Sta. 4 (3)

NOV 0 6 1995

ENGINEERING DATA TRANSMITTAL

1. EDT № 614194

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	Systems And Materials	NA
5. Proj./Prog./Dept./Div.:	6. Cog. Engr.:	7. Purchase Order No.:
10250	Dennis P. Lund	NA
8. Originator Remarks: Please approve the attached FFTF Transition Function Analysis Report. All previous comments have been incorporated and/or resolved. Mark column (H), sign and date next to your name.		9. Equip./Component No.: NA
		10. System/Bldg./Facility: FFTF
11. Receiver Remarks:		12. Major Assm. Dwg. No.: NA
		13. Permit/Permit Application No.: NA
		14. Required Response Date: NA

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-FF-FAR-001	N/A	0	FFTF Plant Transition Function Analysis Report	N/A	2	1	1

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng. D.P. Lund	D.P. Lund	10-17-95	R3-56	Central Files	KMB	11/3/95	A3-88	~~L8-04~~	
1	1	Cog. Mgr. R.R. Borisch	R.R. Borisch	10-17	R3-56	~~0671~~	KMB	11/3/95	~~L8-07~~		
–		QA N/A									
–		Safety N/A									
–		Env. N/A									
1	1	FFTF; S. Guttenbeck	S. Guttenbeck		N2-53						
1	1	FFTF; T.M. Burke	T.M. Burke	10/31/95	H6-01						

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
DP Lund D.P. Lund 11-1-95 Signature of EDT Originator / Date	N/A Authorized Representative for Receiving Organization / Date	RR Borisch R.R. Borisch 11-1-95 Cognizant Manager / Date	[] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (04/94) GEF097

RELEASE AUTHORIZATION

Document Number:	WHC-SD-FF-FAR-001, REV 0
Document Title:	FFTF Plant Transition Function Analysis Report
Release Date:	11/3/95

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara Broz 11/3/95

SUPPORTING DOCUMENT

1. Total Pages 37

2. Title	3. Number	4. Rev No.
FFTF Plant Transition Function Analysis Report	WHC-SD-FF-FAR-001	0

5. Key Words	6. Author
FFTF Function Analysis Report, Function Analysis Report, FFTF Transition Function Analysis	Name: DP Lund Signature Organization/Charge Code 10250/K1C11

7. Abstract

The document contains the functions, function definitions, function interfaces, function interface definitions, Input Computer Automated Manufacturing Definition (IDEFO) diagrams, and function hierarchy charts that describe what needs to be performed to deactivate FFTF.

8. RELEASE STAMP

WHC-SD-FF-FAR-001, Revision 0

FFTF PLANT TRANSITION FUNCTION ANALYSIS REPORT

September 1995

Prepared for:

WESTINGHOUSE HANFORD COMPANY
P.O. Box 1970
Richland, Washington 99352

Prepared by:
FFTF Working Group

FFTF PLANT TRANSITION FUNCTION ANALYSIS REPORT

Table of Contents

1.0 INTRODUCTION

1.1 Objective

This report is the product of one of several steps in the system engineering approach and defines the detailed content and broad context of the Hanford Site cleanup effort for Fast Flux Test Facility (FFTF). A summary of the steps are listed below:

- Mission Analysis: This step establishes the problem to be solved and an acceptable end condition. It provides the basis for developing a system to resolve the problem. The mission is basically the purpose of the system which is to transform the initial conditions to final conditions. The product from this step is WHC-SD-FF-MAR-001 FFTF Plant Transition Mission Analysis Report.

- Functional Analysis: The functions that FFTF must perform are derived in this step. These functions include technical functions that a system must perform, other functions that must be carried out in support of the technical functions (i.e., organizational/ management functions), interdependencies among the functions, and functional performance criteria. The functional analysis effort produces a functional hierarchy with detailed descriptions of all functions and interfaces to the lowest level.

