CHAPTER 1
PROPOSED ACTIONS: BACKGROUND, PURPOSE, AND NEED

Chapter 1 describes the background and purpose and need for the agency action presented in this *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC & WM EIS)*. Section 1.1 provides summary information on the size and distribution of the waste inventory at the Hanford Site (Hanford), the specific objectives of this *TC & WM EIS*, and the regulatory basis for the proposed actions. Section 1.2 details the operational history of Hanford, efforts to secure an agreement between Federal and state regulators on milestones for compliance with regulatory requirements, and the succession of environmental impact studies and Records of Decision consistent with that agreement. Section 1.3 presents the three major objectives of the U.S. Department of Energy (DOE) at Hanford, as well as specific objectives as part of the National Environmental Policy Act (NEPA) process. Provided in Section 1.4 are outlines of environmental impact statement–supported decisions relative to operation of DOE's Office of River Protection. Section 1.5 includes a brief description of the scoping process for the *TC & WM EIS* alternatives. Section 1.6 summarizes public comments and DOE responses on issues raised during the scoping processes for this *TC & WM EIS* and the earlier, unpublished "Environmental Impact Statement for Retrieval, Treatment, and Disposal of Tank Waste and Closure of Single-Shell Tanks at the Hanford Site, Richland, Washington" and "Environmental Impact Statement for the Decommissioning of the Fast Flux Test Facility at the Hanford Site, Richland, Washington." Section 1.7 presents a breakdown of the *TC & WM EIS* alternatives as modified by DOE consistent with a review of public, stakeholder, and regulator comments generated during the scoping process. Section 1.8 contains brief discussions of a number of NEPA reviews, completed or ongoing, and their relationships with the proposed actions at Hanford. The organization of this *TC & WM EIS* is presented as Section 1.9.

1.1 INTRODUCTION

The U.S. Department of Energy (DOE) prepared this *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC & WM EIS)* to analyze and evaluate the potential environmental impacts of storing, retrieving, treating, and disposing of the waste inventory generated during defense production years at the Hanford Site (Hanford) in Washington State. This waste inventory of about 205 million liters (54.5 million gallons) of mixed radioactive and chemically hazardous waste, stored in 177 large and associated smaller underground storage tanks, presents a major source of potential public health and environmental risk. This *TC & WM EIS* revises and updates the analyses of the *Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement (TWRS EIS)* (DOE and Ecology 1996) and subsequent supplement analyses (SAs), which addressed retrieval, treatment, and disposal of the tank waste, by also evaluating the impacts of different scenarios for final closure of the single-shell tank (SST) system.

In addition, this *TC & WM EIS* evaluates the potential environmental impacts of proposed activities to decommission the Fast Flux Test Facility (FFTF), a nuclear test reactor, and associated auxiliary facilities at Hanford, including management of waste generated by the decommissioning process (such as certain waste designated as remote-handled special components [RH-SCs]) and disposition of Hanford's inventory of radioactively contaminated bulk sodium from FFTF and other onsite facilities.

Finally, this *TC & WM EIS* evaluates the potential environmental impacts of ongoing solid waste management operations at Hanford, as well as the proposed disposal of Hanford low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) and a limited volume of LLW and MLLW from other DOE sites in an Integrated Disposal Facility(ies) (IDF) located at Hanford.

This *TC & WM EIS* describes the potential environmental impacts and relative cost consequences of the proposed actions and reasonable alternatives for the major activities discussed above. This *TC & WM EIS* was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.); DOE implementing procedures for NEPA (10 CFR 1021); and Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500–1508). Further, this *TC & WM EIS* implements a Settlement Agreement signed on

January 6, 2006, by DOE, the Washington State Department of Ecology (Ecology), and the Washington State Attorney General's Office. The agreement settles NEPA claims made in the case *State of Washington v. Bodman* (Civil No. 2:03-cv-05018-AAM), which addressed the January 2004 *Final Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement, Richland, Washington (HSW EIS)* (DOE 2004a). Ecology is participating in this NEPA activity as a cooperating agency; as such, it is responsible for reviewing the content of the *TC & WM EIS* under authority of Washington's State Environmental Policy Act (SEPA) (RCW 43.21C) to ensure it satisfies the State of Washington's requirements and supports its proposed action to issue permits under its hazardous waste program. The information provided in this environmental impact statement (EIS) will be considered, along with other pertinent information, in the final decision process for DOE's proposed actions.

1.2 BACKGROUND

Hanford is located in southeastern Washington State along the Columbia River and is approximately 1,517 square kilometers (586 square miles) in size. Hanford's mission included defense-related nuclear research, development, and weapons production activities from the early 1940s to approximately 1989. During that period, Hanford operated a plutonium production complex with nine nuclear reactors and associated processing facilities.

To produce plutonium, uranium metal (fuel rods) was irradiated in plutonium production reactors located near the Columbia River. The irradiated uranium metal (spent nuclear fuel, or SNF) was cooled and then treated through chemical separation in reprocessing plants located in the central part of Hanford. At the reprocessing plants, the SNF was dissolved in acid and the plutonium was separated from the remaining uranium and byproducts, many of which are radioactive. The plutonium then was used for nuclear weapons production.

Hanford reprocessed SNF containing approximately 100,000 metric tons of irradiated uranium and generated several hundred thousand metric tons of chemical and radioactive waste during its production period. The waste included (1) high-level radioactive waste (HLW) as defined under the Nuclear Waste Policy Act (42 U.S.C. 10101 et seq.); (2) transuranic (TRU) waste (waste containing alpha emitting radionuclides with atomic numbers greater than uranium [92] and half-lives greater than 20 years in concentrations greater than 100 nanocuries per gram of waste); (3) LLW, which is radioactive waste that is neither HLW nor TRU waste; (4) MLLW, which is LLW containing hazardous constituents as defined under the Resource Conservation and Recovery Act (RCRA) of 1976 (42 U.S.C. 6901 et seq.); and (5) hazardous waste, as defined under RCRA.

For waste generated by the chemical reprocessing plants, the waste management process initially involved neutralizing the acidic waste with sodium hydroxide and sodium carbonate and storing the resulting caustic waste in large underground tanks until a long-term disposal solution could be found. From 1943 through early 1964, 149 SSTs were built to store waste in the 200 Areas of Hanford.

During the 1950s, uranium was extracted from some of the waste stored in SSTs, which introduced new chemicals to the tanks. Beginning in the 1960s, some waste was retrieved from SSTs and transferred to the B Plant at Hanford, where cesium and strontium were extracted, placed in capsules, and stored in a separate facility. This process removed approximately 40 percent of the fission product inventory from the tank waste. The remaining waste was returned to the tanks.

In the mid-1950s, leaks were suspected or detected in some SSTs. To address concerns about SST designs, Hanford adopted a new double-shell tank (DST) design—basically, a tank within a tank. The DST design would allow leaks to be detected and corrective actions to be taken before the waste could reach the soil surrounding the tanks. Between 1968 and 1986, 28 DSTs were constructed. Due to their

age, all SSTs were interim-stabilized by removing pumpable liquids to minimize the potential for future leaks. The interim stabilization program was completed in 2004. Newly generated waste and pumped SST interim stabilization waste are stored in the DSTs.

DOE is processing Hanford's contact-handled TRU waste (which does not require special protective shielding) for shipment to the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, consistent with the 1998 Records of Decision (RODs) (63 FR 3629) for treatment and disposal of TRU waste under the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (WM PEIS)* (DOE 1997a) and the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement (WIPP SEIS-II)* (DOE 1997b). DOE is disposing of Hanford's LLW and MLLW on site, consistent with the ROD (65 FR 10061) for treatment and disposal of these wastes under the *Final WM PEIS*. The *Final WM PEIS* ROD also designates Hanford as a regional disposal site for LLW and MLLW from other DOE sites.

1.2.1 Hanford Regulatory Compliance Requirements

Throughout much of the history of plutonium production at Hanford, DOE regulated waste management and environmental protection under a set of orders implementing the Atomic Energy Act (42 U.S.C. 2011 et seq.), including DOE Order 435.1, *Radioactive Waste Management*. (For more detail, see the discussion on DOE Order 435.1 in Chapter 8 of this *TC & WM EIS.*) Although RCRA (42 U.S.C. 6901 et seq.) was enacted in 1976, giving other components of the Federal Government a major role in the regulation of hazardous waste, its applicability to the hazardous component of mixed waste (waste containing both radioactive and hazardous components) at DOE facilities was not recognized by DOE until 1987. In 1986, Ecology was authorized by the U.S. Environmental Protection Agency (EPA) to administer its own hazardous waste program (through the state's Hazardous Waste Management Act [RCW 70.105]) in lieu of the Federal RCRA program. Ecology has adopted "Dangerous Waste Regulations" (WAC 173-303) to regulate the management of hazardous waste.

To establish liability for cleanup of disposal sites for hazardous substances (radioactive materials and hazardous waste), Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund) in 1980 (42 U.S.C. 9601 et seq.). In 1986, the Superfund Amendments and Reauthorization Act (P.L. 99-499) amended CERCLA, establishing Federal agencies' responsibility to investigate and remediate releases of hazardous substances, including radioactive contaminants, from their facilities.

Beginning in 1986, Ecology and EPA began working with DOE to examine how to bring Hanford into compliance with RCRA and CERCLA. The regulators and DOE agreed to develop one compliance agreement that set milestones for cleaning up past disposal sites under CERCLA and bringing operating facilities into compliance with RCRA. Negotiations concluded in late 1988, and the Hanford Federal Facility Agreement and Consent Order, also known as the Tri-Party Agreement (TPA), was completed in 1988 and signed by the three agencies in 1989 (Ecology, EPA, and DOE 1989). Hanford's current mission is the cleanup of waste from defense-related nuclear research, development, and weapons production activities and, ultimately, the closure of Hanford. Because the TPA, which addresses DOE's mixed waste that is subject to the RCRA storage prohibition, preceded the Federal Facility Compliance Act of 1992 (P.L. 102-386), the TPA also satisfies the act's requirement for a site treatment plan addressing mixed waste in storage at Hanford.

1.2.2 *Tank Waste Remediation System Environmental Impact Statement* and Record of Decision

From 1991 to 1998, a DOE organization known as the Tank Waste Remediation System (TWRS) managed all aspects of Hanford's tank farms. In 1998, Congress created a new DOE organization, the Office of River Protection (ORP). Creation of this organization was required by the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 (P.L. 105-261). The manager of ORP is responsible for all aspects of Hanford's tank farm operations. The ORP River Protection Project (RPP) carries out activities associated with storage, treatment, and disposal of Hanford's tank waste.

In 1996, DOE and Ecology coauthored the *TWRS EIS* (DOE and Ecology 1996) to be consistent with the requirements of NEPA (10 CFR 1021) and Washington's SEPA (RCW 43.21C). The *TWRS EIS* evaluated the range of reasonable alternatives feasible at that time to manage and dispose of radioactive, hazardous, and mixed wastes stored in the Hanford tanks. In February 1997, DOE published its decision in the "Record of Decision for the *Tank Waste Remediation System, Hanford Site, Richland, WA*" (62 FR 8693), hereafter referred to as the "*TWRS EIS* ROD."

DOE decided to implement the Preferred Alternative (Phased Implementation) identified in the *TWRS EIS* for retrieval, treatment, and disposal of tank waste. This alternative was based on a two-phase approach to tank waste treatment that included an initial demonstration phase lasting approximately 10 years, followed by Phase II, in which large production-level waste treatment plants would treat the remainder of the tank waste by 2028. DOE decided to chemically separate the tank waste into HLW and low-activity waste (LAW) streams. The LAW would be disposed of in a vitrified form on site at Hanford. The *TWRS EIS* ROD deferred the matter of tank closure pending development of further information. The Phased Implementation Alternative was selected because it would balance short- and long-term environmental impacts; meet regulatory requirements; address the technical uncertainties associated with remediation; and provide the flexibility necessary to accommodate future changes in remediation plans due to new information and technology development.

In the *TWRS EIS* ROD, DOE recognized that the conditions addressed in the *TWRS EIS* would likely require periodic reconsideration. Therefore, DOE committed in the *TWRS EIS* ROD to performing future evaluations of new information related to the tank waste remediation program. These evaluations were anticipated to occur at key points during implementation of the Phased Implementation Alternative, and DOE indicated that they would be performed under its NEPA regulations (10 CFR 1021), with appropriate public involvement. DOE committed to conducting NEPA evaluations as the information warranted to determine whether previous decisions should be changed.

As part of the *TWRS EIS*, a mitigation action plan was developed and implemented. This plan described three general actions to be performed. These included (1) creation of shrub-steppe habitat by transplanting sagebrush; (2) remediation of a transmission line corridor via seedlings of native grasses and sagebrush; and (3) research on native plant species.

In 2000 and 2001, sagebrush seedlings were planted on the Fitzner-Eberhardt Arid Lands Ecology Reserve. About a third of the seedlings were burned during the 24 Command Fire of June 2000 (more information on the fire is provided in Chapter 3 of this draft EIS). The surviving seedlings and subsequent replanting have resulted in about 91,000 seedlings that were planted across four general areas on the reserve. Remediation of the transmission line corridor was completed in March 2001. The mitigation action plan is complete (Durham and Sackschewsky 2004).

1.2.3 Developments Since Issuing the *Tank Waste Remediation System Environmental Impact Statement* Record of Decision

Publication of the *TWRS EIS* and ROD supported implementation of DOE's plans to proceed with the following:

- Design, construction, and operation of waste treatment facilities, including securing permits (e.g., air emissions, RCRA) supporting construction and operation of the treatment facilities
- Operation and maintenance of the tank farms
- Implementation of tank waste retrieval and transfer design and construction projects to support transferring the waste from the tanks to the waste treatment facilities

Consistent with DOE's commitment to conduct periodic evaluations under NEPA, an SA (DOE 1997c) was issued in May 1997. This analysis addressed the potential environmental impacts of proceeding with tank farm infrastructure upgrades, such as upgrading instrumentation and control, tank ventilation, waste transfer, and electrical distribution at existing tank farm facilities to support continued safe storage of tank waste until waste retrieval and disposal can be accomplished. DOE concluded that the potential impacts would be small in comparison to—and are bounded by—the impacts previously assessed under the Phased Implementation Alternative selected in the *TWRS EIS* ROD.

A second SA (DOE 1998) was issued in May 1998. This analysis addressed the impacts of emergent information on the design and construction of a new waste treatment plant under the privatization approach.[1] The new data included a revised tank waste inventory; emerging information on the level of contamination in the vadose zone; revised assessments on the potential for and consequences of accidents associated with management of the tank waste; ongoing technology development activities; and other engineering data. DOE concluded that the information developed since preparation of the *TWRS EIS* only minimally affected the impacts previously estimated in the *TWRS EIS*, and that the changes in environmental impacts were bounded by the impacts presented in the *TWRS EIS*.

A third SA (DOE 2001a) was issued in March 2001. This analysis considered information developed since approval of the *TWRS EIS* ROD relative to plans for treating Hanford tank waste. DOE concluded that new information regarding Phase I activities did not substantially change the proposed actions or present significant new circumstances relevant to environmental concerns, except for vitrified LAW disposal. Therefore, no further NEPA review was needed prior to starting construction of Phase I facilities (facilities capable of immobilizing approximately 10 percent of the tank waste through 2018).

However, changes in the vitrified LAW, including the change in waste form from cullet (small pieces of glass) to monoliths, the change from retrievable storage in vaults to disposal in shallow RCRA trenches, and the change in location within the 200-East Area, represented substantial changes to the scope of the Phased Implementation Alternative selected in the *TWRS EIS* ROD. While these changes in scope appeared to be bounded by the impacts previously analyzed in the *TWRS EIS*, the public had not had an opportunity to comment on the changes. Therefore, DOE determined that further NEPA analysis was

[1] "DOE started its privatization initiative in 1995 as a way to reduce the cost and speed the cleanup of its contaminated sites and to improve contractors' performance. The initiative was primarily an alternative contracting and financing strategy to foster open competition for fixed-price contracts; require the contractors to design, finance, build, own, and operate the facilities necessary to meet treatment requirements; and pay the contractors only for products or services delivered in accordance with the contracts." (GAO 2000).

warranted, and in 2003 these changes were included within the scope of the *Final HSW EIS* (DOE 2004a).[2]

The third SA also concluded that the Phase II waste treatment facilities (facilities capable of immobilizing the remaining tank waste through 2028) appeared to be substantially different from the facilities identified in the Phased Implementation Alternative selected in the *TWRS EIS* ROD. The impacts of revising the design of the Phase II treatment facilities to meet the SST retrieval key assumption made in the *TWRS EIS* (retrieval of all SSTs by 2018) appeared to exceed the bounds of the impacts analyzed in the *TWRS EIS*. Therefore, DOE determined that these changes would be included within the scope of a future NEPA analysis.

Since issuance of the *TWRS EIS* ROD and subsequent SAs, DOE has proceeded with plans to design, construct, and operate facilities that would separate waste into HLW and LAW streams, vitrify the HLW stream, and immobilize the LAW stream. These facilities are now under construction in the 200-East Area of the site and are collectively referred to as the "Waste Treatment Plant" (WTP). The WTP is the cornerstone of DOE's treatment capability for tank waste. The WTP will separate waste stored in Hanford's underground tanks into HLW and LAW fractions. HLW will be vitrified in the WTP and stored at Hanford until disposition decisions are made and implemented. Immobilized LAW would be produced at the WTP.

