the materials would be anticipated to be generated in substantial quantities when compared to the annual amount routinely generated throughout the Hanford Site.

DETERMINATION: Based on the analysis in the DOE/EA-1547F, and, after considering the preapproval comments received, I conclude that the proposed sodium residuals reaction/removal and other deactivation work activities associated with the FFTF Project at the Hanford Site do not constitute a major federal action significantly affecting the quality of the human health and the environment within the meaning of NEPA. Therefore, an EIS for the proposed action is not required.

Issued at Richland, Washington, this 31st day of March 2006.

Keith A. Klein
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