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Revision 0

Fast Flux Test Facility Deactivation End Point Criteria

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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End Point Criteria

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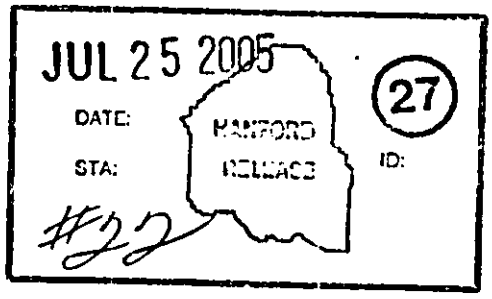

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Fast Flux Test Facility
Deactivation End Point Criteria

Table of Contents

Tables

Figures

Fast Flux Test Facility
Deactivation End Point Criteria

1.0 Introduction

The deactivation end point document for the U.S. Department of Energy's (DOE) Fast Flux Test Facility (FFTF) is prepared to meet two purposes. First, to identify work to be completed in order to declare the FFTF Plant deactivated and that major hazards have been either removed or stabilized. Second, to identify regulated units and or hazardous substances proposed to remain at the facility following the completion of deactivation. This document is prepared in accordance with the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement [TPA]) Milestone M-81-11, "Submit FFTF End Point Criteria Document," due August 31, 2005.

Current DOE planning for the FFTF Closure Project is to go directly (close couple) from facility deactivation to facility decommissioning without a surveillance and maintenance period. This, in addition to the ongoing DOE National Environmental Policy Act (NEPA) FFTF Decommissioning Environmental Impact Statement (EIS) limits these endpoints to deactivation activities currently being conducted under existing DOE NEPA decisions. These existing decisions include the "Environmental Assessment, Shutdown of the Fast Flux Test Facility, Hanford Site, Richland, Washington" (Environmental Assessment [EA], DOE/EA-0993) and the "Finding of No Significant Impact" (FONSI). The FFTF EIS is evaluating reasonable decommissioning alternatives and a No Action alternative. (Implicit in the No Action alternative is a surveillance and maintenance period.)

These deactivation endpoints are limited to the FFTF Plant buildings and systems, and do not include all buildings inside the 400 Area security (Property Protected) fence (see Figure 1). Including them at this time is premature for the close coupled approach to complete the FFTF Closure Project because of the continuing need for services or capabilities and the uncertainty of the final end state decision for the FFTF. The end state will not be known until the FFTF EIS is completed and the Record of Decision (ROD) issued. Therefore, decisions arising from the FFTF EIS ROD, due to the broader scope, will take precedence over FFTF deactivation end points for system shutdown and hazards reduction identified in this document. Overall, the goal of the FFTF Closure Project is that deactivation and decommissioning activities shall be conducted in the most cost effective, efficient, and environmentally responsible manner.

2.0 Background

DOE has made program and NEPA decisions to permanently shutdown and deactivate the FFTF, and is currently performing deactivation activities consistent with these decisions. Major deactivation activities underway at this time include: washing the FFTF fuel to remove radioactively-contaminated sodium, placing the fuel into dry cask storage, draining radioactively-contaminated sodium systems, and deactivating auxiliary plant systems. As a first part of the FFTF Closure Project, completion of these actions will place the FFTF in a radiologically and industrially-safe permanent shutdown and deactivated condition, prior to the DOE decision on the final end state condition of the FFTF. To complete the FFTF Closure Project, an ongoing FFTF EIS is being prepared to determine DOEs final end state for the