Design of and preliminary performance projections for the WTP support DOE's proposal to extend operations beyond the 10-year period (Phase I) originally planned in the *TWRS EIS* ROD. DOE also plans to enhance the throughput of the WTP rather than use a second, larger-scale treatment facility in 2012, as identified in the *TWRS EIS* ROD (Phase II). DOE determined that the original plan for a Phase II WTP was prohibitively expensive, and it was believed that the enhanced WTP would implement the *TWRS EIS* ROD. Based on this decision, DOE changed the mission of the WTP from demonstration plant to single, full-scale production facility.

Since issuance of the third SA and after evaluating changes to enhance the WTP, DOE began focusing on treatment methods tailored more to specific waste streams. Based on this evaluation, DOE decided to keep the enhanced WTP at its currently planned configuration and to use supplemental treatment for the remaining portion of the waste to meet the requirement to treat all tank waste. Based on the decision to pursue supplemental treatment and closure, in January 2003, DOE published a Notice of Intent (NOI) (68 FR 1052) in the *Federal Register* to prepare the "Environmental Impact Statement for Retrieval, Treatment, and Disposal of Tank Waste and Closure of Single-Shell Tanks at the Hanford Site, Richland, Washington" ("Tank Closure EIS") (DOE/EIS-0356). The proposed scope of the "Tank Closure EIS" included closure of the 149 underground SSTs and analysis of newly available information on supplemental treatment of a portion of the LAW from all 177 tanks, which contain a total of approximately 206 million liters (54.5 million gallons) of waste.

Another change since issuance of the third SA concerns the design of the WTP Pretreatment Facility. The Pretreatment Facility was originally designed to remove technetium from the HLW stream. However, based on reviews of technetium-99 in immobilized low-activity waste (ILAW) glass, DOE and Ecology agreed to delete technetium removal from the permit (Hedges 2008). The technetium removal capability was removed from the design of the Pretreatment Facility, which is currently being constructed without it. For analysis purposes, this *TC & WM EIS* assumes that technetium-99 removal capability could be added in the existing Pretreatment Facility. Design and construction modifications would be needed later to add the technetium-99 removal capacity if required.

[2] As stipulated in the Settlement Agreement, this scope is now included in this *TC & WM EIS*.

Issues facing DOE primarily result from uncertainties associated with the magnitude of waste retrieval required. DOE began retrieval activities on an SST in 2002 with the C-106 tank, consistent with TPA Milestone M-45-00. Since completion of waste retrieval from the C-106 tank, retrieval has been completed on the following tanks: C-103, C-201, C-202, C-203, C-204, and S-112. TPA Milestone M-45-00 specifies that closure will follow retrieval of as much tank waste as technically possible. Under this milestone, residual waste remaining in the tank is not to exceed 10.2 cubic meters (360 cubic feet) for 100-series tanks or 0.85 cubic meters (30 cubic feet) for 200-series tanks, corresponding to a 99 percent retrieval goal. Appendix H of the TPA, "Single Shell Tank Waste Retrieval Criteria Procedure," provides a procedure for DOE to request an exception to the retrieval criteria established under Milestone M-45-00 if DOE does not believe this criterion is achievable. This EIS will provide the environmental impact information needed to make informed decisions regarding the impacts of meeting or not meeting the 99 percent retrieval goal.

Additionally, requirements implementing DOE's Atomic Energy Act authority under DOE Order 435.1, *Radioactive Waste Management*, which was issued July 9, 1999, also identify retrieval goals as part of the HLW tank closure requirements.

1.2.4 Formal Evaluations of the Tank Waste Remediation Program

The RPP is very complex, and many technical uncertainties associated with implementation of the Phased Implementation Alternative were identified in the *TWRS EIS* ROD. To address these uncertainties and ensure that data developed during the various phases of the project would be incorporated into project planning, DOE committed in the *TWRS EIS* ROD to perform future analyses at three specific points in the program. Below is a description of the review commitments and how they have been fulfilled.

The first review was to occur "before proceeding into Privatization Phase I Part B (scheduled for May 1998)" (62 FR 8693). Phase I Part B consisted of detailed design, construction, and hot (radioactive) commissioning of the WTP demonstration facility. Completion of this review consisted of three parts.

- The first part was a detailed review of the Privatization Authorization to Proceed process, including a comprehensive assessment of the following:
  - The proposals submitted by the privatization contractors for Phase I Part B, including the technical and financial aspects of each proposal, and the options for proceeding with the next phase of the project
  - The Formal Readiness to Proceed reviews conducted by DOE, the management and operations contractor, and the privatization contractors to ensure that all policies, plans, procedures, equipment, facilities, and personnel are in place and each organization is ready to meet its responsibilities for Phase I Part B
- The second part was a programmatic review, including an assessment of the environmental reports submitted by the privatization contractors to address *TWRS EIS* and ROD commitments. This assessment included a review of the reports to verify the accuracy of the information submitted and preparation of an environmental critique (procurement-sensitive) and a publicly available synopsis (non-procurement-sensitive) of the potential impacts of the proposals, consistent with DOE NEPA regulations (10 CFR 1021.216).
- The third and last part included conducting a second SA (DOE 1998) to evaluate new data related to a re-evaluation of the tank waste inventory; emerging information on the level of contamination in the vadose zone; revised assessments of the potential for and consequences of

accidents associated with management of tank waste; and ongoing technology development activities.

The second review was to occur "prior to the start of hot operations of Privatization Phase I Part B (scheduled for December 2002/December 2003)"; the third review was to occur "before deciding to proceed with Privatization Phase II (scheduled for December 2005)" (62 FR 8693). As a result of the decision to terminate the privatization contract and rebid the WTP contract, as well as associated program delays and the decision to focus waste treatment on specific waste streams (identified as supplemental treatment), the second and third review commitments became part of the scope of this *TC & WM EIS*.

In 1996, DOE requested and received comments on the *Draft TWRS EIS* from the National Research Council in a report entitled *The Hanford Tanks: Environmental Impacts and Policy Choices* (National Research Council 1996). These comments were received after the *Final TWRS EIS* had been issued and were considered in preparing the *TWRS EIS* ROD. The National Research Council's principal findings were: (1) significant uncertainties exist concerning waste removal and treatment technologies, costs, environmental policy and regulatory requirements, sitewide integration and future land use, and long-term risks that limit DOE's ability to select a final disposal alternative for all tank waste; and (2) DOE needs to consider remediation alternatives that involve both ex situ (removal and treatment of waste) and in situ (in-place treatment and/or isolation) disposal to provide flexibility in the event that specific technologies do not perform as anticipated or new technologies emerge. The National Research Council recommended that DOE consider a phased decision strategy that incorporates multiple alternatives to allow the program to move forward.

Following issuance of the *TWRS EIS* ROD, DOE has made progress in a number of areas identified as issues/concerns in the National Research Council's report. For example, past leaks and spills are being characterized and contaminant fate and transport uncertainties are being addressed through RCRA facility investigations, and new data have been incorporated into the conceptual models used to evaluate environmental impacts in this *TC & WM EIS*. Additionally, significant advances have been made in the design, testing, construction, and estimates of costs associated with vitrification of tank waste in the WTP. Supplemental treatment technologies are also being considered in this EIS.

1.2.5 Fast Flux Test Facility Deactivation Decision and Record of Decision/Environmental Impact Statement for Deactivation Decision

FFTF is a DOE-owned, formerly operating 400-megawatt (thermal) liquid-metal (sodium)-cooled research and test reactor in the 400 Area of Hanford. Construction of FFTF was completed in 1978 and initial operation began in 1980. From April 1982 to April 1992, FFTF operated successfully as a national research facility to test advanced nuclear fuels, materials, and components; nuclear power plant operations and maintenance protocols; and reactor safety designs. During this time, FFTF also produced a wide variety of medical and industrial isotopes, made hydrogen-3 (tritium) for the U.S. fusion research program, and conducted cooperative international research work.

In December 1993, DOE ordered FFTF to be shut down due to a lack of economically viable missions at that time. An environmental assessment (EA) was prepared to evaluate the impacts of deactivating FFTF, which resulted in a Finding of No Significant Impact (FONSI) (DOE 1995a).

In 1994, Ecology, EPA, and the DOE Richland Office negotiated, under TPA authority, a set of transition phase milestones and targets for deactivating and shutting down FFTF as a first step toward decommissioning the facility (Ecology, EPA, and DOE 1995). From 1994 through 1997, fuel was removed from the reactor vessel for storage in aboveground dry storage casks, and some nonessential FFTF operating systems were deactivated.

In January 1997, the Secretary of Energy ordered FFTF to be maintained in a standby condition while its potential future role in DOE's tritium production strategy was evaluated. Consequently, FFTF transition work was limited to activities that would not inhibit a reactor restart. Additionally, the TPA agencies negotiated to revise (and potentially delete) the work schedules under the TPA M-81-00 series milestones, which cover the deactivation of FFTF. The proposed modifications and the agencies' "Tentative Agreement" were issued for public comment. As a result of the public comments received, the agencies agreed that, rather than delete the TPA M-81-00 series milestones and target dates, they would be held in abeyance (temporary suspension) until the Secretary of Energy issued a final decision regarding the potential restart of FFTF (Ecology, EPA, and DOE 1999). In December 1998, the Secretary of Energy announced that FFTF would not play a role in tritium production and that a decision on any other future FFTF missions would be made by spring 1999.

In May 1999, DOE initiated a two-phase process for finalizing a path forward for FFTF that included development and review of a program scoping plan. By August 1999, DOE initiated preparation of 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 (Nuclear Infrastructure PEIS [NI PEIS])* (DOE 2000a). The *NI PEIS* evaluated the potential environmental impacts resulting from DOE expanding domestic civilian nuclear energy research and development and isotope production using existing and new resources. In the *NI PEIS*, FFTF was evaluated as an alternative irradiation services facility to accomplish these missions. In the *NI PEIS* ROD, published in January 2001, DOE ruled out the use of FFTF for isotope production and research missions and reaffirmed its decision to permanently deactivate the facility (66 FR 7877).

From April 2001 to December 2001, DOE suspended its decision to resume permanent deactivation of FFTF to conduct additional reviews of the decision made in the *NI PEIS* ROD. Following these reviews, DOE decided in December 2001 that restarting FFTF was impractical and deactivation would proceed. Major deactivation activities consist of, but are not limited to, dry cask storage of irradiated fuel, dry storage of nonirradiated and sodium-bonded fuel, sodium draining and storage, and deactivation of the auxiliary plant systems.

In 2002, the TPA milestones were re-established and the M-81-00 series milestones were revised to reflect the new due dates for FFTF deactivation activities (Ecology, EPA, and DOE 2002). In late 2002, FFTF deactivation activities were temporarily suspended because of legal challenges by Benton County, which alleged it was not acceptable to address only deactivation of FFTF in the 1995 EA. The county asserted that a full NEPA EIS on the complete decommissioning process should have been done before any deactivation activities were performed. On February 28, 2003, the U.S. District Court of Eastern Washington ruled in favor of DOE's decision to address only deactivation of FFTF in the 1995 EA. Benton County subsequently appealed the U.S. District Court's ruling in favor of DOE to the U.S. Ninth Circuit Court of Appeals. On May 6, 2003, the county filed a motion with the Ninth Circuit Court dismissing its appeal.

In previous NEPA reviews and appropriate RODs, DOE evaluated transportation and storage of FFTF fuel at either Hanford or Idaho National Laboratory (INL) (formerly Idaho National Engineering and Environmental Laboratory [INEEL]) (DOE 1995a, 1995b, 1997d); transportation and treatment of FFTF sodium-bonded fuel at INL's Materials and Fuels Complex (MFC) (formerly Argonne National Laboratory-West [ANL-W]) (DOE 1995a, 2000b); storage and possible disposal or commercial use of surplus plutonium (including a small quantity of nonirradiated FFTF fuel) (DOE 1999a); and transportation and disposal of SNF and HLW at a geologic repository (DOE 2002a). Ongoing activities associated with management of the FFTF fuel are not evaluated in this EIS.

Numerous NEPA reviews were conducted that directly support ongoing FFTF deactivation activities. Additionally, numerous NEPA reviews that are either completed or under way support the FFTF

decommissioning activities addressed in this *TC & WM EIS*. These related NEPA reviews are enumerated and briefly described in Section 1.7 of this EIS.

1.2.6 *Hanford Solid Waste Environmental Impact Statement* and Record of Decision

In March 2003, prior to issuance of the *Final HSW EIS* and ROD, Ecology initiated litigation on issues related to importation, treatment, and disposal of radioactive and hazardous wastes generated off site as a result of nuclear defense and research activities. In response, the court enjoined shipment of offsite TRU waste to Hanford for processing and storage pending shipment to WIPP.

In January 2004, DOE issued the *Final HSW EIS*, which addressed ongoing solid waste management operations. In June 2004, DOE issued a ROD (69 FR 39449) that announced DOE's decision to dispose of Hanford LLW and MLLW and a limited volume of offsite LLW and MLLW in a new IDF in the 200-East Area (IDF-East) of Hanford. Two cells of IDF-East were constructed in April 2006. DOE also decided to continue sending Hanford's MLLW off site for treatment and to modify Hanford's T Plant for processing remote-handled TRU waste and MLLW.

1.2.7 Developments Since Issuing the *Hanford Solid Waste Environmental Impact Statement* Record of Decision

Ecology amended its March 2003 complaint in 2004, challenging the adequacy of the *HSW EIS* analysis of offsite waste importation. In May 2005, the court granted a limited discovery period and continued the injunction against shipping offsite waste to Hanford, including LLW and MLLW (*State of Washington v. Bodman* [Civil No. 2:03-cv-05018-AAM]). In July 2005, while preparing responses to discovery requests from Ecology, Battelle Memorial Institute, DOE's contractor who assisted in preparing the *HSW EIS*, advised DOE of several differences in groundwater analyses between the *HSW EIS* and its underlying data.

DOE promptly notified the court and the State of Washington and, in September 2005, convened a team of DOE experts in quality assurance, groundwater analysis, transportation, and human health and safety impacts analysis to conduct a quality assurance review of the *HSW EIS*. The team completed its *Report of the Review of the "Hanford Solid Waste Environmental Impact Statement (EIS)" Data Quality, Control and Management Issues (Quality Review)* in January 2006 (DOE 2006a). DOE, Ecology, and the Washington State Attorney General's Office signed a Settlement Agreement ending the NEPA litigation on January 6, 2006, which is intended to resolve Ecology's concerns about the *HSW EIS* groundwater analyses and to address other concerns about the *HSW EIS* that were identified in the *Quality Review*.

The agreement called for expanding the "Tank Closure EIS" to provide a single, integrated set of analyses that includes all waste types analyzed in the *HSW EIS* (LLW, MLLW, and TRU waste), which is now this *Draft TC & WM EIS*. Under the agreement, pending finalization of the *TC & WM EIS*, the *HSW EIS* remains in effect to support ongoing waste management activities at Hanford (including transportation of TRU waste to WIPP) in accordance with applicable regulatory requirements. The agreement also stipulates that, when the *TC & WM EIS* has been completed, it will supersede the *HSW EIS*. Until that time, DOE will not rely on *HSW EIS* groundwater analyses for decisionmaking and will not import offsite waste to Hanford, apart from certain limited exemptions specified in the agreement.

The agencies subsequently revised the original Memorandum of Understanding for the "Tank Closure EIS," effective March 25, 2003 (DOE and Ecology 2003) which identified Ecology as a cooperating agency in the preparation of this *TC & WM EIS*. The Memorandum of Understanding revision, signed January 6, 2006 (DOE and Ecology 2006), is consistent with the Settlement Agreement and provides for Ecology's continuing participation as a cooperating agency in preparing this *TC & WM EIS* to assist both agencies in meeting their respective responsibilities under NEPA and Washington's SEPA.

For example, concerning closure of the SSTs, Ecology regulates Hanford's tank systems under the provisions of WAC 173-303-640; specifically, that regulation requires DOE to close the tank system per WAC 173-303-640(8)(a). If DOE cannot clean-close the tanks per this regulation, then DOE must perform postclosure care to meet the WAC 173-303-665(6) requirements for closure and postclosure that apply to landfills. Ecology and DOE agreed that this *TC & WM EIS* would include alternatives for clean closure and landfill closure that would address the environmental impacts of either choice. If Ecology finds that the *Final TC & WM EIS* meets the criteria in the WAC 197-11 SEPA regulations, then Ecology may adopt the document in whole or in part. Ecology may then use this *TC & WM EIS* to satisfy its need to review any Hanford tank systems permit applications or modifications, including closure and postclosure plans, for their significant environmental impacts.

1.3 PURPOSE AND NEED FOR AGENCY ACTION

DOE needs to take action to accomplish the following objectives:

- Safely retrieve and treat radioactive, hazardous, and mixed tank waste; close the SST system; and store and/or dispose of the waste generated from these activities at Hanford. Further, DOE needs to treat the waste and close the SST system in a manner that complies with Federal and applicable Washington State laws and DOE directives to protect human health and the environment. Long-term actions are required to permanently reduce the risk to human health and the environment posed by waste in the 149 SSTs and 28 DSTs.