- Requirement Identification: Statutory, regulatory, technical, social, and economic requirements with which a system must comply are identified in this step. These requirements fall into two classes: mission-driven requirements and externally imposed requirements. This step produces a baseline list including requirement sources and their descriptions.

- Requirements Allocation to System Functions: The identified requirements are allocated to the system functions producing a requirements baseline for the systems engineering process.

- Identification of Alternative Solutions: Based on the products of the systems engineering steps described above different structural, physical and organizational configurations that provide system solutions are developed.

This report contains the products from the second step described above. The sections in this report are: 2.0 Functional Analysis, 3.0 Functional Interfaces and Dependencies, and 4.0 Issues. Addenda provide all of the back up information relating to FFTF. The addenda are reports generated from RDD-100, a computer program by Ascent Logic.

1.2 Mission Statement

The FFTF Mission Statement was developed during mission analysis and is reported in WHC-SD-FF-MAR-001 FFTF Plant Transition Mission Analysis Report. It is repeated below:

> " The purpose of the FFTF Transition Project is to prepare FFTF for Decontamination and Decommissioning (D&D). This will be accomplished by establishing a passively safe and environmentally secure configuration of the FFTF Plant, that can be preserved for several decades. The project removes reactor fuel, dispositions unirradiated fuel, washes and dry cask stores irradiated fuel, shuts down auxiliary systems, drains the sodium systems, addresses the sodium residuals, and converts the bulk sodium into a form suitable for disposition. Ancillary support facilities within the FFTF fenceline will be deactivated. During deactivation, appropriate portions of the safety envelope will be maintained to ensure deactivation takes place in a safe and regulatory compliant manner. Stakeholders will also be actively involved during deactivation."

2.0 FFTF FUNCTIONS

Identifying FFTF functions and subfunctions creates a functional hierarchy called a tree. The analysis begins with the top level function, "Deactivate FFTF." It is broken down into a number of major, necessary, and sufficient functions that, when completed in the prescribed logic, will ensure that FFTF's mission is accomplished. The functional decomposition process is repeated for successively more detailed functional levels until known (precedented) solutions are available. Each function and subfunction is precisely defined. System function definitions are essential to establish what FFTF must do to execute its mission successfully. Formal definitions create understanding of all aspects of the system being engineered (i.e. hardware, software, facility, processes, services, or modifications) and provide a mechanism to insure that all parts of the system contribute to fulfill the FFTF mission.

The ultimate function of the FFTF system is to perform operations that satisfy the mission need identified in the FFTF Mission Analysis Report repeated below:

> " The research and development mission at FFTF does not exist anymore. The FFTF facility is expensive to maintain and operate, and nuclear, radioactive and hazardous materials are not properly dispositioned. FFTF must be deactivated in a manner such that safe and compliant D&D operations can take place with acceptable risk and with only minimal maintenance and surveillance required to maintain the facility for 20 years or more while awaiting D&D."

2.1 Relationship to Hanford Site Functional Hierarchy

The FFTF mission statement developed during the FFTF mission analysis is consistent with the top level (0 Cleanup Hanford) and the first, second and third level functions (4.0 Remedy Unsafe and Unacceptable Conditions, 4.1 Deactivate Facilities and 4.1.1 Deactivate Facilities with Special Nuclear Materials and Nuclear Materials (Type 1 Facility)) first identified in WHC-EP-0722 "Systems Engineering Functions and Requirements for the Hanford Cleanup Mission: First Issue" of January 1994 and later revised and maintained as the Hanford Site Integrated Technical Baseline (HSITB). This function hierarchy is shown in Figure 1. The FFTF mission begins with function 4.1.1.4 Deactivate FFTF.