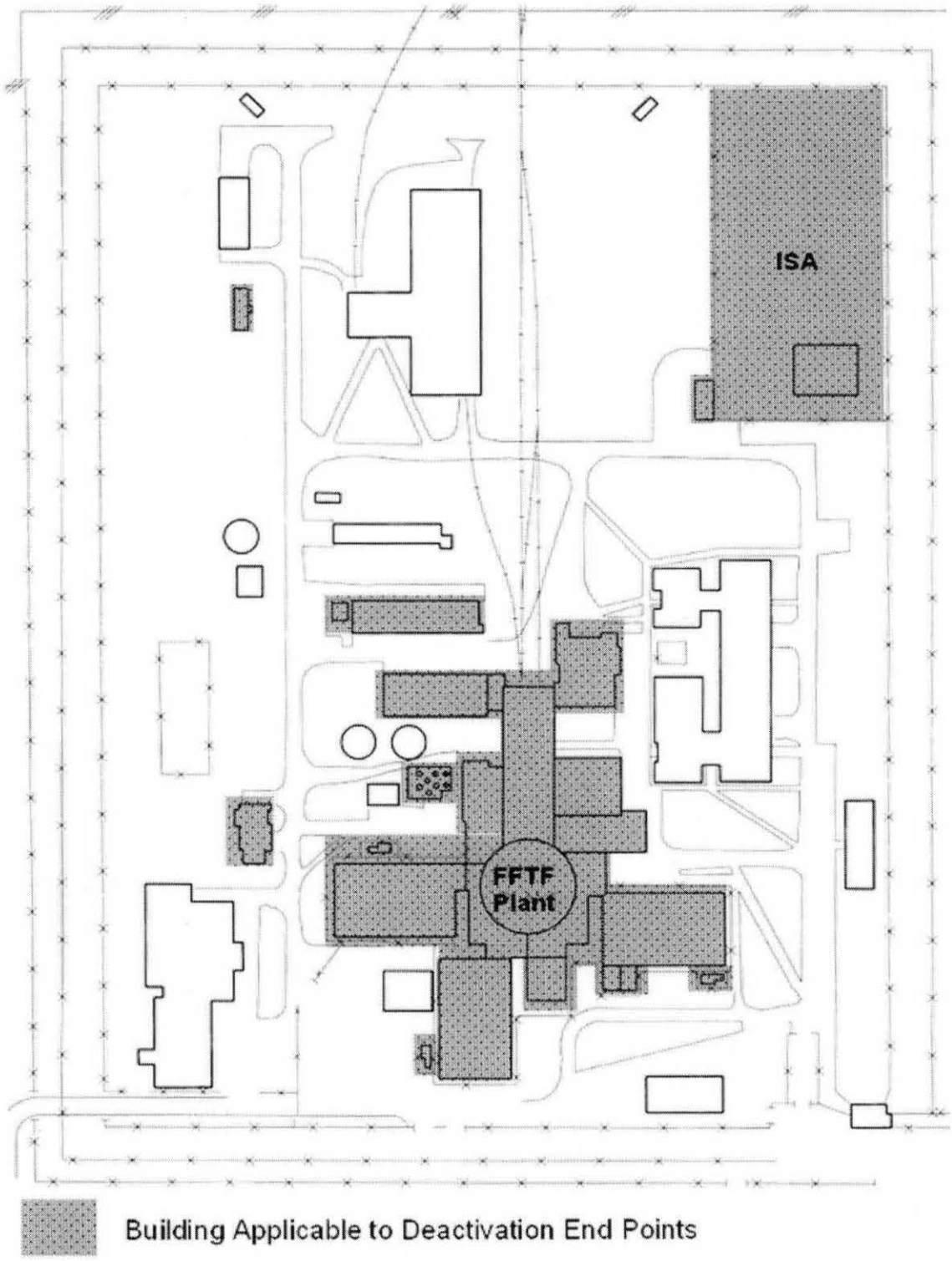

Figure 1. Property Protected Area Buildings in the 400 Area

deactivated FFTF complex. Currently, this EIS is evaluating proposed decommissioning alternatives (e.g., entombment, removal, and restoration) and a No Action alternative. Disposition of the associated radioactive and hazardous materials is necessary to deactivate and place the facility in a safe shutdown condition with reduced risk to plant workers, the public, and the environment, while achieving a cost savings.

The DOE currently plans to award an ongoing procurement contract to a single contractor with responsibility for all phases of the FFTF Closure Project (i.e., deactivation/transition and decommissioning/disposition). This will maintain an integrated and seamless process linking deactivation with the decommissioning phases, without a surveillance and maintenance phase. This will result in the most cost effective closure and has the advantage of knowledgeable facility staff to complete many of the complex activities associated with closure of this unique facility.

DOE Order 430.1A, *Life Cycle Asset Management*, requires a method be provided to ensure activities taken during deactivation are "...implemented to place the facility, systems and materials in stable and known conditions, and to ensure hazards are identified and known, pending transfer or disposition." An end point process in deactivation and decommissioning planning is required to identify specific facility end points and activities to achieve those end points. The goal is to ensure that a formal project management approach is used for the planning, managing, and conducting projects, in order to ensure the project can answer the question: "How do you know when the project is complete?"

To this end, deactivation end points for FFTF are developed in the shutdown planning process in order to determine the most efficient and cost effective method of achieving an industrially and radiologically-safe shutdown and deactivated condition that meets the needs of the Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA) for the regulated units and hazardous materials that will remain.

Having clearly defined end points allows FFTF deactivation to successfully:

- Focus work on critical path activities.
- Plan detailed work packages to support scheduled activities.
- Demonstrate conformance with agreements negotiated with third parties (i.e., the TPA).
- Demonstrate compliance with both local and federal regulations.
- Minimize costs by avoiding work that is not needed to meet requirements.

This document provides a description of what the deactivation "end points" are and how they are managed, the regulatory framework applied to deactivation, the hazardous materials that will remain in the facility at the end of initial deactivation, and the planned path forward to final safe closure.

TPA Milestones

The FFTF TPA Milestones were renegotiated in July of 2002; included was milestone M-81-11, *Submit FFTF End Point Document*, due August 31, 2005. The end point document original purpose was to define when FFTF was ready for the surveillance and maintenance phase. The current close coupled planning approach for the FFTF Closure Project by a single contractor and the FFTF EIS affects this milestone "End Point" scope. Discussions between the TPA agencies concluded that an End Point Document per TPA Milestone M-81-11 would be retained, but the objective and scope would be changed to reflect the DOE decision to close couple FFTF transition and disposition phases. The format and content of this document was agreed to at the May 13, 2004, TPA Project Managers meeting. This document reflects that agreement in scope and content. The appropriate end point focus under these conditions is to identify the state at which the FFTF may be declared deactivated and that major hazards have been either removed or stabilized. Furthermore, completion of the final phase of the FFTF Closure Project (e.g., decommissioning) may not be performed until the FFTF EIS is completed. Therefore, inclusion of some activities, like special component disposition, equipment removal and utilities systems shutdown, in the defined end points is premature.