An environmental impact statement does not constitute a decision; rather, it is one of several sources of information that decisionmakers consider in making a decision on a proposed action. The final step in the National Environmental Policy Act process is issuing a Record of Decision (ROD), or possibly a series of RODs, to record a Federal agency's decision concerning a proposed action for which the agency has prepared an environmental impact statement. Decisions stated in a ROD sometimes may be broad in nature. Such decisions enable subsequent, more-detailed activities to move forward through implementing documents. Examples of implementing documents at Hanford include the Hanford Federal Facility Agreement and Consent Order (also known as the Tri-Party Agreement) milestones, closure plans, permit applications, contracts, and funding requests.

- Decommission FFTF and its support facilities at Hanford, manage waste associated with decommissioning the facilities, and manage disposition of the radioactively contaminated bulk sodium inventory at Hanford. These actions are necessary to facilitate cleanup at Hanford consistent with decisions reached by DOE as a result of previous NEPA reviews (DOE 1995a, 2000a; 66 FR 7877) and to comply with Federal, state, and local laws and regulations.

- Expand or upgrade existing waste treatment, storage, and disposal capacity at Hanford to support ongoing and planned waste management activities for on- and offsite waste. Some tank waste, LLW, and MLLW at Hanford, including waste resulting from FFTF decommissioning and waste from other DOE sites that do not have appropriate facilities, must be disposed of to facilitate cleanup of Hanford and other DOE sites.

1.4 DECISIONS AND REGULATORY FRAMEWORK

In support of the proposed actions to retrieve, treat, and dispose of tank waste; decommission FFTF; and expand waste disposal capacity at Hanford to provide disposal of on- and offsite waste, this EIS will support several decisions that DOE has to make related to the ORP mission. These potential decisions are outlined below.

1.4.1 Decisions to Be Made

- Storage of Tank Waste. Tank farm waste storage would be required under each of the Tank Closure alternatives evaluated in this *TC & WM EIS*. However, different lengths of time are considered, depending on the alternative. This EIS evaluates the construction and operation of waste transfer infrastructures, including waste receiver facilities (WRFs), which are below-grade storage and minimal waste treatment facilities; waste transfer line upgrades; and additional or replacement DSTs. This EIS also evaluates various waste storage facilities to manage the treated tank waste and the waste associated with closure activities. This includes construction and operation of additional immobilized high-level radioactive waste (IHLW) storage vaults, melter pads, TRU waste storage facilities, and ILAW storage facilities. This EIS also provides environmental impact information to assist in making informed decisions regarding continued storage of tank waste and storage to support treatment and disposal activities.

- Retrieval of Tank Waste. This *TC & WM EIS* evaluates various retrieval technologies and benchmarks. The four waste retrieval benchmarks considered are 0 percent, 90 percent, 99 percent, and 99.9 percent. These retrieval percentages address various aspects related to retrieval levels or activities. The 0 percent retrieval benchmark represents the No Action Alternative, which is required to be evaluated as part of the NEPA process; 90 percent retrieval represents a programmatic risk analysis for the tank farms as defined by Appendix H of the TPA, "Single Shell Tank Waste Retrieval Criteria Procedure"; 99 percent retrieval is the goal established by the TPA (Milestone M-45-00); and 99.9 percent retrieval reflects multiple uses of retrieval technologies to support clean closure requirements.

- Treatment of Tank Waste. Additional waste treatment capability can be achieved by building new treatment facilities that are either part of or separate from the WTP. DOE could also complete treatment sometime after 2028 by extending the current WTP operating period until all the waste is treated without supplemental treatment. The two primary choices that would comply with DOE's commitments are to treat all the waste in an expanded WTP or to provide supplemental treatment in conjunction with, but separate from, the WTP. DOE has conducted preliminary tests on three supplemental treatment technologies to determine whether one or more could be used to provide the additional capability needed to complete waste treatment. The decision of whether to treat all the waste in the WTP (as is or expanded) or to supplement its capacity by adding new treatment capability depends on the demonstration of supplemental treatment technology feasibility. (See Appendix E for more information on supplemental treatment.)

- Disposal of Treated Tank Waste. This *TC & WM EIS* addresses on- and offsite disposal, depending on the waste type. Onsite disposal includes disposal of treated tank waste and waste generated from closure activities that meet onsite disposal criteria. The decision to be made involves the onsite location of disposal facilities, specifically, one or two IDFs, which would manage treated tank waste, and the River Protection Project Disposal Facility (RPPDF), which would manage closure activity waste. This EIS will provide the environmental impact information needed to make informed decisions on tank waste that could be classified as TRU waste for disposal. Offsite disposal of tank waste determined to be TRU waste would occur at WIPP.

- Closure of the SST System. This *TC & WM EIS* addresses closure of the SST system under all Tank Closure alternatives except Tank Closure Alternatives 1 and 2A. Although DOE is committed to retrieving at least 99 percent of the waste, consistent with the TPA, the range of potential impacts in the cases considered includes the potential impacts of residual waste left in the tanks at different retrieval benchmarks (0, 90, 99, and 99.9 percent). Several types of closure

scenarios are also evaluated: clean closure, selective clean closure/landfill closure, and landfill closure with or without contaminated soil removal. In addition, two structurally different landfill barriers—an engineered modified RCRA Subtitle C barrier and a Hanford barrier—are considered to determine the effectiveness of the natural and engineered defense-in-depth barriers in minimizing any transport of waste over the long timeframes of interest. (See Appendix E for information on these two barriers.)

- Disposal of Hanford Waste and Offsite DOE LLW and MLLW. The decision to be made concerns the onsite location of disposal facilities for Hanford's waste and other DOE sites' LLW and MLLW. DOE committed in the *HSW EIS* ROD to disposing of LLW in lined trenches. Thus, the decision is whether to dispose of waste at IDF-East or at a new IDF located in the 200-West Area (IDF-West).

- Final Decommissioning of FFTF. This decision would determine the end state for FFTF's aboveground, belowground, and ancillary support structures.

This EIS is the next step in the process to close the tank farm waste management system, decommission FFTF, and expand waste management and disposal capacity at Hanford. The information provided in this EIS will be used both to identify a preferred alternative and to support (along with other data sources) future decisions regarding waste treatment and tank closure, FFTF decommissioning, and waste management and disposal capacity expansion. Public participation will continue throughout this process. Decisions based on the data presented in this EIS will be documented in a ROD or a series of RODs no sooner than 30 days after EPA's notice of the availability of the *Final TC & WM EIS* is published in the *Federal Register*. All project work resulting from the ROD that pertains to waste storage, treatment, or disposal facilities must undergo a permitting process with Ecology. Permit conditions will specify the safe handling and storage of the waste forms and will ensure any process air or liquid discharges are within regulatory limits. This permitting process offers additional opportunity for public input.

1.4.2 Decisions Not to Be Made

DOE will not make decisions on the following as part of this NEPA process:

- DST Closure. A closure configuration for the original 28 DSTs was evaluated in this EIS for engineering reasons related to the closure barrier placement. However, a decision on closure of DSTs is not part of the proposed actions because the DSTs are active components needed to complete waste treatment. Closure of the DSTs would need to be addressed at a later date subject to appropriate NEPA review.

- WTP Closure. The WTP is currently under construction in the 200-East Area of Hanford. As such, construction (and subsequent operations and deactivation) of the WTP from 2006 onward was analyzed under each Tank Closure alternative to establish a common reference point for use in comparing alternatives. However, closure of the WTP is not part of the proposed actions because it is a facility needed to complete waste treatment. Closure of the WTP would need to be addressed at a later date subject to appropriate NEPA review.

- Groundwater Remediation. Remediation of contaminated groundwater operable units is not part of the proposed actions for this EIS. Groundwater contamination in the non-tank-farm 200 Areas is being addressed under CERCLA, which will also satisfy substantive RCRA and Hazardous Waste Management Act corrective action requirements. NEPA values are integrated into the CERCLA analyses. However, contamination in the vadose zone resulting from tank farm past leaks is currently being evaluated under the RCRA facility investigation and corrective measures study process. Therefore, the vadose zone in the tank farms is part of an RCRA unit and is not

included in the CERCLA groundwater operable unit. As a result, the vadose zone as impacted by the tank farms is part of this *TC & WM EIS* scope.

- CERCLA Past-Practice Units. There are six sets of cribs and trenches (ditches) that are contiguous to the SSTs and would fall under the barriers placed over the SSTs during closure. They are evaluated in this EIS as part of a connected action because they would be influenced by barrier placement. However, closure of these CERCLA past-practice units is not part of the proposed actions for this EIS. Closure of these units would be addressed at a later date subject to appropriate NEPA review.

- Deactivation of FFTF. DOE does not intend to make any further decisions regarding deactivation of FFTF as a result of this EIS. Based on previous NEPA reviews (DOE 1995a, 2000a, 2006b), DOE decided to shut down and deactivate FFTF. Deactivation of FFTF as evaluated in those reviews consists of the following:

  - Removing fuel from the facilities
  - Storing fuel in either the 400 Area or the 200 Areas
  - Draining metallic sodium from the reactor cooling systems and support facilities
  - Storing metallic sodium from FFTF in the 400 Area
  - Removing and disposing of some radioactive and chemically hazardous materials
  - Deactivating plant systems as they are no longer required for safe operation
  - Placing the remaining plant systems in a radiologically and industrially safe condition for long-term surveillance and maintenance
  - Removal and packaging of the four RH-SCs for storage in the 400 Area

- Disposition of the Cesium and Strontium Capsules. Treatment of the cesium and strontium capsules, which are currently stored at the Waste Encapsulation and Storage Facility (WESF), is evaluated in this EIS based on the existing TPA milestone; however, the decision on final disposition of the cesium and strontium capsules will be determined at a later date subject to appropriate NEPA review.

- HLW Transportation and Disposition. The scope of this *TC & WM EIS* does not include making a decision on the ultimate disposition of HLW and transportation related to such disposition. The *TWRS EIS* ROD to treat the Hanford tank waste has not changed. Funding for the Yucca Mountain facility has been eliminated in the Administration's fiscal year 2010 budget request. Notwithstanding the decision to terminate the Yucca Mountain program, which was the development of a geologic repository for the disposal of HLW and SNF, DOE remains committed to meeting its obligations to manage and ultimately dispose of HLW and SNF. The Administration intends to convene a blue ribbon panel of experts to evaluate alternative approaches for meeting these obligations. Decisions reached through this process will need to be addressed at a later date subject to appropriate NEPA review.

1.5 SCOPING PROCESS AND DEVELOPMENT OF THE *DRAFT TC & WM EIS* ALTERNATIVES

Scoping is a process in which the public, regulators, and other interested parties provide comments directly to a Federal agency on the scope of an EIS. This process is initiated by publication of the NOI in the *Federal Register*. The NOI for this *TC & WM EIS* (71 FR 5655) was published on February 2, 2006. The NOI, as published, is provided in Appendix A of this document.

The NOI identified a set of preliminary alternatives that were presented to the public, regulators, and other interested parties for comment. The set included a No Action Alternative and a representative number of other alternatives to ensure analysis of the range of reasonable alternatives for waste treatment and tank closure, FFTF decommissioning, and waste management to assist in the decisionmaking process. Information collected from the NEPA scoping process was used to modify the scope of this *Draft TC & WM EIS*, as appropriate.

Ongoing dialogue with the public will continue as the *Draft TC & WM EIS* undergoes public review and comment (see Figure 1–1). A 140-day comment period will begin when EPA publishes a Notice of Availability in the *Federal Register*. Public hearings will be held during the comment period.

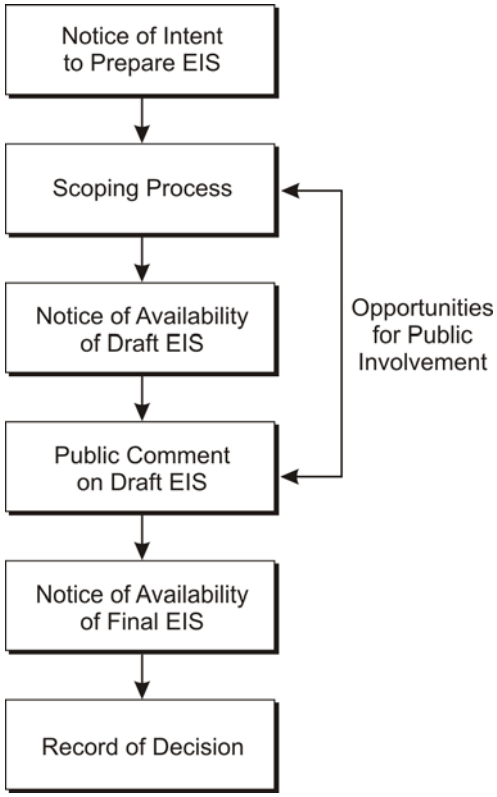

Figure 1–1. National Environmental Policy Act Process

1.6 PUBLIC COMMENTS ON THE PROPOSED *TC & WM EIS* SCOPE

The NOI to prepare this *TC & WM EIS* (71 FR 5655) initiated a 30-day scoping period that ended March 6, 2006. A later notice (71 FR 8569) extended the scoping period to April 10, 2006. In the NOI, DOE requested public comment on the proposed scope for the new *TC & WM EIS*. A number of ways to submit public comments were provided, including standard mail, electronic mail, fax, voicemail, and oral or written comments presented at formal public meetings. As stated in the NOI for this *TC & WM EIS*, DOE considered the comments previously submitted in response to the 2003 NOI for the "Tank Closure EIS" (68 FR 1052) and the 2004 NOI for the "Environmental Impact Statement for the Decommissioning of the Fast Flux Test Facility at the Hanford Site, Richland, Washington" ("FFTF Decommissioning EIS") (69 FR 50176). Section 1.6.1 discusses the *TC & WM EIS* scoping process and the comments received. Sections 1.6.2 and 1.6.3 similarly discuss the "Tank Closure EIS" and "FFTF Decommissioning EIS" scoping processes and comments, respectively.

1.6.1 Public Meetings and Issues Identified During the *TC & WM EIS* Scoping Process

1.6.1.1 Public Meetings

DOE and Ecology, a cooperating agency, conducted four public meetings on the proposed scope of this *TC & WM EIS* at the following locations:

Seattle, Washington	March 21, 2006
Portland, Oregon	March 22, 2006
Hood River, Oregon	March 23, 2006
Tri-Cities, Washington	March 28, 2006

1.6.1.2 Issues Identified During the *TC & WM EIS* Scoping Process

As a result of the public scoping meeting and comment process, DOE considered each of the comments received and made corresponding changes to the alternatives as appropriate. DOE received comments from approximately 150 commentors during the *TC & WM EIS* scoping period. The issues presented below reflect the key concerns expressed by these commentors:

Issue: *DOE must do everything possible to avoid and/or mitigate contamination of the Columbia River and regional groundwater supplies due to the proposed actions.*

Response: This *TC & WM EIS* incorporates several mitigation measures into the proposed alternatives, including engineered barriers, contaminated soil removal, and waste treatment. This *TC & WM EIS* also explores other potential mitigation measures that could be pursued based on specific concerns.

Issue: *Complete Hanford waste cleanup activities as soon as possible, including removing both the waste and the tanks, as well as the waste currently buried in existing disposal facilities.*

Response: Retrieval of waste from the SSTs has been completed for seven tanks to date and is ongoing. The WTP is currently under construction to treat the tank waste. Removal of waste buried in existing disposal facilities is considered either as part of the alternatives or in the cumulative impacts section analyzed in this *TC & WM EIS*, depending on the waste stream.

Issue: *DOE should not consider an alternative for retrieving less than 99 percent of the tank waste, consistent with the TPA.*

Response: One *TC & WM EIS* alternative addresses a retrieval goal of 90 percent, less than the TPA Milestone M-45-00 minimum goal of 99 percent. Retrieval to 90 percent represents a range depicting the potential programmatic risk analysis process for the tank farms as defined by Appendix H of the TPA, "Single Shell Tank Waste Retrieval Criteria Procedure." This alternative evaluates the potential impacts that could occur from implementing that process. To date, Ecology and DOE have initiated the Appendix H process for one tank, 241-C-106.

Issue: *DOE needs more extensive, detailed data to complete this EIS; characterization data for all waste types is particularly lacking.*

Response: Both DOE and Ecology believe there is sufficient characterization information to support this *TC & WM EIS*. The goal of NEPA is to complete an impact analysis to support decisions that an agency needs to make related to a proposed Federal or state (in the case of Washington's SEPA) action early enough in the process to be useful. Additional

information may be necessary before a final permit decision can be issued. This *TC & WM EIS* describes uncertainties in the analysis of potential impacts.

Issue: *Preserve FFTF for potential future uses such as medical isotope production.*

Response: FFTF is not being considered for medical isotope production at this time. DOE has previously weighed FFTF's potential use in other applications (DOE 2000a; 72 FR 331). There is currently no proposed use. Irrespective of any proposed use, DOE needs to determine an appropriate end state for FFTF.

Issue: *Don't import waste from elsewhere to Hanford.*

Response: DOE is currently evaluating the potential for disposal of 62,000 cubic meters (81,000 cubic yards) of LLW and 20,000 cubic meters (26,000 cubic yards) of MLLW at Hanford. This is the amount identified in the Settlement Agreement for disposal at Hanford.