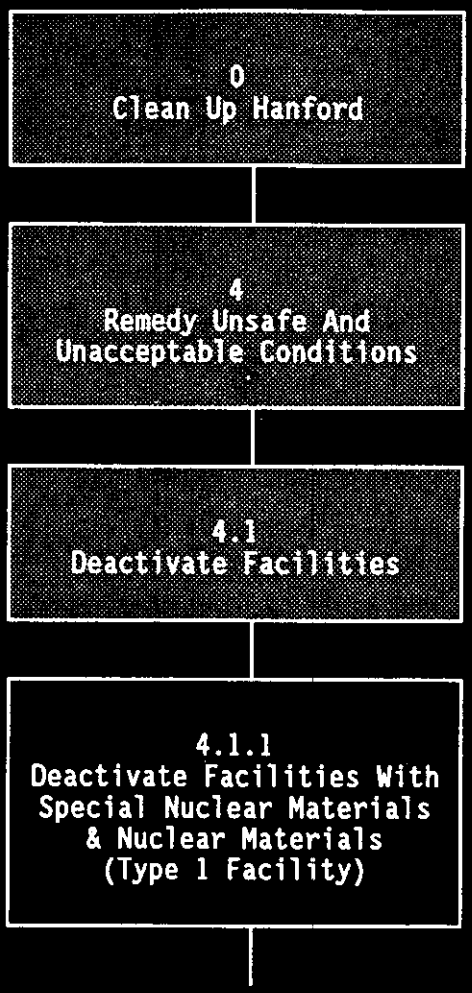


Figure 1. Hanford Site Function Hierarchy

2.2 Function Hierarchy

The detailed FFTF functional hierarchy is presented in Addendum 1. It begins at level four (4.1.1.4 Deactivate FFTF) and continues to level six and in some places level seven and level eight.

2.3 Function Definition Table

The definitions of the FFTF functions in the functional hierarchy in Addendum 1 are presented in Addendum 2.

3.0 FUNCTIONAL INTERFACES AND DEPENDENCIES

Another way to describe functions is using functional interface diagrams. They establish the dependencies between the functions defined in the functional hierarchy. By conceptualizing each function as a process where inputs, resources, and controls are transformed into outputs, the relationships between functions can be identified. The outputs of one function become the inputs of other functions. Function inputs (initial-state condition) enter from the left. Outputs (end-state condition) exit to the right. Controls enter from the top, and resources (sometimes called mechanisms) enter from the bottom. Inputs, outputs, controls and resources are all called interfaces and/or products and are defined for each system function.

3.1 IDEF Diagrams

The FFTF interface diagrams are provided in the form of Input Computer Automated Manufacturing Definition (IDEF0) diagrams produced from the RDD system model and are found in Addendum 3. IDEF0 diagrams are one kind of diagram used in ICOM DEFinition method where ICOM stands for Input, Controls, Output, Mechanisms.

3.2 Interface Definitions

The FFTF interface definitions, presented in Addendum 4, provides descriptions of all the interfaces found on the IDEF diagrams in Addendum 3. Inputs, outputs, controls and resources are all considered interfaces and are also sometimes called products.