3.0 End Points Methodology

Deactivation end points are established to ensure that FFTF activities are appropriately planned, conducted, and documented in a manner consistent with the guiding principles and core functions of the DOE integrated safety management and facility disposition policies. The deactivation end point document format and scope were agreed to by the TPA Project Managers to meet the main objectives of the Milestone M-81-11. End point conditions completing deactivation are defined for FFTF systems, equipment and structures based on cost effectiveness, as well as providing three layers of protection: elimination or stabilization of hazards, effective facility containment for remaining hazards, and facility monitoring and control prior to decommissioning. Regulated Units and/or hazardous substance proposed to remain following deactivation completion are identified for Ecology and EPA review. When the end points are achieved the FFTF Plant deactivation may be considered complete.

A checklist based end point method is selected for the required TPA Milestone End Points (a.k.a. Deactivation End Points) as opposed to a more detailed criteria based end points. Guidance and application are contained in DOE Guidance DOE G 430.1-3 and DOE/EM-0318. For these end points the following considerations were used to guide checklist items selection.

- Perform work scope currently bounded by identified NEPA Documentation (EA/FONSI).
- Reduce and/or control of significant potential hazards (radioactive materials, liquid metal and initial decontamination).
- Identify significant remaining hazards materials.
- Shutdown of non-needed systems.
- Preserve needed systems and items pending decommissioning related activities.
- Decommissioning (i.e., final decontamination, dismantlement, and disposition) activities will be seamless without a lengthy surveillance and maintenance period.

Prior end points (WHC-SD-FF-TPP-001, *FFTF Deactivation End Point Criteria*) were reviewed for potential use, but were judged to be not appropriate for the current FFTF Deactivation End

Points. They were based on a criteria approach for transition to a surveillance and maintenance contractor for long term surveillance and maintenance period, pending the end state for the FFTF.

The deactivation will be completed and documented in accordance with the FFTF Project Management Plan and project specific implementing procedures. The minimum work to be performed is identified by the end points. The implementing procedures will identify requirements and recommendations to ensure that all aspects of the deactivation process are addressed and the resulting system and equipment condition is adequately documented. Requirements to be satisfied include:

- Identification of affected components and the deactivated system boundary.
- Identification of isolation points.
- Documentation of "as-left" conditions and a system deactivation summary document.

The responsible Design Authority (or assigned Cognizant Engineer), with management concurrence, will determine the level of detail in the documentation based on the relative importance to safety, environmental compliance, safeguards and security, the magnitude of any hazard identified, programmatic importance, financial impact, and any other appropriate factors identified for a specific system.

4.0 FFTF Deactivation End Points

The applicable facilities and end point requirements are identified in this section. Upon completion of these end points the FFTF Plant may be declared deactivated and that major hazards are either removed or stabilized.

The actions decided upon in the FFTF EIS ROD, when issued, shall take precedence over end points for system deactivation and hazards reduction identified in this section. Again, the guiding principal is that deactivation and decommissioning activities shall be conducted in the most cost effective, efficient, and environmentally-friendly manner.

4.1 Applicable Buildings, Structures, and Areas

For the deactivation of FFTF these end points will be applied to the buildings, structures and areas, listed in Table 1.0. These buildings are all located inside the 400 Area Property Protected Area (PPA), see Figure 1.

Because of the ongoing FFTF EIS, evaluating the alternatives for the disposition of the FFTF complex, including all buildings in the PPA is premature; as they may be needed during the decommissioning phase (examples are the Maintenance and Storage Facility [MASF] – 437 Building, FFTF Maintenance Shop - 4713B Building, Sodium Storage Facility [SSF] - 402 Building, water supply system buildings and electrical supply buildings). The criteria is also not applicable to facilities located outside the 400 Area PPA (examples are Fuels and Materials Examination Facility - 427 Building, 400 Area Fire Station - 4704S Building, 400 Area Process Pond and Sewer System, and electrical supply buildings and equipment), because they are either unrelated to FFTF or have ongoing beneficial use.