Issue: *DOE should ensure that independent experts provide objective oversight, analysis, and review throughout the EIS preparation process.*

Response: Throughout the EIS preparation process, DOE has coordinated and consulted, as appropriate, with the U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, U.S. Advisory Council on Historic Preservation, American Indian tribes, and local agencies on matters within their technical expertise. In addition, a technical review group was formed to evaluate the conversion of the groundwater model from the previous models used on site to MODFLOW [modular three-dimensional finite-difference groundwater flow model]. This review group process is identified in Appendix L of this *TC & WM EIS*.

Issue: *DOE should address health risks to Hanford workers and the public from the proposed actions.*

Response: This *TC & WM EIS* addresses human health risks to workers and the public from actions proposed under the alternatives.

1.6.2 Public Meetings and Issues Identified During the "Tank Closure EIS" Scoping Process

The NOI to prepare the "Tank Closure EIS" (68 FR 1052) initiated a 60-day scoping period that ended March 10, 2003. In the NOI, DOE requested public comment and input on the proposed scope and the alternatives. A number of opportunities to submit public comments were provided, including standard mail, electronic mail, fax, voicemail, and oral or written comments presented at formal public meetings.

1.6.2.1 Public Meetings

DOE conducted four public meetings on the proposed "Tank Closure EIS" scope. Meetings were held at the following locations:

Richland, Washington	February 5, 2003
Hood River, Oregon	February 18, 2003
Portland, Oregon	February 19, 2003
Seattle, Washington	February 20, 2003

The public meetings were facilitated; DOE introduced the proposed activities, and Ecology and EPA were invited to make opening statements, as were a number of public interest groups. A court reporter and tape recorder captured the oral comments. In addition, DOE collected written comments.

1.6.2.2 Issues Identified During the "Tank Closure EIS" Scoping Process

DOE considered all comments received during the "Tank Closure EIS" public scoping period and made changes to the alternatives. The comments summarized below represent those that impacted a major component of the scope of an alternative.

Issue: *The alternatives are too complicated to understand and the titles need clarification.*

Response: Alternative titles and descriptions were clarified and, where possible, alternative descriptions were simplified. However, the multitude and combinations of retrieval/treatment/disposal/closure options make this an inherently complex assessment. For this reason, DOE prepared a Reader's Guide to help readers navigate the document.

Issue*:* *The proposed "No Action" alternative is not an accurate portrayal of what is typically considered as a "no action."*

Response: In CEQ's "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (46 FR 18026), two types of No Action Alternative are allowed. In one case, work is stopped and impacts are evaluated. In the second case, ongoing activities are evaluated as a "no change" and continuation of the present course of action.

In this EIS, DOE has chosen to show both types of no action. Under Tank Closure Alternative 1, the work would be stopped and impacts would be evaluated. Under Tank Closure Alternative 2A, DOE would evaluate retrieval from the tanks and treatment through the WTP, in accordance with the *TWRS EIS* ROD with modifications.

Issue: *No alternative is provided to address tank closure with the current all-vitrification waste treatment plans.*

Response: Tank Closure Alternative 2A retained implementation of the 1997 *TWRS EIS* ROD to address the current vitrification capacity of the existing WTP, which is currently under construction (i.e., Existing WTP Vitrification; No Closure).

Tank Closure Alternative 2B was developed to address an expanded LAW vitrification capacity for the existing WTP, which would provide vitrification of all tank waste, and to add a landfill closure of the SST system (i.e., Implement the *Tank Waste Remediation System EIS* Record of Decision with Modifications – Expanded WTP Vitrification; Landfill Closure).

Issue: *DOE is proposing to minimize the use of the WTP for tank waste treatment.*

Response: DOE is committed to completing construction of the WTP and operating the facility to vitrify all of the tank HLW and a portion of the LAW. Supplemental treatment technologies for LAW are part of the scope of this *TC & WM EIS*.

Issue: *DOE should stay the course on vitrifying all tank waste.*

Response: See previous response. With respect to the portion of the LAW that may not be treated in the WTP, DOE is evaluating supplemental treatment (supplemental to the WTP) for that

waste. This *TC & WM EIS* evaluates whether completing treatment of this waste with supplemental technologies faster could result in decreased impacts on the public and environment.

Issue: *None of the action alternatives address the possibility that separation of waste into HLW and LAW constituents may not be allowed under DOE directives.*

Response: Tank Closure Alternative 6A was created to address a scenario where separation of the tank waste into HLW and LAW components is not performed. Alternatives 6B and 6C were created to implement the current vitrification facility, supplemented with additional vitrification capacity. Under all three subalternatives, treated waste would be managed as HLW.

Issue: *Technetium-99, with its very long half-life, would impact the groundwater and Columbia River if allowed to remain in the ILAW disposed of at Hanford.*

Response: This *TC & WM EIS* evaluates the impacts on the groundwater and Columbia River resources of various waste treatment and disposal scenarios related to technetium-99. Projected impacts will be considered in making the decisions discussed in Section 1.4 of this document.

Issue: *Nuclear waste residuals would be abandoned inside the tanks and would impact the environment in the future.*

Response: NEPA requires consideration of all reasonable alternatives in EISs, as well as "no action," which serves as a baseline for comparison among alternatives. The No Action Alternative may not always be a reasonable alternative. To satisfy this requirement, DOE is evaluating the impacts of a range of waste retrieval benchmarks. The benchmarks considered are 0 percent of the tank volume (No Action Alternative), 90 percent, 99 percent, and 99.9 percent.

Issue: *Not enough information is available on supplemental treatment technology performance to make any decisions.*

Response: DOE is in the process of collecting available information on supplemental treatment technologies and is also funding additional studies where information gaps exist. Consistent with CEQ regulations, early evaluation is encouraged in an agency's planning process, when all information may not be available.

Issue: *Grout, or any similar waste form, does not have acceptable long-term performance.*

Response: DOE chose cast stone as a candidate nonthermal treatment technology to represent a lower-performing waste form for this assessment. WTP vitrification, bulk vitrification, and steam reforming were selected to represent a range of thermal waste form performance. The impacts of this treatment technology performance range will be considered in the decisions discussed in Section 1.4.

Issue: *Tank Closure alternatives are either landfill for all or total removal of all—no graded approach is considered.*

Response: Tank Closure Alternative 4 was revised to include selective clean closure of the BX tank farm (200-East Area) and SX tank farm (200-West Area) as representative tank farms and

landfill closure of the remaining tank farms. The range of closure alternatives represents landfill closure, selective clean closure, and clean closure.

Issue: *This process is being rushed. There is no driver for addressing closure at this time.*

Response: DOE needs to begin specific planning actions to treat the tank waste and to close the SST system. These actions are necessary to protect human health and the environment and to comply with several enforceable milestones in the TPA, specifically Milestone M-45-00, which requires complete closure of the SST system by September 30, 2024, and Milestone M-62-00, which requires completion of vitrification treatment of tank HLW and LAW by December 1, 2028.

1.6.3 Public Meetings and Issues Identified During the "FFTF Decommissioning EIS" Scoping Process

The NOI to prepare the "FFTF Decommissioning EIS" (69 FR 50176) initiated a 56-day scoping period that ended October 8, 2004. In the NOI, DOE requested public comment and input on the proposed scope and the alternatives. A number of opportunities to submit public comments were provided, including standard mail, electronic mail, fax, voicemail, and oral or written comments presented at formal public meetings.

1.6.3.1 Public Meetings

The NOI announced the schedule for the public scoping process and summarized the alternatives to be considered in the "FFTF Decommissioning EIS." Two scoping meetings were held at the following locations and dates:

Richland, Washington	September 22, 2004
Idaho Falls, Idaho	September 30, 2004

Opportunities were provided at each meeting for informal discussion, as well as formal comments, regarding DOE's proposed actions and the scope and content of the "FFTF Decommissioning EIS." Both oral and written comments were received at the public scoping meetings. Written comments were also accepted by conventional and electronic mail. All written and oral comments were considered in preparing this *TC & WM EIS*. Commentors provided comments on several topics, including additional alternatives and activities, waste management issues, transportation, and environmental consequences.

1.6.3.2 Issues Identified During the "FFTF Decommissioning EIS" Scoping Process

The following is a brief summary of the oral and written comments received by DOE during the "FFTF Decommissioning EIS" scoping period. DOE considered all comments received and made changes to the alternatives as appropriate.

Issue: *The EIS should evaluate each of the proposed alternatives, including suboptions, in a way that is complete and detailed. In particular, the alternative discussion should include a full evaluation of how each alternative would be implemented from beginning to end. The evaluation should include a full analysis of all impacts, including all impacts associated with transportation, handling, storage, and treatment of radioactive and hazardous materials; a detailed explanation of the workforce requirements; and a complete description of the ultimate disposal for all waste, including residuals. The information should be presented in a comparative format that will allow stakeholders to evaluate each alternative relative to the others.*

Response: This *Draft TC & WM EIS* provides a full evaluation of each alternative. It includes impacts associated with transportation, handling, storage, and treatment of radioactive and hazardous materials; details on the workforce requirements; and a complete description of the ultimate disposition of waste, including residuals. These impacts are discussed in Chapters 4 and 5 of this draft EIS. A comparison of the alternatives is provided in Chapter 4, Section 4.4, of this draft EIS for short-term impacts and in Chapter 5, Section 5.4, for long-term impacts. In addition, Chapter 2, Section 2.8, summarizes the short-term environmental impacts, and Section 2.9 summarizes the long-term impacts.

***Issue**: DOE should evaluate the environmental impacts of building a new facility at Hanford equivalent to the existing Sodium Processing Facility (SPF) at the MFC at INL. In particular, the cost savings and reduced risks caused by eliminating the need for transportation to INL should be evaluated.*

Response: This *Draft TC & WM EIS* provides options for the processing of bulk sodium at both the MFC (the Idaho Reuse Option) and Hanford. The Hanford Reuse Option would involve construction and operation of a new facility and eliminate the need for transportation to the INL's MFC.

***Issue:** DOE should evaluate the environmental impacts of construction and operation of a new facility at Hanford equivalent to the proposed Remote Treatment Project (RTP) at the MFC.*

Response: This *Draft TC & WM EIS* provides options for treating RH-SCs at both the MFC and Hanford. The Hanford Option would involve construction and operation of a new facility and eliminate the need for transportation to INL's MFC.

***Issue:** This EIS should include a Greenfield alternative that evaluates removal of all contaminated structures and equipment from the 400 Area. Cleanup should not result in a new waste site in the Hanford 400 Area that would require maintenance and monitoring for the foreseeable future.*

Response: FFTF Decommissioning Alternative 3: Removal is an alternative that looks at the (1) removal of all contaminated equipment while leaving small amounts of radioactivity in underground structures and (2) implementation of appropriate postclosure care, which may lead to unrestricted use of the site.

***Issue**: The No Action Alternative is clearly dangerous and should not be included as a reasonable alternative.*

Response: NEPA requires consideration of all reasonable alternatives in EISs, as well as "no action," which serves as a baseline for comparison among alternatives. The No Action Alternative may not always be a reasonable alternative. To satisfy this requirement, under the No Action Alternative, DOE is evaluating the impacts of completing only those actions consistent with previous DOE NEPA decisions. Final decommissioning would not occur. The site would be maintained under administrative control for 100 years following the ROD.

***Issue**: This draft EIS should evaluate all impacts of transportation associated with the radioactive sodium (in liquid and solid form), reactor components, and sodium-bonded SNF that would be shipped to the MFC for treatment, including estimates of the volumes and characteristics of all radioactive and hazardous materials and waste that would be produced at the MFC as a result of treatment of the incoming materials and waste.*

Response: This *Draft TC & WM EIS* evaluates the transportation impacts associated with the bulk sodium and the RH-SCs being considered for shipment to the MFC for processing or treatment. The impacts associated with these actions are provided in Chapter 4 of this draft EIS. In previous NEPA reviews, DOE evaluated transportation and storage of FFTF fuel at either Hanford or INL (formerly INEEL) (DOE 1995a, 1995b, 1997d); transportation and treatment of FFTF sodium-bonded fuel at INL's MFC (formerly ANL-W) (DOE 1995a, 2000b); storage and possible disposal or commercial use of surplus plutonium (including a small quantity of nonirradiated FFTF fuel) (DOE 1999a); and transportation and disposal of SNF and HLW at a geologic repository (DOE 2002a, 2008a). Ongoing activities associated with management of the FFTF fuel are not evaluated in this *Draft TC & WM EIS.*

Issue: *This EIS should consider alternatives that are economically sound and efficient.*

Response: Chapter 2, Section 2.11, of this *Draft TC & WM EIS* summarizes and compares the relative costs of the alternatives.

Issue: *This EIS should consider the effects of decommissioning activities on adjacent Hanford facilities and their programs. The Laser Interferometer Gravitational-Wave Observatory research facility is in close proximity to FFTF and is highly sensitive to vibration.*

Response: Chapter 6 of this *Draft TC & WM EIS* provides an analysis of the impacts on other Hanford activities, including the Laser Interferometer Gravitational-Wave Observatory.

Issue: *DOE is not complying with the spirit or the letter of the NEPA regulations in preparing the "FFTF Decommissioning EIS." The distinction between deactivation and decommissioning, as well as irreversible versus reversible actions, is unclear.*

Response: Chapter 1, Section 1.2.5, of this *Draft TC & WM EIS* provides a discussion of deactivation of FFTF, including the court decision in the Benton County case against DOE. Chapter 2, Section 2.3, of this *Draft TC & WM EIS* provides a discussion on the deactivation activities addressed by the *Environmental Assessment, Sodium Residuals Reaction/Removal and Other Deactivation Work Activities, Fast Flux Test Facility (FFTF) Project, Hanford Site, Richland, Washington* (DOE 2006b) and those proposed decommissioning activities under the scope of this *Draft TC & WM EIS.*

Issue: *This EIS should demonstrate that DOE intends to comply with Federal and state regulations and international (proliferation) and tribal agreements. Transportation and training agreements are not fully addressed.*

Response: Chapter 8 of this *Draft TC & WM EIS* discusses the Federal and state regulations that may be applicable to the proposed actions and consultations with tribes.

Issue: *FFTF should be preserved for various future missions. The decision to shut down FFTF is politically driven; political pressure may yet be able to reverse the process. FFTF should not be decommissioned.*

Response: Based on previous NEPA reviews (DOE 1995a, 2000a, 2006b), DOE decided to shut down and deactivate FFTF. DOE does not intend to make any further decisions regarding deactivation of FFTF.

1.7 ALTERNATIVES EVALUATED IN THIS *DRAFT TC & WM EIS*

1.7.1 Tank Closure Alternatives

DOE's review of the public's, regulators', and other interested parties' comments generated during the scoping process determined that revision of the proposed alternatives for tank closure was needed. In response to the comments, DOE modified the proposed alternatives as presented in the sections below. More-detailed discussions of the proposed alternatives are provided in Chapter 2.

In creating and modifying the alternatives, emphasis was placed on including all reasonable waste storage, retrieval, treatment, disposal, and tank closure components that could be selected. The goal was to give the public and decisionmakers sufficient information about each candidate component and allow maximum flexibility in selecting the technologies, methods, time periods, and locations of the treatment and closure activities. Developing alternatives that could be selected in their entirety was not a primary goal. Therefore, the alternatives described in this section and evaluated in the balance of this EIS are combinations of the treatment and closure decision options under consideration.

1.7.1.1 Tank Closure Alternative 1: No Action

In CEQ's "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (46 FR 18026), two types of No Action Alternative are allowed. In one case, work is stopped and impacts are evaluated. In the second case, ongoing activities are evaluated as a "no change" and continuation of the present course of action.

In this EIS, DOE has chosen to show both types of no action. Under this alternative, the work would be stopped and impacts would be evaluated. Under Tank Closure Alternative 2A, DOE would evaluate retrieval from the tanks and treatment through the WTP, in accordance with the *TWRS EIS* ROD.

Storage: DOE would continue to store and monitor waste in the SSTs and DSTs for 100 years. Tanks showing signs of deterioration affecting their structural integrity would be filled with grout or gravel as a corrective action or emergency response. The cesium and strontium capsules would remain in storage in the WESF.

Retrieval: Waste from the tanks would not be retrieved.

Treatment: No vitrification or treatment capacity would be built after 2008. The existing WTP construction would be terminated, and the WTP site would be isolated pending some future use, if any. No ILAW or IHLW would be produced.

Disposal: The waste in the SST and DST systems would remain in the tank farm indefinitely.

Closure: Tank closure would not be addressed under this alternative. DOE would maintain security and management of the site for a 100-year administrative control period (ending in 2107). During this period, DOE would continue to store and conduct routine monitoring of the waste in the SSTs, DSTs, and miscellaneous underground storage tanks.

1.7.1.2 Tank Closure Alternative 2: Implement the *Tank Waste Remediation System EIS* Record of Decision with Modifications

This alternative consists of two subalternatives: (1) Tank Closure Alternative 2A: Existing WTP Vitrification; No Closure and (2) Tank Closure Alternative 2B: Expanded WTP Vitrification; Landfill Closure. It represents the implementation of decisions made in the *TWRS EIS* ROD and considered in three SAs completed through 2001. Under this alternative, all waste retrieved from the tanks would be vitrified, resulting in either an ILAW or IHLW glass product.