4.0 ISSUES

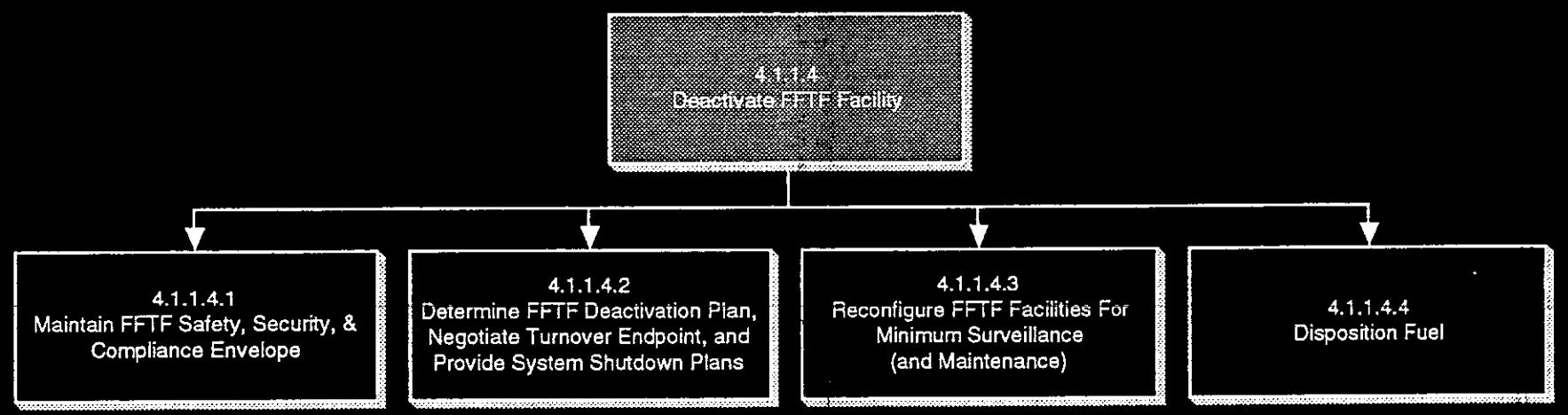
The following list summarizes issues from WHC-SD-FF-MAR-001 FFTF Plant Transition Mission Analysis Report and the issues currently facing the project as identified by the work group. These issues will be further refined and clarified in order to effectively attach them to the functions and interfaces contained in the systems model in RDD-100.