Table 1 FFTF Plant Deactivation Buildings

Building Number	Description
403	Fuel Storage Facility
405	FFTF Reactor Containment Building
440	Hazardous Waste Temporary Storage
483	Cooling Towers
484	FFTF In-Containment Chill Water Equipment Building
4703	FFTF Control Building
4716	FFTF Rigging Loft
4717	Reactor Service Building
4718	400 Area Interim Storage Area Pad
4721	FFTF Emergency Turbine Generator Building
408A	Main Heat Dump, East
408B	Main Heat Dump, South
408C	Main Heat Dump, West
409A	Closed Loop Heat Dump, East #1
409B	Closed Loop Heat Dump, East #2
432A	Interim Storage Area Storage Shed
4621E	Auxiliary Equipment Building, East
4621W	Auxiliary Equipment Building, West
4734A	Nitrogen Dewar Pad
491E	Heat Transport System Service Building, East
491S	Heat Transport System Service Building, South
491W	Heat Transport System Service Building, West

4.2 End Point Criteria

The applicable end point requirements and specific requirements are identified in this section. Upon completion of these end points, the FFTF Plant may be declared deactivated and that major hazards are either removed or stabilized. All fuel will be removed, alkali metals (sodium and NaK) containing systems will be drained and stabilized, any remaining hazards will be identified and unneeded systems and buildings will be shutdown and deenergized.

4.2.1 Fuel Off Load (TPA Milestones M-81-00A-T02, M-81-00A-T03, M-81-00A-T04)

All unirradiated and irradiated fuel assemblies have been removed from buildings identified in Table 1. Documented evidence is available showing that all locations where fuel assemblies were handled, stored, or irradiated have been thoroughly examined for the presence of fuel materials (i.e., reactor core, fuel handling areas, storage areas, shipping and storage areas, etc.).

A. All FFTF fuel materials have been processed and placed into interim storage outside the 400 Area, consistent with existing DOE NEPA decisions.

1) The cleaned irradiated fuel is transferred to above-ground dry cask interim storage.
2) Unirradiated fuel assemblies, which have been in sodium, are cleaned.
3) The cleaned irradiated and unirradiated fuel is loaded into existing approved containers, and transferred to storage at locations other than the 400 Area.
4) Sodium-bonded metal fuel assemblies and sodium-bonded pins (metal and carbide) are cleaned and loaded into appropriate containers.
5) The fuel storage containers are transferred to an interim storage outside the 400 Area.

4.2.2 Sodium Drain and Disposition (TPA Milestones M-81-13, M-81-14, M-81-14-T01, and M-81-14-T02)

A. Radioactively-contaminated sodium in the following systems is drained to the maximum extent practical and transferred to tanks located in the SSF.

1) Primary and Secondary Heat Transport Systems (Systems 51A, 51B, and 51C)
2) Auxiliary Liquid Metal Systems (Systems 81 and 85)
3) Interim Decay Storage (IDS) (System 41-C subsystem 41-5)
4) Fuel Storage Facility (FSF) (Systems 81Y and 81Z).

B. The NaK cooling systems shall be flushed with sodium then drained or drained and cleaned. Included are FSF (System 81Z) and IDS (System 81D) and primary cold traps (System 81E).

C. Bulk sodium in the SSF is in a stable, documented condition.

4.2.3 Alkali Metal Residuals

A. The estimated quantity and location of alkali metal residuals shall be identified and documented.

B. Residual alkali metal is in a condition that allows monitoring and surveillance of the FFTF to be conducted in a safe and environmentally sound manner. The current approach for accommodating residuals is to maintain an inert gas (nitrogen or other suitable gas) atmosphere in the alkali metal systems, to prevent chemical reactions.

1) Cooling systems which contained NaK shall be flushed with sodium or drained and cleaned to remove the NaK hazard.

4.2.4 Special Components

A. Special components containing alkali metal remaining in the facility will be isolated and frozen. Special components include the following highly radioactively-contaminated equipment:

1) Primary Cold Trap (Component No. N-5)
2) Cesium Trap (Component No. N-3)
3) 1 standard cubic feet per minute (SCFM) Sodium Vapor Trap (Component No. U-532, VT-61, and VT-62)
4) 5 SCFM Sodium Vapor Trap (Component No. U-527, VT-63, and VT-64)

Other alkali metal filled components:

1) IDS Cold Trap (Component No. N-46)
2) FSF Cold Trap (Component No. N-932)
3) Secondary Cold Traps (Component No. N-7, N-40 and N-41)
4) NaK filled pressure transducers. (There are approximately 50 transducers. The NaK in the transducer and sensing lines will not be frozen.)

B. Special components, left in place, shall be characterized to determine radiological and hazardous constituent inventory.

4.2.5 Systems Shutdown

Systems to be shutdown and deactivated are identified in subsection A; how and what to be done for system deactivation is identified in subsection B.

A. Systems are shutdown and deactivated if there is no longer a functional need to support remaining deactivation, surveillance and maintenance or decommissioning activities. For deactivation there are eight groupings of systems and subsystems. The FFTF Project Management Plan, Revision 5, identifies the systems and function in the groupings.

Group 0: Systems shutdown during Operation (Inactive Systems)
Group 1: Systems shutdown for FFTF Standby
Group 2: Systems shutdown after fuel removed from the reactor vessel

Group 3: Systems shutdown after secondary sodium drain
Group 4: Systems shutdown after primary sodium drain
Group 5: System shutdown after NaK systems flush
(Group 6 has been deleted and incorporated into the other groups.)
Group 7: Systems shutdown after all fuel is removed from FSF
Group 8: Systems shutdown after all fuel is removed from IDS

The following groups will be addressed during the decommissioning phase, due to close coupling deactivation and decommissioning activities, and will be affected by decisions to be made by the Decommissioning EIS.