Storage Under Tank Closure Alternative 2A: DOE would continue current waste management operations using existing tank storage facilities. Because all the DSTs will exceed their 40-year design life during the approximate 80-year period of waste retrieval, they would be replaced in a phased manner through 2054.

Storage Under Tank Closure Alternative 2B: DOE would continue current waste management operations using existing tank storage facilities. No new DSTs would be required, but four new WRFs, which are below-grade lag storage and minimal waste treatment facilities, would be constructed.

Retrieval Under Tank Closure Alternatives 2A and 2B: Using currently available liquid-based waste retrieval and leak detection systems, waste would be retrieved to the TPA minimum goal, i.e., residual waste would not exceed 10.2 cubic meters (360 cubic feet) for 100-series tanks or 0.85 cubic meters (30 cubic feet) for the smaller 200-series tanks, corresponding to 99 percent retrieval.

Treatment Under Tank Closure Alternative 2A: The existing WTP configuration (two HLW melters and two LAW melters) would operate at a theoretical maximum capacity (TMC) of 6 metric tons of glass IHLW per day and 30 metric tons of glass ILAW per day. Treatment would start in 2018, and both HLW and LAW treatment would end in 2093. All the waste streams routed to the WTP would be pretreated, although technetium-99 removal would not occur. For analysis purposes, it was assumed that the WTP would need to be replaced after 60 years. No supplemental or TRU waste treatment is proposed. The cesium and strontium capsules would be retrieved from the WESF, de-encapsulated, and treated in the WTP.

Treatment Under Tank Closure Alternative 2B: The existing WTP configuration (two HLW melters and two LAW melters) would be supplemented with expanded LAW vitrification capacity (an addition of four LAW melters) to provide a vitrification TMC of 6 metric tons of glass IHLW per day and 90 metric tons of glass ILAW per day. Treatment would start in 2018 and end in approximately 2040 (for HLW) and 2043 (for LAW). All the waste streams routed to the WTP would be pretreated, including technetium-99 removal from the LAW stream. No facilities would need to be replaced. No supplemental or TRU waste treatment is proposed. The cesium and strontium capsules would be retrieved from the WESF, de-encapsulated, and treated in the WTP.

Disposal Under Tank Closure Alternatives 2A and 2B: LAW immobilized via the WTP would be disposed of on site in an IDF. IHLW would be stored on site until disposition decisions are made and implemented.

Closure Under Tank Closure Alternative 2A: Tank closure would not be addressed under this alternative. For analysis purposes, administrative control of the tank farms would cease following a 100-year period ending in 2193.

Closure Under Tank Closure Alternative 2B: As operations are completed, the SST system at Hanford would be closed as an RCRA hazardous waste landfill unit under WAC 173-303, "Dangerous Waste Regulations," and DOE Order 435.1, as applicable, or decommissioned under DOE Order 430.1B. The tanks and ancillary equipment would be filled with grout to immobilize the residual waste, prevent future

tank subsidence, and discourage intruder access. Soil would be removed down to 4.6 meters (15 feet) for the BX and SX tank farms and replaced with clean soil from onsite sources. The removed contaminated soils and ancillary equipment would be disposed of on site in the RPPDF, a new facility similar to an IDF. The closed tank systems and six sets of adjacent cribs and trenches (ditches) would be covered with an engineered modified RCRA Subtitle C barrier. Postclosure care would continue for 100 years.

1.7.1.3 Tank Closure Alternative 3: Existing WTP Vitrification with Supplemental Treatment Technology; Landfill Closure

This alternative consists of three subalternatives: (1) Tank Closure Alternative 3A: Existing WTP Vitrification with Thermal Supplemental Treatment (Bulk Vitrification); Landfill Closure, (2) Tank Closure Alternative 3B: Existing WTP Vitrification with Nonthermal Supplemental Treatment (Cast Stone); Landfill Closure, and (3) Tank Closure Alternative 3C: Existing WTP Vitrification with Thermal Supplemental Treatment (Steam Reforming); Landfill Closure. These subalternatives involve use of either thermal or nonthermal treatment technology to supplement the WTP treatment. TRU tank waste would be packaged and interim-stored pending shipment to WIPP for disposal.

Storage Under Tank Closure Alternatives 3A, 3B, and 3C: DOE would continue current waste management operations using existing tank storage facilities. No new DSTs would be required, but four new WRFs would be constructed.

Retrieval Under Tank Closure Alternatives 3A, 3B, and 3C: Using currently available liquid-based waste retrieval and leak detection systems, waste would be retrieved to the TPA minimum goal, i.e., residual waste would not exceed 10.2 cubic meters (360 cubic feet) for 100-series tanks or 0.85 cubic meters (30 cubic feet) for the smaller 200-series tanks, corresponding to 99 percent retrieval.

Treatment Under Tank Closure Alternative 3A: The existing WTP configuration (two HLW melters and two LAW melters) would operate at a TMC of 6 metric tons of glass IHLW per day and 30 metric tons of glass ILAW per day. Treatment would start in 2018, and both HLW and LAW treatment would end in approximately 2040. All waste streams routed to the WTP would be pretreated, although technetium-99 removal would not occur as part of WTP pretreatment. WTP capacity would be supplemented with bulk vitrification treatment capacity to immobilize a portion of the LAW. Bulk vitrification supplemental treatment of the LAW would occur in both the 200-East and 200-West Areas. In the 200-East Area, the waste feed would be pretreated in the WTP, excluding technetium-99 removal. In the 200-West Area, the waste feed would be pretreated in a new Solid-Liquid Separations Facility. A separate portion of the tank waste (approximately 11.8 million liters [3.1 million gallons]) would be designated as mixed TRU waste and treated and packaged for disposal at WIPP.[3] The cesium and strontium capsules would be retrieved from the WESF, de-encapsulated, and treated in the WTP.

Treatment Under Tank Closure Alternative 3B: The existing WTP configuration (two HLW melters and two LAW melters) would operate at a TMC of 6 metric tons of glass IHLW per day and 30 metric tons of glass ILAW per day. Treatment would start in 2018, and both HLW and LAW treatment would end in approximately 2040. All waste streams routed to the WTP would be pretreated, including technetium-99 removal from the LAW stream. WTP capacity would be supplemented with cast stone treatment capacity to immobilize a portion of the LAW. Cast stone supplemental treatment of the LAW would occur in both the 200-East and 200-West Areas. In the 200-East Area, the waste feed would be pretreated in the WTP, including technetium-99 removal. In the 200-West Area, the waste feed would be

[3] DOE believes there may be certain HLW storage tanks that it could demonstrate should be classified as TRU waste based on the origin of the waste. This *Draft TC & WM EIS* evaluates the environmental impacts of managing this waste as TRU waste because it assumes the historical processing data support this classification. For Alternatives 3 through 5, this EIS evaluates treating the waste stream associated with the TRU waste portion as both TRU waste and HLW because this waste has not gone through the TRU waste confirmation and certification process.

pretreated in a new Solid-Liquid Separations Facility. A separate portion of the tank waste (approximately 11.8 million liters [3.1 million gallons]) would be designated as mixed TRU waste and packaged for disposal at WIPP. The cesium and strontium capsules would be retrieved from the WESF, de-encapsulated, and treated in the WTP.

Treatment Under Tank Closure Alternative 3C: The existing WTP configuration (two HLW melters and two LAW melters) would operate at a TMC of 6 metric tons of glass IHLW per day and 30 metric tons of glass ILAW per day. Treatment would start in 2018, and both HLW and LAW treatment would end in approximately 2040. All waste streams routed to the WTP would be pretreated, although technetium-99 removal would not occur as part of WTP pretreatment. WTP capacity would be supplemented with steam reforming treatment capacity to immobilize a portion of the LAW. The steam reforming supplemental treatment for the LAW would occur in both the 200-East and 200-West Areas. In the 200-East Area, the waste feed would be pretreated in the WTP, excluding technetium-99 removal. In the 200-West Area, the waste feed would be pretreated in a new Solid-Liquid Separations Facility. A separate portion of the tank waste (approximately 11.8 million liters [3.1 million gallons]) would be designated as mixed TRU waste and treated and packaged for disposal at WIPP. The cesium and strontium capsules would be retrieved from the WESF, de-encapsulated, and treated in the WTP.

Disposal Under Tank Closure Alternatives 3A, 3B, and 3C: LAW immobilized via both the WTP and external to the WTP would be disposed of on site in an IDF. IHLW would be stored on site until disposition decisions are made and implemented. Mixed TRU waste would be stored on site in a new storage facility pending disposal at WIPP.

Closure Under Tank Closure Alternatives 3A, 3B, and 3C: As operations are completed, the SST system at Hanford would be closed as an RCRA hazardous waste landfill unit under WAC 173-303, "Dangerous Waste Regulations," and DOE Order 435.1, as applicable, or decommissioned under DOE Order 430.1B. The tanks and ancillary equipment would be filled with grout to immobilize the residual waste, prevent future tank subsidence, and discourage intruder access. Soil would be removed down to 4.6 meters (15 feet) for the BX and SX tank farms and replaced with clean soils from onsite sources. The removed contaminated soils and ancillary equipment would be disposed of on site in the RPPDF, a new facility similar to an IDF. The closed tank systems and six sets of adjacent cribs and trenches (ditches) would be covered with an engineered modified RCRA Subtitle C barrier. Postclosure care would continue for 100 years.

1.7.1.4 Tank Closure Alternative 4: Existing WTP Vitrification with Supplemental Treatment Technologies; Selective Clean Closure/Landfill Closure

This alternative involves the use of both thermal and nonthermal treatment technologies (bulk vitrification and cast stone, respectively) to supplement the WTP treatment. This alternative also evaluates treatment of 99.9 percent of the waste volume in the tank farms, clean closure of two representative (BX and SX) tank farms, and landfill closure of the remaining tank farms.

Storage: DOE would continue current waste management operations using existing tank storage facilities. No new DSTs would be required, but four new WRFs would be constructed.

Retrieval: Using currently available liquid-based retrieval and leak detection systems along with a final chemical wash step, waste would be retrieved to a volume corresponding to 99.9 percent retrieval, equal to residual tank waste of no more than 1 cubic meter (36 cubic feet) for 100-series tanks or 0.08 cubic meters (3 cubic feet) for the smaller 200-series tanks.

Treatment: The existing WTP configuration (two HLW melters and two LAW melters) would operate at a TMC of 6 metric tons of glass IHLW per day and 30 metric tons of glass ILAW per day. Treatment would start in 2018, and both HLW and LAW treatment would end in approximately 2043, which would

include treating the highly contaminated waste stream resulting from clean closure of the BX and SX tank farms. All waste streams routed to the WTP would be pretreated, although technetium-99 removal would not occur as part of WTP pretreatment. WTP capacity would be supplemented with additional waste treatment capacity to immobilize a portion of the LAW. Supplemental treatment of the LAW would occur in both the 200-East and 200-West Areas and consist of a combination of cast stone treatment capacity in the 200-East Area and bulk vitrification treatment capacity in the 200-West Area. The waste stream feed for the 200-East Area cast stone supplemental treatment facility would be pretreated in the WTP, excluding technetium-99 removal. In the 200-West Area, the waste feed would be pretreated in a new Solid-Liquid Separations Facility. A separate portion of the tank waste (approximately 11.8 million liters [3.1 million gallons]) would be designated as mixed TRU waste and packaged for disposal at WIPP. The cesium and strontium capsules would be retrieved from the WESF, de-encapsulated, and treated in the WTP.

Disposal: LAW immobilized via both the WTP and external to the WTP would be disposed of on site in an IDF. IHLW would be stored on site until disposition decisions are made and implemented. Mixed TRU waste would be packaged and stored on site in an existing or new storage facility pending disposal at WIPP.

Closure: As operations are completed, the SST system at Hanford, except the BX and SX tank farms, would be closed as an RCRA hazardous waste landfill unit under WAC 173-303, "Dangerous Waste Regulations," and DOE Order 435.1, as applicable, or decommissioned under DOE Order 430.1B. The tanks and ancillary equipment would be filled with grout to immobilize the residual waste, prevent long-term degradation of the tanks, and discourage intruder access. The closed tank systems, except the BX and SX tank farms, and six sets of adjacent cribs and trenches (ditches) would be covered with an engineered modified RCRA Subtitle C barrier. Postclosure care would continue for 100 years. The BX and SX tank farms would be clean-closed by removing the tanks, ancillary equipment, and soils to a depth of 3 meters (10 feet) below the tank base. The removed tanks, ancillary equipment, and soils would be treated, as appropriate, in the Preprocessing Facility (PPF), a new facility, resulting in MLLW and a highly contaminated liquid waste stream. The MLLW would be disposed of on site, and the highly contaminated liquid waste stream would be processed as HLW in the WTP, resulting in additional IHLW. Where necessary, deep soil excavation would also be conducted to remove contamination plumes within the soil column. Highly contaminated soils from deep soil excavation would be treated in the PPF. This process would generate a contaminated liquid waste stream that would be processed as LAW in the WTP, resulting in additional ILAW. The washed soils would be disposed of in the RPPDF, a new facility similar to an IDF. The BX and SX tank farms would be backfilled with clean soil.

1.7.1.5 Tank Closure Alternative 5: Expanded WTP Vitrification with Supplemental Treatment Technologies; Landfill Closure

This alternative involves the use of both thermal and nonthermal treatment technologies (bulk vitrification and cast stone, respectively) to supplement the WTP treatment. This alternative also evaluates retrieval and treatment of 90 percent of the tank waste volume in the tank farms, but on an accelerated schedule, as well as landfill closure of the SST system.

Storage: DOE would continue current waste management operations using existing tank storage facilities. Four new DSTs and four WRFs would be constructed.

Retrieval: Using currently available liquid-based retrieval and leak detection systems, waste would be retrieved to a volume corresponding to 90 percent retrieval, less than the TPA Milestone M-45-00 minimum goal of 99 percent. Retrieval to 90 percent represents a programmatic risk analysis process for the tank farms as defined by Appendix H of the TPA, "Single Shell Tank Waste Retrieval Criteria Procedure." The 90 percent retrieval level would be equal to residual tank waste of no more than

102 cubic meters (3,600 cubic feet) for 100-series tanks or 8.5 cubic meters (300 cubic feet) for the smaller 200-series tanks.

Treatment: The existing WTP configuration (two HLW melters and two LAW melters) would be supplemented with expanded LAW vitrification capacity (an addition of one LAW melter) to provide a vitrification TMC of 6 metric tons of glass IHLW per day and 45 metric tons of glass ILAW per day. All waste streams routed to the WTP would be pretreated, although technetium-99 removal would not occur as part of WTP pretreatment. Treatment would start in 2018 and end in approximately 2034. This alternative considers implementation of a sulfate removal technology following WTP pretreatment that would potentially reduce the amount of glass produced in the WTP by increasing the waste loading in the ILAW glass. WTP capacity would be supplemented with additional waste treatment capacity to immobilize a portion of the LAW. Supplemental treatment of the LAW would occur in both the 200-East and 200-West Areas and consist of a combination of cast stone treatment capacity in the 200-East Area and bulk vitrification treatment capacity in the 200-West Area. The waste stream feed for the 200-East Area cast stone supplemental treatment facility would be pretreated in the WTP, excluding technetium-99 removal. In the 200-West Area, the waste feed would be pretreated in a new Solid-Liquid Separations Facility. A separate portion of the tank waste (approximately 11.8 million liters [3.1 million gallons]) would be designated as mixed TRU waste and packaged for disposal at WIPP. The cesium and strontium capsules would be retrieved from the WESF, de-encapsulated, and treated in the WTP.

Disposal: LAW immobilized both via the WTP and external to the WTP would be disposed of on site in an IDF. IHLW would be stored on site until disposition decisions are made and implemented. Mixed TRU waste would be packaged and stored on site in a new storage facility pending disposal at WIPP.

Closure: As operations are completed, the SST system would be closed as an RCRA hazardous waste landfill unit under WAC 173-303, "Dangerous Waste Regulations," and DOE Order 435.1, or decommissioned under DOE Order 430.1B. The tanks and ancillary equipment would be filled with grout to immobilize the residual waste, prevent long-term degradation of the tanks, and discourage intruder access. Tank systems (tanks, ancillary equipment, and soils) and the six sets of adjacent cribs and trenches (ditches) would be closed in place and covered with the Hanford barrier (a barrier with performance characteristics that exceed RCRA requirements for disposal of hazardous waste). To support this schedule, SST system ancillary equipment outside the boundaries of the surface barriers would not be removed or decontaminated. Postclosure care would continue for 100 years.

1.7.1.6 Tank Closure Alternative 6: All Waste as Vitrified HLW[4]

This alternative consists of three subalternatives: (1) Alternative 6A: All Vitrification/No Separations; Clean Closure (Base and Option Cases), (2) Alternative 6B: All Vitrification with Separations; Clean Closure (Base and Option Cases), and (3) Alternative 6C: All Vitrification with Separations; Landfill Closure. These alternatives evaluate an all-vitrification case wherein all vitrified waste would be managed as HLW.

Storage Under Tank Closure Alternative 6A: DOE would continue current waste management operations using existing tank storage facilities that would be modified as needed to support SST waste retrieval and treatment. New DSTs would be required after the existing DSTs reach the end of their design life.