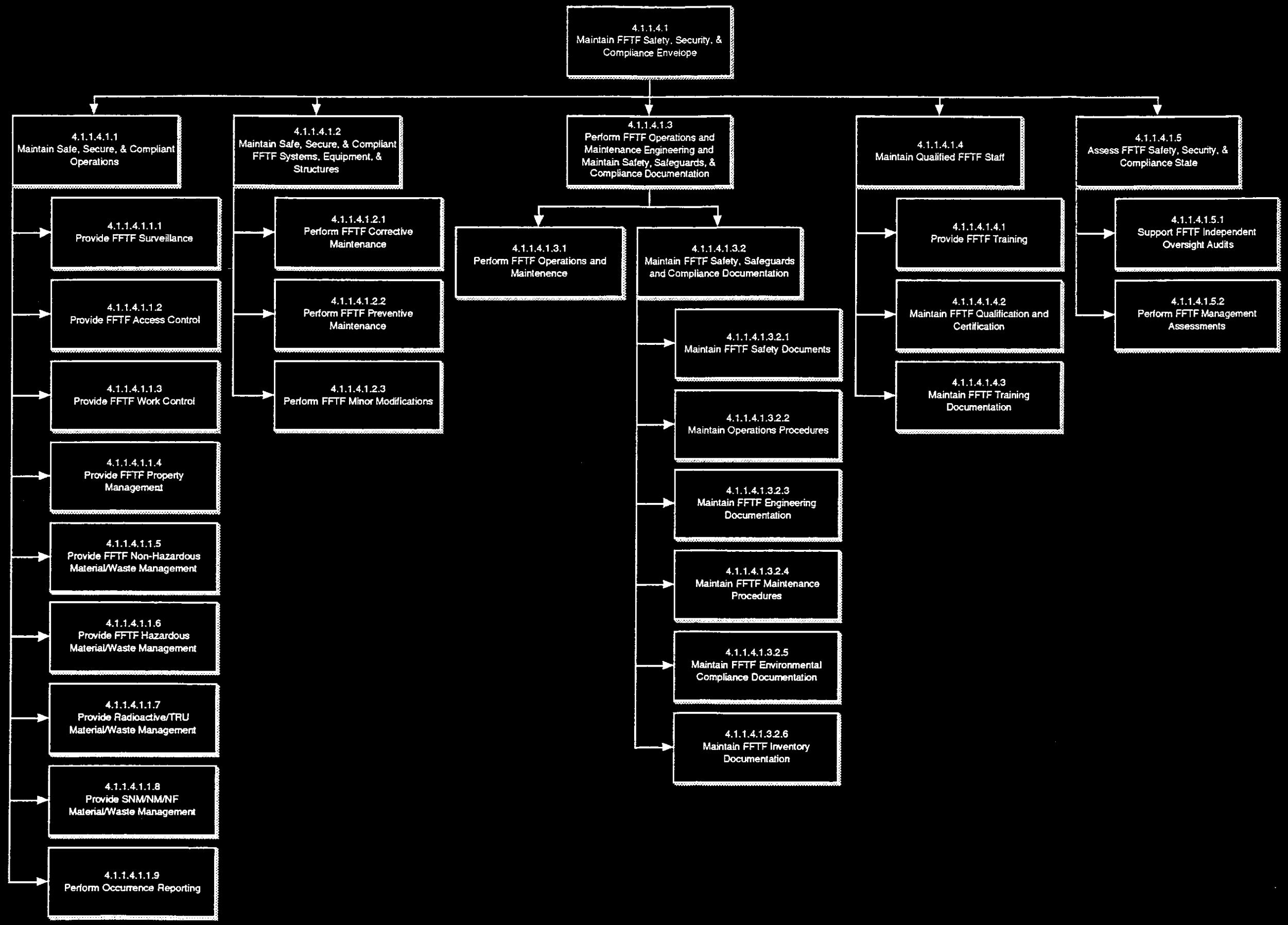
- The specific end-point criteria for turnover to the Environmental Restoration Contractor (ERC) have not been completely developed or agreed upon by the ERC. The activities which will be completed and the key assumptions made to continue progress are described in the FFTF Transition Project Plan (WHC-SD-FF-SSP-004, Rev. 1).