Group 9: Systems required for Interim Examination and Maintenance (IEM) Cell support
Group 10: Final Systems Shutdown

B. System shutdown is performed and documented in accordance with facility deactivation procedures and requirements. The procedures define the documents required to identify the final lay-up or deactivation configuration of the system(s) or subsystems, the actions to be taken to lay-up or deactivate the system or subsystem, the process to be used for the disposition of system related documents, drawings and procedures, and the documentation necessary to identify the location and strength or magnitude of any known hazards (radiological, chemical or industrial) within the system or subsystem.

1) All potential energy will be removed to the maximum extent possible.
2) Systems and subcomponents will be isolated, drained, depressurized, and vented as appropriate.
   a. Component lubricating and cooling fluids will be drained.
   b. When no longer needed, utilities such as electricity, water, and air will be isolated from facilities and any associated piping and pressure vessels.
   c. Blank flanges or caps will be installed where necessary for isolation.
   d. Electric transformers with no loads will be drained of oil. (See 4.2.6 for specific polychlorinated biphenyl [PCB] transformers requirements.)
   e. Selected equipment and materials may be removed from facility spaces to minimize the remaining hazards for decommissioning activities.
3) For all shutdown systems/equipment, hazardous materials will be removed, to the extent practical, to protect against the potential release of hazardous materials to the environment and to minimize the cost of decommissioning and demolition required to manage hazardous materials in compliance with regulatory requirements.

C. Systems (i.e., water, lights, sewer, Heating, Ventilation, and Air Conditioning [HVAC], etc.) needed to support surveillance and maintenance, future disposition and decommissioning activities and 400 Area occupants shall be maintained. These systems or portions of the systems are Group 10, Final Systems Shutdown. Included will be system documentation, procedures, spare parts and preventive maintenance performed. (The final deactivation in accordance with NEPA determinations will determine the timing and ultimate disposition of these systems and the IEM Cell.)

D. Provide a file on the operating history and the spare parts list for plant equipment that is required to be left operational in support of anticipated surveillance and maintenance or decommissioning activities.

E. Equipment or components with high value and recycle potential shall be either removed, or preserved for later removal.

4.2.6 Hazardous Materials

A. Locate, identify, and quantify all hazardous material which is attached, contained or cannot be removed without going into a decommissioning mode and record as part of the shutdown/deactivation file.

B. Hazardous materials (e.g., solvents, glycols, polychlorinated biphenyls, and asbestos) which may be stabilized or removed are managed, reused, recycled, or disposed of in accordance with applicable federal and state regulations.

C. Electrical transformers containing PCB oils will be dispositioned in accordance with requirements of 40 Code of Federal Regulations (CFR) 761 when they no longer provide power to equipment needed for decommissioning.

4.2.7 Administrative Items

A. All deactivation activities are recorded in System Deactivation Summary Reports.

B. The FFTF Safety Analysis Report or Interim Safety Bases and Plant Emergency Procedures shall be reviewed and updated or replaced as required for the deactivated condition, in accordance with applicable regulations.

C. Complete a risk assessment on all the FFTF Plant Buildings identified in Table 1.0 and publish a report on the findings.

D. Review existing environmental and/or other applicable permits associated with the FFTF Plant Buildings to determine the status and need for maintaining the related system, then, either:

1) Required environmental monitoring and discharge systems are identified and needed equipment is to be in a serviceable condition.
2) For systems and subsystems no longer required, deactivate, and environmentally seal ventilation air supply and exhaust systems, where appropriate.

E. Assure full compliance with Radiological Control Manual, especially as it pertains to radiological posting. This should be accomplished by having Health Physics perform an operational safety assessment, followed by correcting all noted discrepancies.

F. Devalue in the Property Management System deactivated facilities, buildings, structures and internal equipment.

5.0 Remaining Hazardous Materials

The FFTF Plant has an inventory of hazardous and radiological materials, in varying amounts, types, and locations. The primary hazards of concern include irradiated nuclear fuel, multiple radioactive contaminants, radioactively-contaminated liquid sodium and NaK, radioactively-contaminated cold traps (e.g., a cesium trap, vapor traps, etc.), ethylene glycol, PCBs, oils, asbestos, lead, and depleted uranium. Other smaller quantities of hazardous materials are also present. Much of these materials will be dispositioned during the facility deactivation in accordance with decisions made by existing DOE NEPA decisions. Significant materials which may remain following completion of deactivation include the materials identified below. The hazardous material location and quantity will be documented per the requirements of Section 4.2.6.A end point.

Alkali Metal (Sodium)

The SSF will contain approximately 260,000 gallons of frozen, radioactively-contaminated FFTF sodium in tanks with an inert cover gas. This sodium inventory will ultimately be converted to sodium hydroxide for use in the DOE Office of River Protection's Waste Treatment and Immobilization Plant (WTP) for reuse as product and is not considered a waste material. A decision on the WTP pretreatment process was previously made per TPA Milestone M-50-03 and accommodation of this product reuse is currently contained in WTP contract language. Final decisions on the management of the FFTF sodium inventory, including building or using an existing facility to convert the sodium to sodium hydroxide, will be identified in the FFTF EIS ROD.