[4] Alternatives 6A, 6B, and 6C of this EIS evaluate the management of tank waste as HLW combined with different closure scenarios. The purpose of Alternative 6A is to evaluate the bounding case for no-separation scenarios. The DOE Manual 435.1-1 waste incidental to reprocessing evaluation determination process is not required for treatment of the waste under these alternatives.

Storage Under Tank Closure Alternatives 6B and 6C: DOE would continue current waste management operations using existing tank storage facilities. No new DSTs would be required, but four new WRFs would be constructed.

Retrieval Under Tank Closure Alternatives 6A and 6B: Using currently available liquid-based retrieval and leak detection systems along with a final chemical wash step, waste would be retrieved to a volume corresponding to 99.9 percent retrieval, equal to residual tank waste of no more than 1 cubic meter (36 cubic feet) for 100-series tanks or 0.08 cubic meters (3 cubic feet) for the smaller 200-series tanks.

Retrieval Under Tank Closure Alternative 6C: Using currently available liquid-based waste retrieval and leak detection systems, waste would be retrieved to the TPA minimum goal, i.e., residual waste would not exceed 10.2 cubic meters (360 cubic feet) for 100-series tanks or 0.85 cubic meters (30 cubic feet) for the smaller 200-series tanks, corresponding to 99 percent retrieval.

Treatment Under Tank Closure Alternative 6A: The existing WTP configuration would be modified to process all waste as HLW through expanded HLW vitrification capacity. This new WTP configuration (five HLW melters and no LAW melters) would provide a total vitrification TMC of 15 metric tons of glass IHLW per day. Treatment would start in 2018 and end in approximately 2163, requiring two WTP replacement facilities due to design-life constraints. There would be no pretreatment, LAW treatment, or technetium-99 removal. No supplemental or TRU waste treatment is proposed. The cesium and strontium capsules would be retrieved from the WESF, de-encapsulated, and treated in the WTP.

Treatment Under Tank Closure Alternatives 6B and 6C: The existing WTP configuration (two HLW melters and two LAW melters) would be supplemented with expanded LAW vitrification capacity (an addition of four LAW melters) to provide a vitrification TMC of 6 metric tons of glass IHLW per day and 90 metric tons of glass ILAW per day. Treatment would start in 2018 and end in approximately 2040 (for HLW) and 2043 (for LAW). All waste streams routed to the WTP would be pretreated, although technetium-99 removal would not occur as part of WTP pretreatment. No supplemental or TRU waste treatment is proposed. The cesium and strontium capsules would be retrieved from the WESF, de-encapsulated, and treated in the WTP.

Disposal Under Tank Closure Alternative 6A: IHLW canisters would be stored on site until disposition decisions are made and implemented. Replacement of the canister storage facilities would be required after a 60-year design life. The HLW debris from clean closure would be managed as HLW and stored on site.

Disposal Under Tank Closure Alternatives 6B and 6C: IHLW canisters would be stored on site until disposition decisions are made and implemented. ILAW glass canisters would be managed as HLW and stored on site. Under Alternative 6B, HLW debris from clean closure would be managed as HLW and stored on site.

Closure Under Tank Closure Alternatives 6A and 6B: These alternatives analyze clean closure of all twelve 200-East and 200-West Area SST farms following deactivation. Clean closure of the tank farms would involve removal of all tanks, associated ancillary equipment, and contaminated soil to a depth of 3 meters (10 feet) directly beneath the tank base. These materials would be packaged as HLW for onsite storage in shielded boxes. Where necessary, deep soil excavation would also be conducted to remove contamination plumes within the soil column. The new PPF would process the highly contaminated deep soil to render it acceptable for onsite disposal. The liquid waste stream from the PPF soil washing would be thermally treated in the PPF and disposed of on site in an IDF. The washed soils would be disposed of in the RPPDF, a new facility similar to an IDF. Clean closure of the SST system would preclude the need for postclosure care. The six sets of adjacent cribs and trenches (ditches) would be covered with an

engineered modified RCRA Subtitle C barrier (Base Cases). Optional clean closure of these cribs and trenches (ditches) would occur under the Option Cases.

Closure Under Tank Closure Alternative 6C: As operations are completed, the SST system would be closed as an RCRA hazardous waste landfill unit under WAC 173-303, "Dangerous Waste Regulations," and under DOE Order 435.1, or decommissioned under DOE Order 430.1B. The tanks would be filled with grout to immobilize the residual waste, prevent long-term degradation of the tanks, and discourage intruder access. Soil would be removed down to 4.6 meters (15 feet) for the BX and SX tank farms and replaced with clean soils from onsite sources. The removed contaminated soils and ancillary equipment would be disposed of on site in the RPPDF, a new facility similar to an IDF. The closed tank systems and the six sets of adjacent cribs and trenches (ditches) would be covered with an engineered modified RCRA Subtitle C barrier. Postclosure care would continue for 100 years.

1.7.2 FFTF Decommissioning Alternatives

The NOI for the "FFTF Decommissioning EIS" (69 FR 50176) identified the three alternatives listed below.

1.7.2.1 FFTF Decommissioning Alternative 1: No Action

As previously stated, CEQ NEPA regulations (40 CFR 1500–1508) and DOE NEPA regulations (10 CFR 1021) require analysis of a "no action" alternative. The FFTF Decommissioning No Action Alternative includes completion of actions in accordance with previous DOE NEPA decisions. Final decommissioning of FFTF would not occur. Specifically, only deactivation activities for the FFTF complex and support buildings, as described in the *Environmental Assessment, Sodium Residuals Reaction/Removal and Other Deactivation Work Activities, Fast Flux Test Facility (FFTF) Project, Hanford Site, Richland, Washington* (DOE 2006b), would be conducted. Deactivation activities would include removal and packaging of the RH-SCs for storage in the 400 Area, as described in the FONSI dated March 31, 2006. The FFTF Reactor Containment Building (RCB) (Building 405) and the rest of the buildings within the 400 Area Property Protected Area (PPA) would be maintained through 2107 (for 100 years after the *TC & WM EIS* ROD is published) under administrative controls such as site security and management. After 2107, administrative controls would cease and the remaining waste is assumed to become available for release to the environment.

1.7.2.2 FFTF Decommissioning Alternative 2: Entombment

Facility Disposition. The Entombment Alternative consists of removing all aboveground structures within the 400 Area PPA and minimal removal of below-grade structures, equipment, and materials as required to comply with regulatory standards. The RCB would be demolished and removed to grade, and auxiliary facilities would be removed to 0.91 meters (3 feet) below grade. Equipment, piping, and components containing hazardous and radioactive materials would be removed from below-grade structures only as needed for treatment to meet regulatory requirements. Any other necessary treatment of equipment or components would occur in place without removal from the facilities. After treatment, some of the components could be returned to below-grade spaces and grouted in place with the remaining structures and equipment to stabilize them and minimize void space. Most other equipment and materials removed from the facilities would be disposed of in the 200 Areas. An RCRA-compliant barrier would be constructed over the remains of the RCB and any other remaining below-grade structures (including the reactor vessel) that contain residual radioactive and treated hazardous materials. Equipment to be removed under this alternative includes the RH-SCs, which contain sufficient quantities of metallic sodium and radionuclides that they could not be treated and entombed in the RCB with the remaining materials.

Disposition of Remote-Handled Special Components. The RH-SCs consist of four large filter assemblies designed to remove radionuclides and other contaminants from the FFTF sodium coolant systems and the inert-cover gas systems. These components would require treatment to drain and stabilize residual metallic sodium prior to disposal, and they would contain sufficient quantities of radionuclides to require remote handling. Removal and storage of the RH-SCs in the 400 Area are covered in the FONSI dated March 31, 2006 (DOE 2006b). It would be necessary to treat these components in a specialized facility that is equipped to handle hazardous reactive materials and components with high radiological dose rates. Such a facility does not currently exist within the DOE waste management complex; however, most other waste generated during facility decommissioning could be managed using existing or proposed capabilities. Therefore, DOE needs to decide on an approach for treating and disposing of the FFTF RH-SCs. The two options discussed below are being considered for managing these components.

- **Hanford Option**. The RH-SCs would be shipped to an onsite treatment facility. The capability to treat these components does not currently exist at Hanford, nor has such a capability been previously proposed, although construction of a facility to treat RH- and oversized MLLW or TRU waste was evaluated in a previous NEPA review (DOE 2004a). Following treatment, the components and residuals would be disposed of with other Hanford waste in the 200 Areas. DOE is considering this option for management of the FFTF RH-SCs in response to scoping comments that recommended minimizing offsite transportation of these components and treatment residuals.

- **Idaho Option**. The RH-SCs would be shipped to the proposed RTP at the MFC at INL. The proposed RTP would treat remote-handled components containing comparable levels of radiological materials, as well as metallic sodium. An EA is being prepared at INL to evaluate this proposed treatment (DOE 2009a). Following treatment at the RTP, the FFTF components and residuals would be disposed of with other INL waste at an offsite facility, or they could be returned to Hanford for disposal. DOE is considering this option for the FFTF RH-SCs to utilize the existing sodium management expertise at the MFC and to consolidate waste management activities within the DOE complex at existing or proposed facilities.

Disposition of Bulk Sodium. The Hanford radioactive bulk sodium inventory consists of approximately 1.1 million liters (300,000 gallons) of metallic sodium, including sodium from the Hallam Reactor and the Sodium Reactor Experiment (SRE), in addition to sodium drained from the FFTF cooling systems during deactivation. Hallam and SRE sodium are currently stored in the Hanford 200-West Area Central Waste Complex (CWC). Sodium from FFTF is stored in the 400 Area within the RCB or adjacent storage facilities. The current DOE plan for this sodium is to convert it to a caustic for product reuse by ORP for the WTP. The two options discussed below are being considered for managing the Hanford radioactive bulk sodium inventory.

- **Hanford Reuse Option**. The bulk sodium would be stored in its current locations until it is shipped to an onsite facility for processing to a caustic (sodium hydroxide). The capability to process the bulk sodium does not currently exist at Hanford. The treated sodium (caustic) would be transferred to the 200-East Area for product reuse by ORP for the WTP. DOE is considering this option for processing the Hanford bulk sodium inventory in response to scoping comments that recommended minimizing the need for offsite transportation of the bulk sodium and caustic.

- **Idaho Reuse Option**. The bulk sodium would be stored in its current locations until it is shipped to the MFC for processing. The capability to process bulk metallic sodium currently exists at the MFC SPF, which previously has been used to process metallic sodium from the Experimental Breeder Reactor II (EBR-II) and other facilities. Following processing, the caustic would be returned to Hanford for use in the WTP. DOE is considering this option for processing the

Hanford bulk sodium inventory to utilize existing sodium management expertise and facilities at the MFC.

1.7.2.3 FFTF Decommissioning Alternative 3: Removal

Facility Disposition. The Removal Alternative consists of removing all above-grade structures within the 400 Area PPA, as well as contaminated below-grade structures, equipment, and materials. The RCB would be demolished and removed to grade, and all auxiliary facilities would be removed to 0.91 meters (3 feet) below grade. Most equipment, piping, and components containing chemically hazardous and radioactive materials, including the reactor vessel, lead shielding, depleted uranium shielding, and asbestos, would be removed from below-grade structures. Most equipment and materials removed from the facilities would be disposed of in the 200 Areas. The remaining structures and equipment, consisting mainly of the external RCB structure and associated components, as well as uncontaminated below-grade portions of auxiliary facilities, would be backfilled or grouted to minimize void space. The PPA would be backfilled to grade, contoured, and revegetated as necessary to stabilize the ground surface or to prepare the site for future industrial use.

Disposition of Remote-Handled Special Components. The two options being considered under FFTF Decommissioning Alternative 2 are the same options being considered under FFTF Decommissioning Alternative 3 for disposition of the RH-SCs.

Disposition of Bulk Sodium. The two reuse options being considered under FFTF Decommissioning Alternative 2 are the same options being considered under FFTF Decommissioning Alternative 3 for the disposition of the bulk sodium.

1.7.3 Waste Management Alternatives

Waste Management alternatives evaluated in this *TC & WM EIS* address the expansion of waste disposal capacity at Hanford to provide for the disposal of on- and offsite waste, thus to facilitate the cleanup of Hanford and other DOE sites. The major mission components include onsite storage and disposal of Hanford-generated and other sites' LLW and MLLW; onsite storage of Hanford-generated TRU waste; and eventual closure of the waste facilities.

1.7.3.1 Waste Management Alternative 1: No Action

Storage: LLW and MLLW would be stored at the CWC until processed for disposal in trenches 31 and 34 in low-level radioactive waste burial ground (LLBG) 218-W-5. TRU waste would be stored at the CWC and disposed of in WIPP. Processing of waste prior to disposal would continue to occur at existing facilities at the CWC, Waste Receiving and Processing Facility (WRAP), and T Plant. No offsite LLW, MLLW, or TRU waste would be received.

Disposal: LLW and MLLW would be disposed of in LLBG 218-W-5, trenches 31 and 34, through 2035. TRU waste would be disposed of in WIPP. Further construction at IDF-East would be discontinued in 2008, and the IDF site would be deactivated.

Closure: Administrative control would be implemented for 100 years.

1.7.3.2 Waste Management Alternative 2: Disposal in IDF, 200-East Area Only

Storage: LLW, MLLW, and TRU waste would be stored at the CWC until processed for disposal. Processing of waste prior to disposal would occur at existing and expanding facilities at the CWC, WRAP, and T Plant. No offsite TRU waste would be received. Offsite LLW and MLLW would be received from other DOE sites. A total volume of 62,000 cubic meters (81,000 cubic yards) of LLW and

20,000 cubic meters (26,000 cubic yards) of MLLW was assumed to be received, as identified in the Settlement Agreement for waste disposal at Hanford.

Disposal: LLBG 218-W-5, trenches 31 and 34, would continue to operate through 2050. Construction, operations, deactivation, closure, and postclosure care would take place at IDF-East. Waste from tank treatment operations, onsite non-CERCLA sources, FFTF decommissioning, waste management, and other DOE sites would be disposed of in IDF-East. Waste from tank farm cleanup operations would be disposed of in the RPPDF. TRU waste would be disposed of in WIPP.

Closure: Disposal facilities would be covered with engineered modified RCRA Subtitle C barriers. Postclosure care would continue for 100 years.

1.7.3.3 Waste Management Alternative 3: Disposal in IDF, 200-East and 200-West Areas

Storage: LLW, MLLW, and TRU waste would be stored at the CWC until processed for disposal. Processing of waste prior to disposal would occur at existing and expanding facilities at the CWC, WRAP, and T Plant. No offsite TRU waste would be received. Offsite LLW and MLLW would be received from other DOE sites. A total volume of 62,000 cubic meters (81,000 cubic yards) of LLW and 20,000 cubic meters (26,000 cubic yards) of MLLW was assumed to be received.

Disposal: LLBG 218-W-5, trenches 31 and 34, would continue to operate through 2050. Construction, operations, deactivation, closure, and postclosure care would take place at IDF-East and IDF-West. Waste from onsite non-CERCLA sources, FFTF decommissioning, waste management, and other DOE sites would be disposed of in IDF-West. Waste from tank waste treatment operations would be disposed of in IDF-East. Waste from tank farm cleanup operations would be disposed of in the RPPDF. TRU waste would be disposed of in WIPP.

Closure: Disposal facilities would be covered with engineered modified RCRA Subtitle C barriers. Postclosure care would continue for 100 years.

1.8 RELATED NEPA REVIEWS

A number of related NEPA reviews have been completed or are ongoing. This section briefly discusses these activities and their relationships with this proposed activity.

***Environmental Statement, Fast Flux Test Facility, Richland, Washington* (WASH-1510, May 1972) (AEC 1972).** The U.S. Atomic Energy Commission prepared this environmental statement to assess the potential environmental impacts associated with constructing and operating FFTF, a liquid-metal-cooled research reactor in the Hanford 400 Area.

***Final Environmental Statement, Waste Management Operations, Hanford Reservation, Richland, Washington* (ERDA 1538, December 1975) (ERDA 1975).** The U.S. Energy Research and Development Administration prepared this environmental statement for use in planning and decisionmaking to ensure that future waste management practices would minimize adverse environmental consequences. Treatment and disposal of waste generated by nuclear defense production, research and development, and other activities at Hanford were addressed. This document was written for the Waste Management Operations Program at Hanford. Because this document predated the CEQ NEPA regulations, a formal ROD was not issued. To some extent, Hanford waste management programs still rely on the analyses conducted in this *Waste Management Operations Statement*. Note: This *TC & WM EIS* updates analysis of waste management activities conducted by DOE, including tank closure.

***Final Environmental Impact Statement on the Disposal of Decommissioned, Defueled Naval Submarine Reactor Plants* (May 1984) (Navy 1984).** This EIS considered the disposal of defueled naval submarine reactor compartments in the Hanford LLW burial grounds. The EIS was prepared by the U.S. Department of the Navy and was adopted by DOE. The EIS analyzed preparation of the reactor compartments at the Puget Sound Naval Shipyard, transportation to Hanford, and disposal in the 200 Areas. The ROD was published in the *Federal Register* on December 6, 1984 (49 FR 47649).