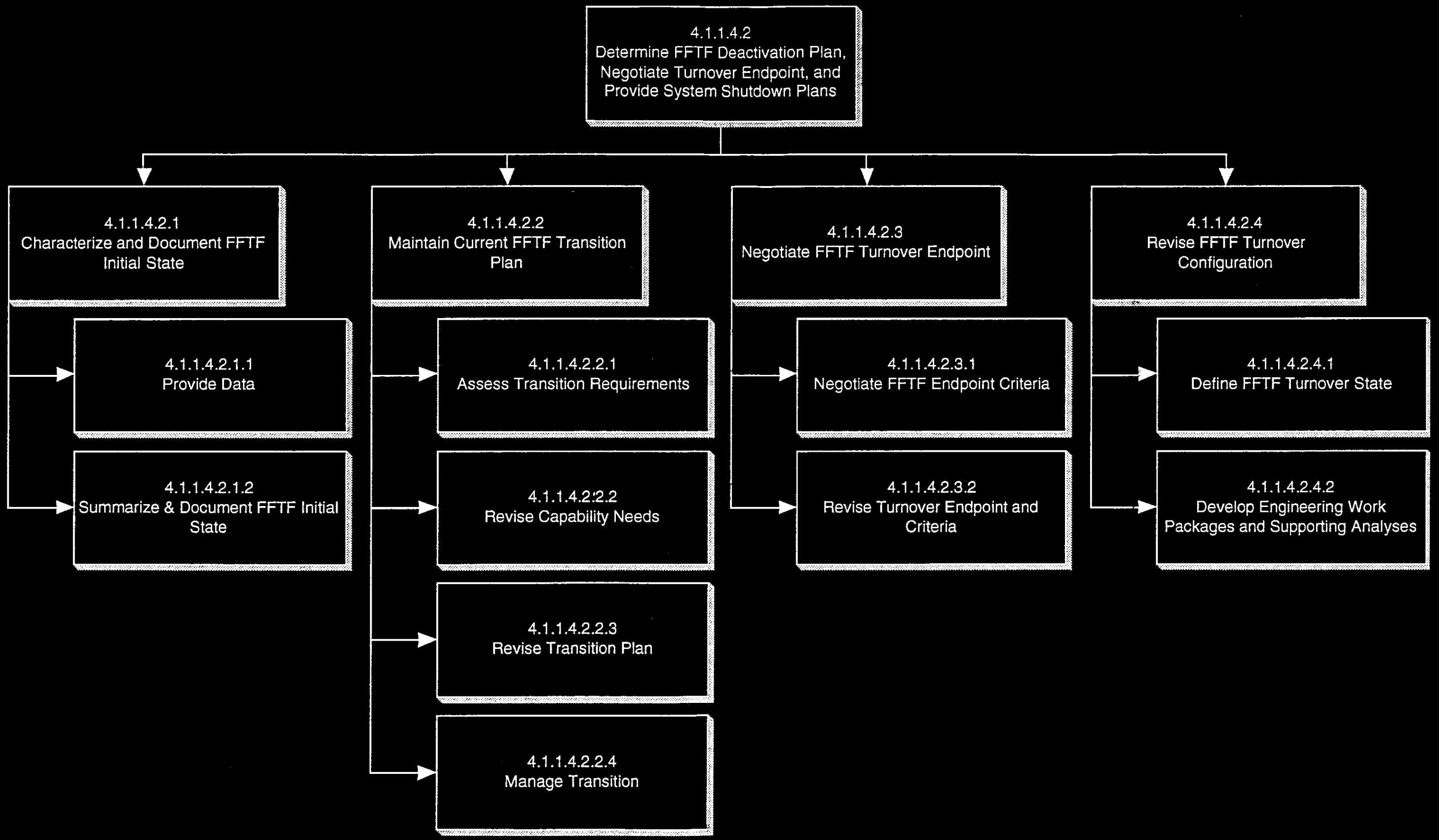
- The final disposition and the storage location until disposition for the nuclear materials have not been determined yet. Potential locations have been identified as follows: sodium bonded test assemblies to Idaho, irradiated fuel stored on site, and unirradiated fuel to Plutonium Finishing Plant (PFP).