Frozen sodium residuals will remain in the systems following draining under a cover gas to prevent significant reaction. The anticipated sodium volume in the primary, secondary and auxiliary sodium systems, FSF and IDS Vessel is estimated as 1300 gallons. In addition to this quantifiable volume, additional residual sodium will remain in the form of droplets, films and small pools in system low points. Management and disposition options of the sodium residuals are being evaluated in the FFTF EIS.

Special (radioactively-contaminated) components identified in Section 4.2.4.4 (primary cold trap, IDS cold trap, two FSF cold traps, three secondary cold traps, cesium trap, and six primary sodium vapor traps) will contain an estimated 2280 gallons of sodium. These components will not be drained and will be isolated then frozen. These components will not be dispositioned during deactivation. Management and disposition options of these components are being evaluated in the FFTF EIS.

In addition, there are approximately 50 NaK filled pressure transducers, containing a very small quantity of NaK. The NaK is encapsulated within a capillary tube between the sodium system and an electronic pressure transmitter. These NaK capillary tubes will be dispositioned along with the small diameter sodium wetted piping and components.

Ethylene Glycol

The chilled water systems contain an estimated 94,360 gallons of water and 45% ethylene glycol mixture. When no longer needed to support HVAC needs the system will be drained and the ethylene glycol recycled during deactivation. For systems still required, the remaining quantity and locations will be documented during deactivation (see End Point 4.2.6). Management and disposition options for the remaining quantities are being evaluated in the FFTF EIS.

Lead

Both lead-based paint and lead shielding are present in the facility. There is an estimated 105,600 lbs of lead, the location and amounts are as follows: In-containment (34,000 lbs), Ex-containment (9,000 lbs), MASF (45,500 lbs), IEM Cell (6,700 lbs), 491S (900 lbs), and 4713D (9,500 lbs). The locations will be confirmed and documented during the deactivation process (see End Point 4.2.6). Management and disposition options for lead are being evaluated in the FFTF EIS.

Miscellaneous Chemicals

Other chemicals in significant quantity include the following: Emergency batteries, containing an estimated 1,344 gallons of battery acid. Pump speed control rheostats, containing an estimated 3,960 gallon of fluid containing sodium carbonate. Compressed gases, including acetylene oxygen, propane P-10 nuclear counter gas mixture, argon and liquid nitrogen, are also present. During deactivation unneeded materials will be recycled. For materials which remain following deactivation the location will be confirmed and documented (see End Point 4.2.6). Management and disposition options for the remaining quantities are being evaluated in the FFTF EIS.

Polychlorinated biphenyls

The electrical systems contain PCBs in transformers and florescent light ballasts. Some of the PCB transformers will have electrical loads until Systems Shutdown Group 10 is addressed, others can not be easily removed without going into a decommissioning mode. Their locations will be confirmed and documented during the deactivation process. When PCB transformers

containing cooling oils with PCB are no longer needed to support decommissioning activities they will be dispositioned in accordance with of 40 CFR 761. (As of November 2004, 9 of 19 transformers have been satisfactorily dispositioned.) Any floresecent light ballast containing PCBs will be dispositioned during the decommissioning phase in accordance with regulatory requirements.

Chlorofluorocarbon (CFC)

Some refrigerants and fire suppression gases contain ozone depleting CFCs and are recovered and recycled when the equipment is no longer needed. Refrigerants are located in air conditioning units and water coolers. An estimated 1,766 lbs of Halon 1301 is used for fire suppression in the FSF Control Room, Turbine Generator Building, and cells 110, 135, and 404. The chilled water systems contain an estimated 22,000 lbs of CFC free refrigerant and 256 lbs of R22 refrigerant. Some systems will be emptied to recover the CFCs during deactivation. The remaining CFC quantities and locations will be documented during the deactivation process.

Asbestos

Asbestos containing materials are used in gaskets, cooling system insulation and fire-retardant wire way coatings. These materials will remain following deactivation. The quantity of asbestos containing materials in FFTF has not been estimated; however the Asbestos Location Tracking Program documents (reference HND-SD-FF-DP-008) asbestos locations and condition. The locations will be confirmed and quantities documented during the deactivation process (see End Point 4.2.6). Management and disposition options for asbestos are being evaluated in the FFTF EIS.

Activated and Radioactively-Contaminated Components

The FFTF has both activated and radiologically-contaminated equipment. There are 70 exit signs, each contains from 10 to 20 curies of tritium. Equipment that has been in the Reactor Cavity (cell 551) was subject to neutron activation and is radioactive. Examples are the reactor vessel and internal components. The IEM Cell and Test Assembly Conditioning Station also contain activated equipment. There is also contaminated reactor support equipment in various plant locations and in storage. Ultimate disposition of these items will occur during decommissioning. Management and disposition options for this type of equipment are being evaluated in the FFTF EIS.