***Final Environmental Impact Statement, Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes, Hanford Site, Richland, Washington (Hanford Defense Waste EIS)* (DOE/EIS-0113, December 1987) (DOE 1987).** DOE prepared this EIS to examine the potential impacts of processing TRU waste and tank waste stored at Hanford since 1943, as well as future waste, for disposal. Most LLW and waste associated with decommissioning of existing surplus or retired Hanford facilities were not considered in this EIS. In the 1988 ROD (53 FR 12449), DOE decided to dispose of or store DST waste and cesium and strontium capsules. Retrievably stored TRU waste in the 200 Area LLW burial grounds would be retrieved and disposed of with other newly generated TRU waste. A decision was also made to retrieve buried pre-1970 suspect TRU-contaminated waste from the 618-11 burial ground site. As part of that decision, DOE decided to construct and operate a facility for vitrification of HLW; facilities for grout stabilization and disposal of the LAW fraction resulting from processing tank waste; and WRAP for processing, certification, and shipment of TRU waste. Subsequent to preparation of this *Hanford Defense Waste EIS*, the TPA was established to implement many of the actions discussed in the ROD. The TPA also addresses compliance with RCRA and CERCLA requirements. Note: This *TC & WM EIS* updates analyses of Hanford waste associated with storage, retrieval, treatment, and disposal of tank waste.

***Environmental Assessment, Hanford Environmental Compliance Project, Hanford Site, Richland, Washington* (DOE/EA-0383, March 1992) (DOE 1992).** This EA included an evaluation of construction and operation of the Effluent Treatment Facility in the Hanford 200-East Area. This facility would receive wastewater collected from tank waste treatment facilities (in addition to other liquid waste generated at Hanford). The EA also evaluated construction of additional facilities at the CWC, where certain types of waste generated from the tank closure activities would be stored. Based on analyses in this EA, DOE determined the proposed actions were not major Federal actions significantly affecting the quality of the human environment and issued a FONSI on March 11, 1992.

***Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (SNF PEIS)* (DOE/EIS-0203-F, April 1995) (DOE 1995b).** The *SNF PEIS* was a DOE nationwide study examining the environmental impacts of managing more than 2,600 metric tons of SNF from past, present, and future DOE activities. The programmatic EIS analyzed the potential environmental consequences of alternatives related to the transportation, receipt, processing, and storage of SNF under the responsibility of DOE over the next 40 years, including no action, decentralization, regionalization, centralization, and the use of plans that existed in 1992 and 1993 for management of these materials. As a result, DOE decided to manage SNF according to the Regionalization Alternative by fuel type (60 FR 28680, 61 FR 9441). As part of that decision, Hanford would continue to store FFTF SNF, except for sodium-bonded fuel, until disposition decisions are made and implemented. The decision also included 12 shipments of sodium-bonded FFTF fuel to INL (formerly INEEL) for treatment and storage.

The waste management portion of the EIS evaluated various alternatives to manage radioactive and hazardous wastes at INL. Among the activities considered was operation of the SPF at the MFC to convert metallic sodium to a solid form suitable for reuse or disposal. Based on that evaluation, DOE decided to use the SPF to process sodium coolant from the EBR-II and other metallic sodium stored at INEEL. DOE also decided to proceed with a demonstration project for electrometallurgical treatment of sodium-bonded SNF (60 FR 28680). DOE has prepared two SAs for the INL portion of this EIS

(DOE/EIS-0203-SA-01, September 2002 [DOE 2002b], and DOE/EIS-0203-F-SA-02, June 2005 [DOE 2005]), concluding that the analyses remain valid and a supplemental NEPA documentation is not required.

***Environmental Assessment, Shutdown of the Fast Flux Test Facility, Hanford Site, Richland, Washington* (DOE/EA-0993, May 1995) (DOE 1995a).** This EA was prepared to assess the environmental impacts of shutting down FFTF. Deactivation, as evaluated in the EA, consisted of removing, cleaning, and storing fuel; draining sodium coolant; deactivating nonessential systems; removing some stored radioactive and hazardous materials; and performing other actions to place the facility in a safe surveillance and maintenance state for eventual decommissioning. Based on analyses in the EA, DOE determined the proposed actions were not major Federal actions that would significantly affect the quality of the human environment and issued a FONSI on May 1, 1995.

***Environmental Assessment, Solid Waste Retrieval Complex, Enhanced Radioactive and Mixed Waste Storage Facility, Infrastructure Upgrades, and Central Waste Support Complex, Hanford Site, Richland, Washington* (DOE/EA-0981, September 1995) (DOE 1995c).** In this EA, DOE proposed to construct and operate the Solid Waste Retrieval Complex and the Enhanced Radioactive Mixed Waste Storage Facility; expand the CWC; and upgrade the associated Hanford infrastructure. These facilities were to be located in the 200-West Area to support the Solid Waste Operations Complex. The proposed actions were to address retrieval of TRU waste, storage capacity for retrieved and newly generated TRU waste, and upgrades to the infrastructure network in the 200-West Area to enhance operational efficiencies and reduce the cost of operating the existing Solid Waste Operations Complex. Actions evaluated in the EA include the following:

- Construction and operations of the Solid Waste Retrieval Complex and the Enhanced Radioactive Mixed Waste Storage Facility
- Expansion of the CWC
- Upgrading associated infrastructure (utilities and roads) in the 200-West Area to support the Solid Waste Operations Complex
- Retrieval of post-1970 TRU waste in the LLW burial grounds and construction, operation, and maintenance of a complex of facilities to be used for the retrieval
- Construction of an RCRA-permitted storage facility for greater-than-Class C waste, retrieved TRU waste, and newly generated TRU waste awaiting processing in WRAP, as well as processed waste awaiting shipment to WIPP
- Construction of two pre-engineered metal solid waste management support buildings

Based on analyses in this EA, DOE determined the proposed actions were not major Federal actions that would significantly affect the quality of the human environment and issued a FONSI on September 28, 1995. This *TC & WM EIS* relies on a number of the waste management facilities analyzed in this EA.

***Final Environmental Impact Statement, Safe Interim Storage of Hanford Tank Wastes, Hanford Site, Richland, Washington* (DOE/EIS-0212, October 1995) (DOE and Ecology 1995).** DOE and Ecology prepared this EIS to assess the environmental and human health impacts associated with the construction and operation of facilities and systems to continue the safe management of tank waste. This EIS addressed only tank waste safety concerns that required action before implementing decisions based on the *TWRS EIS*. In the ROD, DOE decided to continue operation of the existing cross-site transfer system until its replacement had been constructed and begun operating (60 FR 61687). DOE and Ecology also determined that new storage tanks would not be necessary to mitigate the flammable gas safety issue, based on the demonstrated success of the mixer pumps.

***Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement* (DOE/EIS-0189, August 1996) (DOE and Ecology 1996).** In the *TWRS EIS*, DOE examined management and disposal of mixed, radioactive, and hazardous wastes currently stored or projected to be stored in 177 underground storage tanks, as well as cesium and strontium capsules. The *TWRS EIS* deferred analysis of alternatives for tank closure. In the ROD, DOE decided to retrieve, separate, vitrify, and dispose of the tank waste (62 FR 8693). The LAW fraction from the separation process would be retrievably stored on site. The HLW would be disposed of at an HLW geologic repository. A decision on disposition of cesium and strontium capsules was deferred. Note: This *TC & WM EIS* extends the assessment of alternatives for treatment and disposal of tank waste and assesses alternatives for closing the waste storage SSTs.

***Environmental Assessment, Management of Hanford Site Non-defense Production Reactor Spent Nuclear Fuel, Hanford Site, Richland, Washington* (DOE/EA-1185, March 1997) (DOE 1997d).** This EA evaluated the environmental impacts associated with actions necessary to place Hanford non-defense production reactor SNF, including FFTF fuel, in radiologically and industrially safe consolidated storage pending final disposition. The FFTF-irradiated SNF would be placed in interim storage areas in either the 400 Area or the 200 Areas, depending on the fuel characteristics. Irradiated FFTF fuel would be processed to remove sodium residuals in the 400 Area and loaded into dry storage casks in the 400 Area's interim storage area for eventual transfer to the Canister Storage Building in the 200-East Area. Nonirradiated or slightly irradiated FFTF fuel would be processed in the 400 Area as needed and transferred to secure storage in the 200-West Area. Based on analyses in the EA, DOE determined the proposed actions were not major Federal actions that would significant affect the quality of the human environment and issued a FONSI on March 28, 1997.

***Environmental Assessment, Shutdown of Experimental Breeder Reactor-II at Argonne National Laboratory-West* (DOE/EA-1199, September 1997) (DOE 1997e).** This EA addressed placement of EBR-II and its supporting facilities in an industrially and radiologically safe shutdown condition pending ultimate decommissioning, including draining the primary and secondary sodium coolant and processing it at the SPF. The EA did not evaluate final decontamination and decommissioning of EBR-II or the SPF. Based on analyses in the EA, DOE determined the proposed actions were not major Federal actions that would significantly affect the quality of the human environment and issued a FONSI on September 26, 1997.

***Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) (DOE 1997a).** The *WM PEIS* is a DOE complex–wide study examining the environmental impacts of managing more than 2 million cubic meters (2.7 million cubic yards) of radioactive waste from past, present, and future DOE activities. Waste analyzed in the *WM PEIS* results primarily from nuclear weapons production and related activities. DOE's goal in preparing the *WM PEIS* was to develop a nationwide strategy to treat, store, and dispose of LLW, MLLW, HLW, TRU waste, and hazardous waste in a safe, responsible, and efficient manner that minimizes the impacts on workers and the public. The *WM PEIS* provides information on the impacts of using various alternatives and sites to consolidate or

decentralize treatment, storage, and disposal activities for each waste type. DOE would conduct further NEPA reviews regarding the specific location of new facilities at selected sites, as appropriate.

The *Final WM PEIS* was issued in May 1997, and decisions for each waste type analyzed in the *WM PEIS* have since been issued. The HLW storage ROD (64 FR 46661) stated that HLW should be stored at the generator sites pending disposal in an HLW geologic repository. The TRU waste treatment and storage ROD (63 FR 3624) stated that TRU waste at DOE sites would be treated and stored at the generator site prior to disposal at WIPP. The TRU waste treatment and storage ROD also stated that, in the future, DOE may decide to ship TRU waste from smaller sites that do not have the means to certify and package their waste for disposal at WIPP to larger sites, i.e., Savannah River Site, Oak Ridge Reservation, INL (formerly INEEL), and Hanford. The TRU waste treatment and storage ROD has been amended to this effect. The TRU waste treatment and storage ROD (69 FR 39446) was revised based on new information in the *HSW EIS* to confirm DOE's September 6, 2002, decision to ship its TRU waste from the Battelle West Jefferson North Site in Columbus, Ohio, to Hanford for storage, processing, and certification pending disposal at WIPP. DOE amended the TRU waste treatment and storage ROD to announce DOE's intent to send both contact- and remote-handled TRU waste from certain generator sites as needed to INL to be treated and characterized prior to shipment to WIPP for disposal (73 FR 12401). This would include shipping TRU waste from Hanford to INL. The hazardous waste treatment ROD (63 FR 41810) announced DOE's decision to continue using commercial facilities to treat nonwastewater hazardous waste generated at DOE sites. The LLW and MLLW ROD (65 FR 10061) states that DOE will minimally treat LLW at the generator sites, and that Hanford and the Nevada Test Site will be available to all DOE sites for LLW disposal. As part of this decision, DOE will treat MLLW at INL, the Oak Ridge Reservation, and the Savannah River Site; dispose of MLLW at the Nevada Test Site; and both treat and dispose of MLLW at Hanford.

Note: Analyses of alternatives in this *TC & WM EIS* are consistent with and tier from DOE complex–wide policies and practices that have been described in the various *WM PEIS* RODs for each waste type. The *Draft TC & WM EIS* alternatives assess the impacts of managing and disposing of the IHLW; ILAW; TRU waste; and process-generated LLW, MLLW, and hazardous waste associated with the proposed activities.

***Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (DOE/EIS-0026-S-2, September 1997) (DOE 1997b).** This *WIPP SEIS-II* establishes the disposal and transportation pathway for TRU waste. DOE has decided on geologic disposal at WIPP for the TRU component of radioactive waste. TRU waste from Hanford, including that stored in SSTs, is designated for this disposal pathway. In June 2004, DOE issued an SA evaluating the proposal to dispose of up to 2,500 cubic meters (88,000 cubic feet) of TRU waste containing polychlorinated biphenyls (PCBs) at WIPP and to characterize and, if necessary, repackage TRU waste containing PCBs in storage at INL (formerly INEEL), Hanford, Oak Ridge Reservation, Rocky Flats Environmental Technology Site, Savannah River Site, and Knolls Atomic Power Laboratory for disposal at WIPP (DOE 2004b). Based on this SA, DOE determined that the proposed actions are not a substantial change to the proposal analyzed in the *WIPP SEIS-II* and, therefore, a supplement to the *WIPP SEIS-II* is not needed. As a result of this SA, DOE revised the *WIPP SEIS-II* ROD (69 FR 39456) to include disposal of TRU waste containing PCBs in concentrations of 50 parts per million or greater at WIPP.

***Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE/EIS-0222-F, September 1999) (DOE 1999b).** As a result of public comments received and changes in DOE's NEPA/CERCLA/RCRA integration policies, DOE prepared this EIS, formerly named the *Hanford Remedial Action Environmental Impact Statement and Comprehensive Land-Use Plan*, to evaluate the potential environmental impacts associated with implementing a comprehensive land use plan for Hanford. Working with Federal, state, and local agencies and tribal governments, DOE evaluated six land use alternatives. In the ROD for this EIS (64 FR 61615), DOE decided to adopt a comprehensive

land use plan for Hanford. The purpose of this land use plan and its implementing policies and procedures is to facilitate decisionmaking about the site's uses and facilities over at least the next 50 years. As part of this plan, the 200 Areas were designated Industrial-Exclusive and the 400 Area was designated Industrial. Radioactive and hazardous waste treatment, storage, and disposal activities, as described in this *Draft TC & WM EIS*, are consistent with the Industrial-Exclusive and Industrial land use designations selected for the 200 and 400 Areas, respectively, in the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement (Hanford Comprehensive Land-Use Plan EIS)*.

***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* (DOE/EIS-0310, December 2000) (DOE 2000a).** This *NI PEIS* evaluated proposed expansion of nuclear irradiation capabilities for civilian nuclear energy research and development activities, production of medical and industrial isotopes to meet projected higher demand, and production of plutonium-238 to support future National Aeronautics and Space Administration space exploration missions. The *NI PEIS* also evaluated an alternative to permanently deactivate FFTF. The EIS concluded that "lack of clear commitments from likely users discouraged the Department from planning to build new facilities or to restart the FFTF." In the associated ROD (66 FR 7877), DOE decided FFTF would be permanently deactivated.

***Final Environmental Impact Statement for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel* (DOE/EIS-0306, July 2000) (DOE 2000b).** This EIS evaluated strategies to remove or stabilize the reactive sodium contained in a portion of DOE's SNF inventory to prepare the fuel for disposal in a geologic repository. The EIS analyzed six alternatives that employ one or more of the following technology options at nuclear fuel management facilities at the Savannah River Site or INL (formerly INEEL): electrometallurgical treatment; plutonium-uranium extraction; packaging in high-integrity cans; and melt-and-dilute treatment. DOE decided in the ROD (65 FR 56565) to implement the Preferred Alternative, electrometallurgically treating the EBR-II SNF and less than 0.5 metric tons of miscellaneous sodium-bonded SNF, including less than 0.3 metric tons of FFTF fuel at the MFC.

***Environmental Assessment, Use of Existing Borrow Areas, Hanford Site, Richland, Washington* (DOE/EA-1403, October 2001) (DOE 2001b).** This EA evaluated potential environmental consequences of operating existing borrow areas (including Borrow Area C) at Hanford to provide soil, sand, gravel, and rock for construction projects, site maintenance activities, and waste management activities. The EA specifically analyzed provision of an additional 7.6 million cubic meters (10 million cubic yards) of materials over a 10-year period (beginning in fiscal year 2001) to support site activities, including 690,000 cubic meters (905,000 cubic yards) to support WTP project activities. This rate of production (approximately 760,000 cubic meters [994,080 cubic yards] annually) analyzed in the EA would be adequate to support implementation of any of the alternatives considered in this *TC & WM EIS* if production were continued over the timeframe considered under each alternative. Based on analyses in this EA, DOE determined the proposed actions were not major Federal actions that would significantly affect the quality of the human environment and issued a FONSI on October 10, 2001.

Note: While this *Draft TC & WM EIS* evaluates the quantity of resource materials available and potentially consumed from the onsite borrow areas and assesses the environmental impacts of transporting the geologic resource materials to the point of use considered under each alternative, it does not further analyze the operational impacts of the onsite borrow areas.

***Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (Yucca Mountain EIS)* (DOE/EIS-0250, February 2002) (DOE 2002a).** The *Yucca Mountain EIS* examined proposed actions to construct, operate, monitor, and eventually close a geologic repository for the disposal of SNF and HLW currently in storage or expected to be generated at 72 commercial and 5 DOE sites

across the United States. The *Yucca Mountain EIS* also analyzed transporting these materials, including the IHLW at Hanford considered in this *TC & WM EIS*, to the repository for disposal. The *Yucca Mountain EIS* accompanied the Secretary of Energy's recommendation to the President on February 14, 2002, for approval of the Yucca Mountain site for development as a repository. On July 23, 2002, the President signed into law (P.L. 107-200) a joint resolution of the U.S. House of Representatives and the U.S. Senate designating the Yucca Mountain site in Nye County, Nevada, for development as a geologic repository. DOE has submitted an application to the U.S. Nuclear Regulatory Commission for a construction authorization for the repository. An SA (DOE/EIS-0250-SA-01, March 2004) (DOE 2004c) and a supplemental EIS (DOE/EIS-0250F-S1, June 2008) (DOE 2008a) have been issued by DOE. The supplemental EIS addresses new and updated information that has been developed since the original EIS was issued in 2002 and includes views of Nye County, Nevada, concerning the proposed repository.