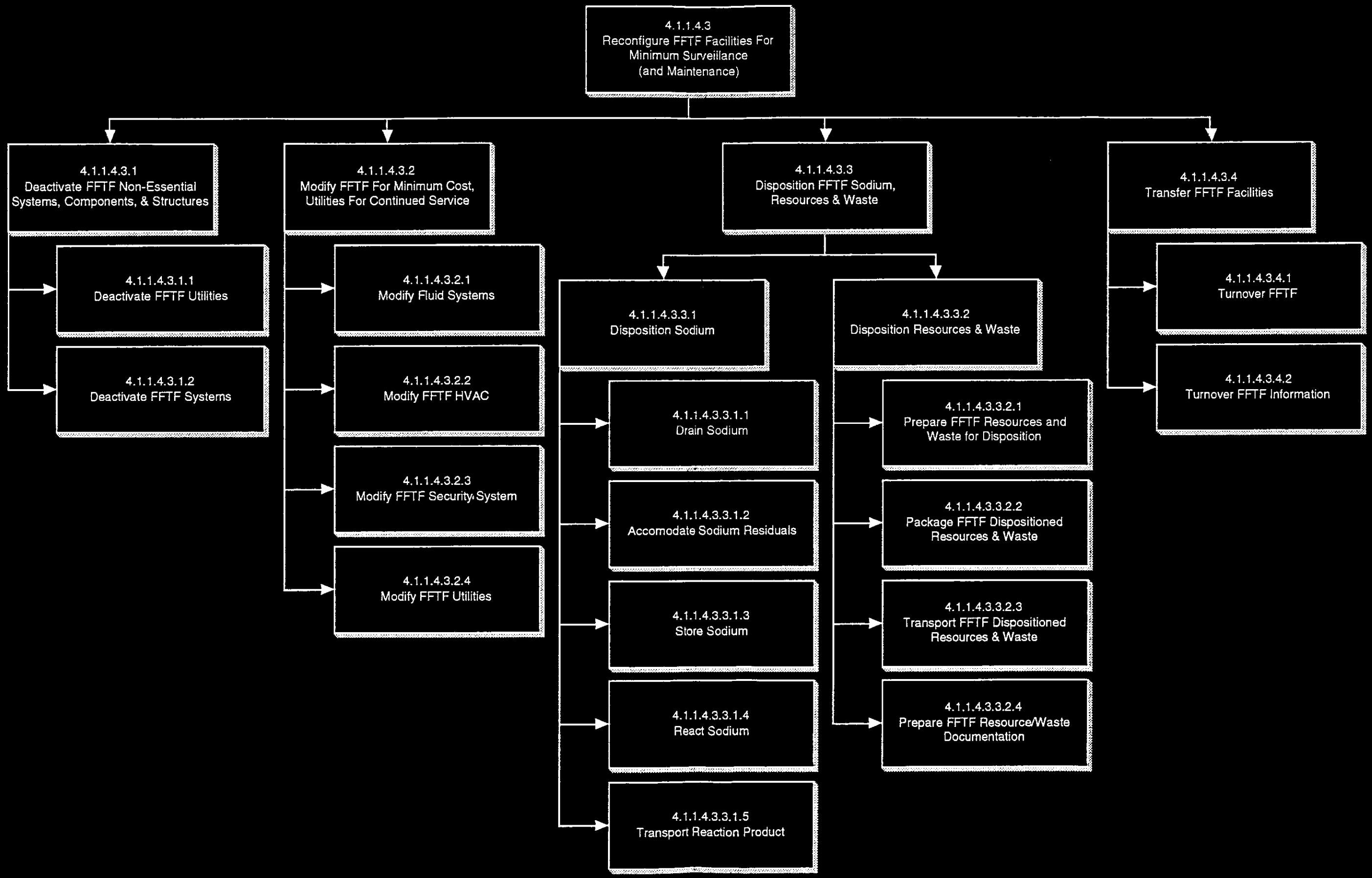
- Bulk sodium is currently planned to be converted to hydroxide for use at TWRS during treatment of tank waste sludge. This conversion is included in the functional decomposition. However, the final decision on this issue is not expected until 1998.