Depleted Uranium

Depleted uranium (DU) is present in shielding for the reactor systems and various components. The location and estimated amounts are as follows: Center Island shielding (51,245 lbs), Floor Valve Adapters (2), (total of 15,000 lbs), Branch Arm Piping (7,765 lbs), Fuel Transfer Ports (3 items, 2,433 lbs each), Closed Loop Ex-vessel Machine Test Assembly Grapple (1800 lbs),

and warehouse storage (5,000 lbs). The locations will be confirmed and documented during the deactivation process. Ultimate disposition will occur during decommissioning. Management and disposition options for the DU are being evaluated in the FFTF EIS.

6.0 Regulatory Framework

This section describes the Regulator and Stakeholder involvement in the FFTF deactivation. Also identified are completed and planned NEPA documentation and TPA milestones established for FFTF deactivation. The FFTF Decommissioning EIS conclusions, when completed, will identify the regulatory framework for the decommissioning phase.

The Deactivation End Points are developed by the responsible FFTF Contractor and approved by RL. This document is provided to EPA and Ecology (the lead agency) for review, and approval for the regulated units and/or hazardous substances proposed to remain at the facility after transition is complete. The hazardous materials anticipated to remain are identified in Section 5.0.

Resource Conversation and Recovery Act (RCRA) Regulated Units:

There are no regulated units at FFTF.

Statutory Requirements:

Deactivation activities for the FFTF Closure Project must comply with state and federal environmental regulations and agreements/consent orders, such as the TPA, RCRA, Clean Air Act, Toxic Substances Control Act, and the State Environmental Policy Act 1971.

DOE Orders & Requirements:

Compliance with applicable DOE Orders will be maintained. The Quality Assurance Program and nuclear-safety documentation are maintained in compliance with 10 CFR 830 requirements. The Radiological Control Program is maintained in compliance with requirements in 10 CFR 835, *Occupational Radiation Protection.*

TPA Milestones:

FFTF is identified as a key facility in the *Hanford Federal Facility Agreement and Consent Order* (TPA), Appendix 2, Section 8. As such, FFTF is subject to the decommissioning process delineated in Sections 7 and 8 of the TPA. FFTF deactivation milestones are contained in the TPA milestones series M-81. The current TPA milestones (as of July 31, 2002) are listed in Table 2. Completion of some milestones is dependant on the outcome of the FFTF Decommissioning EIS.

Stakeholder Involvement:

Stakeholders are involved with actions at FFTF as described by the TPA Community Relations Plan, Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) process commenting periods, and the NEPA process.

Table 2 FFTF TPA Milestones

Milestone ID	Description	Due Date
M-81-13	Complete reactor and heat transport system sodium drain.	6/30/2005
M-81-11	Submit FFTF End Point Criteria Document.	8/31/2005
M-81-10-T01*	Submit final sodium disposition evaluation report	9/30/2005
M-81-14-T01	Complete Fuel Storage Facility sodium drain.	4/30/2007
M-81-14-T02	Initiate Interim Decay Storage Vessel sodium drain.	6/30/2008
M-81-00A-T02	Complete transfer of unirradiated fuel to secure onsite storage.	3/31/2009
M-81-00A-T03	Complete transfer of irradiated fuel to secure onsite storage.	3/31/2009
M-81-00A-T04	Complete transfer of special fuel to DOE Idaho.	3/31/2009
M-81-14	Complete FFTF Sodium Drain.	9/30/2009
Milestones dependent upon FFTF Decommissioning EIS Outcome		
M-81-15	Submit FFTF Surveillance and Maintenance Plan.	6/30/2010
M-081-00A	Complete FFTF Facility Transition and initiate the surveillance and maintenance phase.	2/28/2011
M-81-00A-T05	Complete auxiliary plant systems deactivation.	2/28/2011

* Completion of M-81-10-T01 will also constitute completion of M-92-10.

NEPA Related Documentation:

- FFTF Shutdown Environmental Assessment and Finding of No Significant Impact: DOE/EA-0993, *Environmental Assessment Shutdown of the Fast Flux Test Facility, Hanford Site, Richland, Washington,* completed May 1995.

- Programmatic Environmental Impact Statement and Record of Decision: *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, United States Department of Energy, Office of Nuclear Energy, Science and Technology, Washington, DC.

- Judicial Order:
  Benton County, Plaintiff, v. U.S. Department of Energy, et al., Defendants, *Order Denying the Plaintiff's Motion for Summary Judgment Granting Defendants' Motion for Summary Judgment, and Extending Injunction for 30 Days,* U.S. District Court, Eastern District of Washington, NO. CT-02-5100-EFS, filed February 28, 2003.

- FFTF Decommissioning Environmental Impact Statement:
  Notice of Intent: To Prepare an Environmental Impact Statement for the Decommissioning of the Fast Flux Test Facility at the Hanford Site, Richland, WA, Federal Register: Volume 69, Number 156, Pages 50176-50180, August 13, 2004. (Completion of the EIS is a perquisite to completing TPA M-81-10-T01.)

7.0 Decommissioning Planning

It is anticipated that as a "Key Facility" under TPA Section 8.1.2, the FFTF will be decommissioned under the provisions of a non-time-critical removal action under CERCLA.