As indicated in the Administration's fiscal year 2010 budget request, the Administration intends to terminate the Yucca Mountain program while developing nuclear waste disposal alternatives. Notwithstanding the decision to terminate the Yucca Mountain program, DOE remains committed to meeting its obligations to manage and ultimately dispose of HLW and SNF. The Administration intends to convene a blue ribbon panel of experts to evaluate alternative approaches for meeting these obligations. The panel will provide the opportunity for a meaningful dialogue on how best to address this challenging issue and will provide recommendations that will form the basis for working with Congress to revise the statutory framework for managing and disposing of HLW and SNF.

***Environmental Assessment for the Accelerated Tank Closure Demonstration Project* (DOE/EA-1462, June 2003) (DOE 2003a).** ORP prepared this document to assess the environmental impacts of various SST system closure demonstration projects. Specifically, the assessment evaluated the physical response and behavior of a Phase I grout fill in an actual tank, the field use of actual grout production equipment, and the conduct of component closure activities for SST 241-C-106. The information collected from this demonstration project is expected to be applied to the design of future tank closure activities. The EA was approved in 2003 and a FONSI was issued on June 16, 2003.

***Categorical Exclusion for Treatability and Demonstration Testing of Supplemental Technologies, Hanford Site, Richland, Washington* (DOE/ORP-2003-24, December 2003) (DOE 2003b).** ORP prepared this document to construct, operate, and close a pilot-scale test and demonstration facility that would be used to evaluate the performance of supplemental technologies (bulk vitrification and steam reforming) using actual SST waste.

***Final Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement, Richland, Washington* (DOE/EIS-0286F, January 2004) (DOE 2004a).** The DOE Richland Operations Office prepared this *HSW EIS* regarding enhanced waste management programs at Hanford. The scope of this EIS covers management of LLW, MLLW, and post-1970 TRU waste at Hanford. This EIS includes the scope of the proposed, but not developed and published, Tank Waste Remediation System Supplemental EIS for the Disposal of Immobilized Low-Activity Wastes from Hanford Tank Waste Processing (68 FR 7110). The *HSW EIS* scope does not cover HLW, most liquid waste, SNF, naval reactor compartments, commercial LLW, nonradioactive hazardous solid waste, and other solid waste managed within Hanford boundaries. In the ROD for the *HSW EIS* (69 FR 39449), DOE decided to limit the volumes of LLW and MLLW received at Hanford from other sites for disposal to 62,000 cubic meters (81,000 cubic yards) of LLW and 20,000 cubic meters (26,000 cubic yards) of MLLW. In addition, effective immediately, DOE will dispose of LLW in lined disposal facilities. As previously discussed in Section 1.2.7, DOE, Ecology, and the Washington State Attorney General's Office signed a Settlement Agreement ending the NEPA litigation related to the *HSW EIS* on January 6, 2006. The agreement is intended to resolve Ecology's concerns about *HSW EIS* groundwater analyses and to address other concerns about the *HSW EIS*.

The agreement called for an expansion of the "Tank Closure EIS" to provide a single, integrated set of analyses that will include all waste types analyzed in the *HSW EIS* (LLW, MLLW, and TRU waste), represented by this *Draft TC & WM EIS*. Pending finalization of this *Draft TC & WM EIS*, the *HSW EIS* remains in effect to support ongoing waste management activities at Hanford (including transportation of TRU waste to WIPP) in accordance with applicable regulatory requirements. The agreement also stipulates that, when this *TC & WM EIS* has been completed, it will supersede the *HSW EIS*. Until that time, DOE will not rely on *HSW EIS* groundwater analyses for decisionmaking and will not import offsite waste to Hanford, apart from certain limited exemptions as specified in the agreement.

***Environmental Assessment, Sodium Residuals Reaction/Removal and Other Deactivation Work Activities, Fast Flux Test Facility (FFTF) Project, Hanford Site, Richland, Washington* (DOE/EA-1547F, March 2006) (DOE 2006b).** This EA addressed continuation of ongoing FFTF deactivation work that was not extensively discussed in the *Environmental Assessment, Shutdown of the Fast Flux Test Facility, Hanford Site, Richland, Washington* (DOE 1995a). The activities analyzed include removing radioactively contaminated sodium residuals left over from the drain of the Hanford radioactively contaminated sodium inventory (FFTF, Hallam Reactor, and SRE) by reacting the sodium metal with water to produce caustic sodium hydroxide; removing associated equipment/components to allow sodium removal; and removing, disposing of, and stabilizing miscellaneous hazards and waste streams left over from the sodium drains. The final FFTF decommissioning end state is addressed in this *Draft TC & WM EIS*.

***Hanford Reach National Monument Final Comprehensive Conservation Plan and Environmental Impact Statement, Adams, Benton, Grant and Franklin Counties, Washington (Final Comprehensive Conservation Plan and EIS)* (August 2008) (USFWS 2008).** The U.S. Fish and Wildlife Service prepared this *Final Comprehensive Conservation Plan and EIS* to provide guidance and management direction for the Hanford Reach National Monument (Monument) for the next 15 years. Once approved by DOE, the *Final Comprehensive Conservation Plan and EIS* will provide the framework for making decisions on protection of natural, cultural, and recreational resources; management of visitor use; development of facilities; and day-to-day Monument operations. The Monument was created from buffer lands that were no longer necessary for the Hanford mission. These buffer lands form a horseshoe around the lands still needed by DOE for its current missions. The U.S. Fish and Wildlife Service administers the Monument as an overlay national wildlife refuge.

***Final Planning Report/Environmental Impact Statement, Yakima River Basin Water Storage Feasibility Study, Yakima Project, Washington* (INT-FES-08-65, December 2008) (BOR 2008).** The U.S. Department of the Interior, Bureau of Reclamation, and Ecology, prepared a draft combined planning report and EIS on the Yakima River Basin Waste Storage Feasibility Study (BOR and Ecology 2008). This study evaluates alternatives that would create additional water storage for the Yakima River Basin and assess their potential to supply the water needed for ecosystems, aquatic habitat, and basin-wide agricultural and municipal demands. Ecology decided to separate from the joint NEPA/SEPA process and issued a supplement to the draft on December 10, 2008 (07-11-044A, December 2008, Ecology 2008), to incorporate an Integrated Water Resources Management Alternative in response to comments received on the January 2008 draft. The Bureau of Reclamation issued its *Final Planning Report/Environmental Impact Statement for the Yakima River Basin Water Storage Feasibility Study, Yakima Project, Washington* in December 2008 with Ecology as a cooperating agency. The Bureau of Reclamation identified the No Action Alternative, which includes activities currently planned or under construction, as the Preferred Alternative. The Bureau has informed Ecology that a formal Record of Decision is not required and will not be prepared.

***Environmental Impact Statement for the Disposal of Greater-Than-Class C Low-Level Radioactive Waste (GTCC EIS)* (DOE/EIS-0375) (72 FR 40135).** DOE is preparing this *GTCC EIS* to address disposal of LLW generated by activities licensed by the U.S. Nuclear Regulatory Commission or

agreement states that contains radionuclides in concentrations exceeding Class C limits (10 CFR 61). The *GTCC EIS* will also consider DOE LLW and TRU waste having characteristics similar to GTCC LLW and that may not have an identified path to disposal. Hanford is being considered in the *GTCC EIS* as a candidate location for a new GTCC disposal facility.

***Supplement Analysis, Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE/EIS-0222-SA-01, June 2008) (DOE 2008b).** DOE completed an SA to help determine whether the existing *Hanford Comprehensive Land-Use Plan EIS* (DOE 1999b) remains adequate, or whether a new EIS, or a supplement to the existing EIS, should be prepared. In the SA, DOE did not identify significant changes in circumstances or substantial new information that have evolved since 1999 that would affect the basis for its decision as documented in the *Hanford Comprehensive Land-Use Plan EIS* ROD. DOE does not plan to prepare a new EIS or a supplement to the existing EIS at this time. An amended ROD was issued on September 26, 2008 (73 FR 55824).

***Revised Draft Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center* (DOE/EIS-0226-D [Revised], November 2008) (DOE and NYSERDA 2008).** This draft EIS analyzes alternatives for decommissioning the site and/or long-term stewardship, as well as a No Action Alternative as required by NEPA and New York's State Environmental Quality Review Act. The proposed actions are the completion of the West Valley Demonstration Project and the decommissioning and/or long-term management or stewardship of the Western New York Nuclear Service Center. This includes the decontamination and decommissioning of the waste storage tanks and facilities used in the solidification of HLW, and any material and hardware used in connection with the West Valley Demonstration Project. DOE needs to determine the manner in which facilities, materials, and hardware for which DOE is responsible will be managed or decommissioned in accordance with applicable Federal and state requirements. The New York State Energy Research and Development Authority needs to determine what material or structures for which it is responsible will remain on site, and what institutional controls, engineered barriers, or stewardship provisions would be needed.

***Final Environmental Assessment for the Remote-Handled Waste Disposition Project* (DOE/EA-01386, February 2009) (DOE 2009a).** This EA evaluated the potential environmental impacts related to processing RH waste at INL. This EA analyzed the impacts of treating the FFTF RH-SCs at INL as a reasonably foreseeable action. DOE issued a FONSI (February 18, 2009) for processing remote-handled waste at existing facilities at INL's Idaho Nuclear Technology and Engineering Center (INTEC). However, DOE will make a decision on the treatment of FFTF RH-SCs as part of the *TC & WM EIS* NEPA process.

***Environmental Assessment, Combined Community Communications Facility and Infrastructure Cleanup on the Fitzner-Eberhardt Arid Lands Ecology Reserve, Hanford Site, Richland, Washington* (DOE/EA-1660) (DOE 2009b).** This EA assessed the environmental impacts associated with consolidating existing communications operations and removing excess facilities and infrastructure within the Fitzner-Eberhardt Arid Lands Ecology Reserve located on Hanford. The proposed actions analyzed in the EA are within the scope of this *Draft TC & WM EIS* and are referred to as "interim actions." DOE prepared this interim-action EA before completing the *TC & WM EIS* process to take advantage of opportunities to accelerate remediation actions and reduce the physical footprint on the reserve. DOE issued a FONSI (July 20, 2009) on the proposed action to proceed with construction of the combined community communications facility, demolition of unneeded structures, and cleanup of abandoned debris at the reserve.

***American Recovery and Reinvestment Act of 2009* (P.L. 111-5).** Under the American Recovery and Reinvestment Act, DOE will conduct projects aimed at enhancing and accelerating its tank waste management program. These projects include construction of infrastructure and systems to transfer

radioactive liquid waste from aging underground tanks for waste treatment; accelerated design of the IHLW Interim Storage Facility; upgrade to the Effluent Treatment Facility to continue waste volume reduction; upgrade of the 222-S Analytical Laboratory to allow continued retrieval of waste from SSTs; and development of SST integrity programs for safe storage of waste. The projects are consistent with the *TWRS EIS*, the *Final Environmental Impact Statement, Safe Interim Storage of Hanford Tank Wastes, Hanford Site, Richland, Washington*, and this draft EIS. Additional NEPA reviews such as EAs may be conducted in the future as appropriate.

***Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury* (DOE/EIS-0423) (74 FR 31723).** DOE is preparing this EIS to evaluate alternatives for a facility (or facilities) for the long-term management and storage of elemental mercury generated within the United States as required by the Mercury Export Ban Act of 2008 (P.L. 110-414). Hanford is being considered in this EIS as a candidate host site for the long-term management and storage of elemental mercury.

1.9 STRUCTURE OF THIS *TC & WM EIS*

This *Draft TC & WM EIS* is organized as described below.

- **Reader's Guide—**The Reader's Guide serves as an introduction and guide to the contents of this *TC & WM EIS*. It includes descriptions of the proposed actions; the scope of this EIS; the action alternatives evaluated; DOE's Preferred Alternatives for tank closure, FFTF decommissioning, and waste management at Hanford; and the organization of this EIS itself. It also provides information about the availability of this EIS.

- **Summary—**The Summary, a separate volume, summarizes the key information provided in this *TC & WM EIS* and includes background on, and regulatory history of, past activities at Hanford; the purpose and need for agency actions; a description and comparison of the alternatives; an overview of the tank farm systems, FFTF decommissioning activities, and solid waste operations complex; and a summary of potential short- and long-term impacts of the alternatives, key environmental findings, and costs of the alternatives.

- **Chapter 1—Proposed Actions: Background, Purpose, and Need.** Chapter 1 provides background information regarding preparation of this *TC & WM EIS*, including the purpose and need for agency action regarding final waste disposition, SST system closure, and FFTF decommissioning; the decisions to be made based on the EIS analyses; a summary of the issues identified during scoping; the scope of this EIS, including brief summaries of the alternatives; the relationship of the proposed actions to other actions or programs; the cooperating agencies; and the organization of this EIS.

- **Chapter 2—Proposed Actions and Alternatives.** Chapter 2 describes the alternatives evaluated in this EIS. This chapter also includes a description of the processes and facilities that could be used to implement each of the alternatives and a summary of the short- and long-term environmental impacts and cost estimates of each alternative.

- **Chapter 3—Affected Environment.** Chapter 3 describes the existing Hanford and INL environments that may be affected by the alternatives under consideration. In general, Hanford as a whole is described first, followed by the 200 and 400 Areas. The existing environments described include human, air, surface, and subsurface media that could be affected by activities related to tank waste retrieval, treatment, and disposal; SST system closure; FFTF decommissioning; and waste management.

- **Chapter 4—Short-Term Environmental Consequences.** Chapter 4 discusses the short-term environmental impacts associated with the various EIS alternatives for tank closure, FFTF decommissioning, and waste management. Impacts produced by construction, operations, decontamination, and decommissioning are considered.

- **Chapter 5—Long-Term Environmental Consequences.** Chapter 5 discusses the long-term environmental impacts associated with the various EIS alternatives for tank closure, FFTF decommissioning, and waste management, focusing on long-term environmental impacts on groundwater and human health, as well as ecological risks.

- **Chapter 6—Cumulative Impacts.** Chapter 6 discusses the cumulative impacts associated with the various EIS alternatives.

- **Chapter 7—Environmental Consequences Discussion.** Chapter 7 discusses possible measures to mitigate impacts identified in Chapters 4, 5, and 6; unavoidable adverse environmental impacts; the relationship between short-term use of the environment and long-term productivity; and any irreversible and irretrievable resource commitments.

- **Chapter 8—Potentially Applicable Laws, Regulations, and Other Requirements.** Chapter 8 describes the environmental laws, regulations, permits, and consultations that are potentially applicable to the various activities related to tank waste retrieval, treatment, and disposal and SST system closure; FFTF decommissioning; and waste management associated with the alternatives. Federal laws and regulations; Executive orders; DOE directives, orders, and guidance; and other compliance actions related to protection of the environment also are described.

- **Chapter 9—Glossary.** Chapter 9 contains definitions of important technical terms that may not be commonly used, including both discipline-specific and DOE- and Hanford-unique terms.

- **Chapter 10—List of Preparers.** Chapter 10 identifies the DOE and contractor preparers of this EIS. Information is provided for each preparer in the following areas: (1) name, (2) affiliation, (3) education, (4) experience, and (5) EIS responsibility.

- **Chapter 11—Distribution List.** Chapter 11 contains the external distribution list for this EIS, which includes Federal, state, and local elected and appointed officials and agencies; American Indian representatives; environmental and public interest groups; and organizations and individuals who requested/were sent a copy of this draft EIS.

- **Chapter 12—Index.** Chapter 12 contains the index of key words and terms found in this EIS.

In addition, the following appendices are provided to support these chapters:

- Appendix A *Federal Register* and Other Public Notices
- Appendix B Contractor and Subcontractor National Environmental Policy Act Disclosure Statements
- Appendix C Cooperating Agency, Consultation, and Other Interaction Documentation
- Appendix D Waste Inventories
- Appendix E Descriptions of Facilities, Operations, and Technologies
- Appendix F Direct and Indirect Impacts: Assessment Methodology
- Appendix G Air Quality Analysis

- Appendix H Transportation
- Appendix I Workforce Estimates
- Appendix J Environmental Justice
- Appendix K Human Health Risk Analysis
- Appendix L Groundwater Flow Field Development
- Appendix M Release to Vadose Zone
- Appendix N Vadose Zone Flow and Transport
- Appendix O Groundwater Transport Analysis
- Appendix P Ecological Resources and Risk Analysis
- Appendix Q Human Health, Dose, and Risk Analysis
- Appendix R Cumulative Impacts: Assessment Methodology
- Appendix S Waste Inventories for Cumulative Impact Analyses
- Appendix T Supporting Information for the Short-Term Cumulative Impact Analyses
- Appendix U Supporting Information for the Long-Term Cumulative Impact Analyses
- Appendix V Black Rock Reservoir Sensitivity Analysis

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