The DOE has begun an FFTF EIS to review the various alternatives for the final end state of FFTF Plant and its support facilities at the Hanford Site. This action is required by the Court, as the EA for shutdown did not address the FFTF decommissioning. Alternatives to be considered are the no action, removal, entombment and restoration alternatives. An ROD would be issued no sooner than 30 days after publication of the EPAs Notice of Availability of the final EIS in the Federal Register.

The DOE plans to place a small business contract to complete the FFTF Closure Project. The proposed contract sought for the new contractor to meet the DOE direction for a seamless transition from deactivation to decommissioning activities, without a prolonged surveillance and maintenance period. Deactivation includes transition activities (system shutdown, bulk hazard removal, reactor fuel removal) and initial decontamination. The decommissioning activities encompass the final decontamination, disposition and demolition.

8.0 References

10 CFR 830, Nuclear Safety Management in the Code of Federal Regulations (CFR)
Code of Federal Regulations Title 10 - Energy, Part 830, *Nuclear Safety Management* Subpart B, "Safety Basis Requirements."

10 CFR 835, Occupational Radiation Protection
Code of Federal Regulations Title 10, Part 835, *Occupational Radiation Protection.*

Resource Conservation and Recovery Act (RCRA)
Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.

Clean Air Act
Clean Air Act, 1977, as amended, 42 U.S.C. 7401, et seq.

Toxic Substances Control Act

Toxic Substances Control Act of 1976, 15 U.S.C. 2601, et seq.

DOE Orders and Guides

DOE G 430.1-3, *Deactivation Implementation Guide*, September 29, 1999, U.S. Department of Energy, Washington, D.C.

DOE/EM-0318, *Facility Deactivation Methods and Practices Handbook*, Revision 1, U.S. Department of Energy, Office of Environmental Management, Office of Nuclear Material and Facility Stabilization (EM-60), Washington, D.C., dated August 20, 1999.

DOE O 430.1A, *Life Cycle Asset Management*, 1998, U.S. Department of Energy, Washington, D.C.

FFTF End Point Documents

Letter, J. E. Mecca, RL, to President, WHC, "Approval of the 'FFTF Deactivation End Point Criteria' Revision 0," 96-TPD-062, dated June 7, 1996.

WHC-SD-FF-TPP-001, Revision 0, *FFTF Deactivation End Point Criteria*, Westinghouse Hanford Company, Richland, WA, dated April 23, 1996.

FFTF Program Plan Document

HNF-SD-FF-SSP-004, Revision 5, *Fast Flux Test Facility Closure Project*, Project Management Plan, Fluor Hanford, Richland, WA, dated September 2002.

HNF-SD-FF-DP-008, Revision 11, *Fast Flux Test Facility Asbestos Location and Tracking Program*, Fluor Hanford, Richland, WA, dated March 2002.

NEPA Related Documents

Notice of Intent: To Prepare an Environmental Impact Statement for the Decommissioning of the Fast Flux Test Facility at the Hanford Site, Richland, WA, Federal Register Volume 69, Number 156, Pages 50176-50180, dated August 13, 2004.

Benton County, Plaintiff, v. U.S. Department of Energy, et al., Defendants, *Order Denying the Plaintiff's Motion for Summary Judgment Granting Defendants' Motion for Summary Judgment, and Extending Injunction for 30 Days*, U.S. District Court, Eastern District of Washington, No. CT-02-5100-EFS, filed February 28, 2003.

66 FR 7877, 2001, *Record of Decision for the 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*, Federal Register, Vol. 66 pp. 7877-7887, January 26, 2001.

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, United States Department of Energy, Office of Nuclear Energy, Science and Technology, Washington, DC, DOE/EIS-0310, dated December 2000.

DOE/EA-0993, *Environmental Assessment: Shutdown of the Fast Flux Test Facility,* Hanford Site, Richland, WA, dated May 1995.

Shutdown of the Fast Flux Test Facility, Hanford Site, Richland, Washington, Finding of No Significant Impact, U.S. Department of Energy, Richland Operations Office, dated May 1995.

TPA Related Documents

Meeting Minutes Transmittal, *Meeting Minutes Project Managers Meeting FFTF May 13, 2004*, Tri-Party Agreement Administrative Record File Accession Number D5805717, Richland, WA, dated August 5, 2004.

Letter, J. B. Hebdon, RL, to M. A. Wilson, Ecology, "Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) Change Request M-81-01-01, Fast Flux Test Facility (FFTF) Transition and Change Request M-92-01-01, Sodium Facilities Acquisition and Disposition," dated March 19, 2002.

Community Relations Plan for the Hanford Federal Facility Agreement and Consent Order, January 2002, U.S. Department of Energy Richland Operations Office, Richland, WA.
Document may be found at, "**http://www.hanford.gov/crp/pdf/crp.pdf**"

Document, Washington State Department of Ecology, U.S. Environmental Protection Agency, U.S. Department of Energy, *Hanford Federal Facility Agreement and Consent Order*, July 1995, and subsequent amendments.