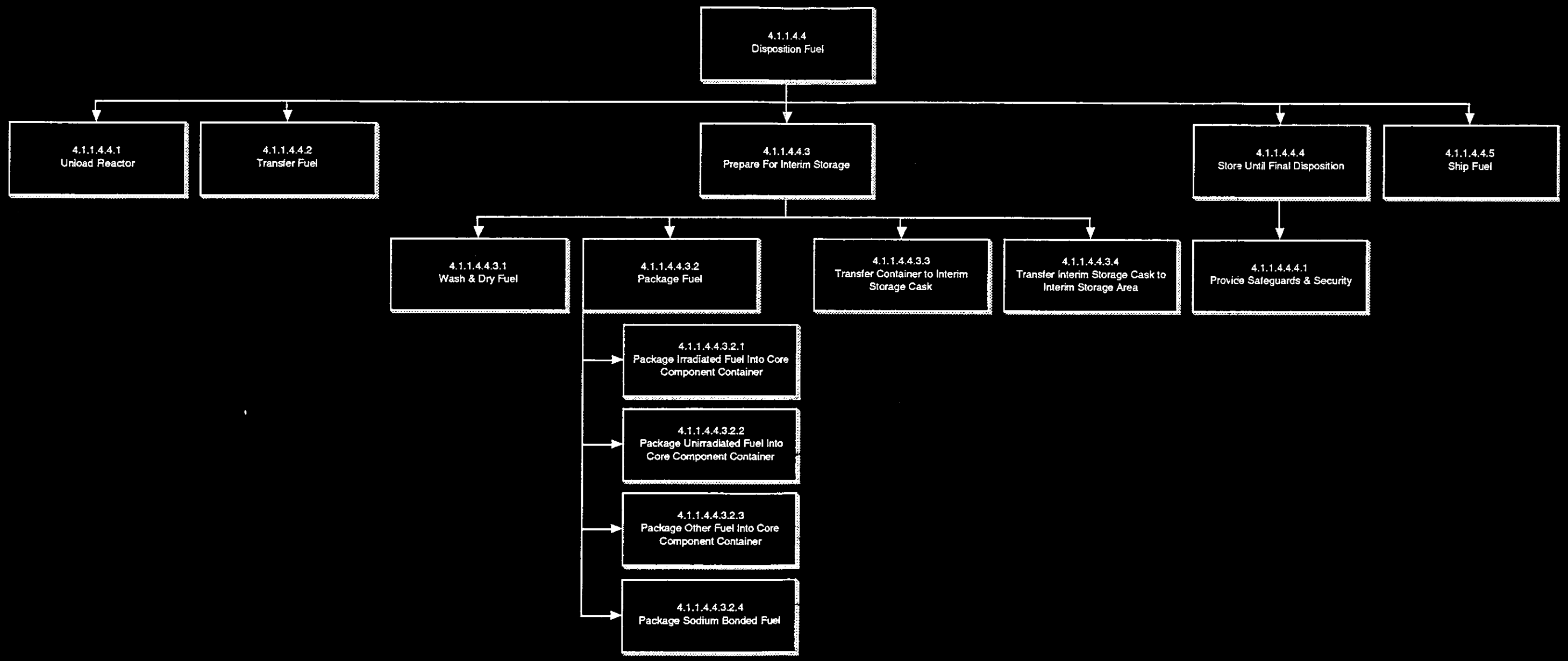
ADDENDUM 1 - FUNCTIONAL HIERARCHY


4.1.1.4
Deactivate FFTF Facility
4.1.1.4.1
Maintain FFTF Safety, Security, & Compliance Envelope
4.1.1.4.2
Determine FFTF Deactivation Plan, Negotiate Turnover Endpoint, and Provide System Shutdown Plans
4.1.1.4.3
Reconfigure FFTF Facilities For Minimum Surveillance (and Maintenance)
4.1.1.4.4
Disposition Fuel


4.1.1.4.1
Maintain FFTF Safety, Security, & Compliance Envelope
4.1.1.4.1.1
Maintain Safe, Secure, & Compliant Operations
4.1.1.4.1.2
Maintain Safe, Secure, & Compliant FFTF Systems, Equipment, & Structures
4.1.1.4.1.3
Perform FFTF Operations and Maintenance Engineering and Maintain Safety, Safeguards, & Compliance Documentation
4.1.1.4.1.4
Maintain Qualified FFTF Staff
4.1.1.4.1.5
Assess FFTF Safety, Security, & Compliance State
4.1.1.4.1.1.1
Provide FFTF Surveillance
4.1.1.4.1.1.2
Provide FFTF Access Control
4.1.1.4.1.1.3
Provide FFTF Work Control
4.1.1.4.1.1.4
Provide FFTF Property Management
4.1.1.4.1.1.5
Provide FFTF Non-Hazardous Material/Waste Management
4.1.1.4.1.1.6
Provide FFTF Hazardous Material/Waste Management
4.1.1.4.1.1.7
Provide Radioactive/TRU Material/Waste Management
4.1.1.4.1.1.8
Provide SNM/NM/NF Material/Waste Management
4.1.1.4.1.1.9
Perform Occurrence Reporting
4.1.1.4.1.2.1
Perform FFTF Corrective Maintenance
4.1.1.4.1.2.2
Perform FFTF Preventive Maintenance
4.1.1.4.1.2.3
Perform FFTF Minor Modifications
4.1.1.4.1.3.1
Perform FFTF Operations and Maintenence
4.1.1.4.1.3.2
Maintain FFTF Safety, Safeguards and Compliance Documentation
4.1.1.4.1.3.2.1
Maintain FFTF Safety Documents
4.1.1.4.1.3.2.2
Maintain Operations Procedures
4.1.1.4.1.3.2.3
Maintain FFTF Engineering Documentation
4.1.1.4.1.3.2.4
Maintain FFTF Maintenance Procedures
4.1.1.4.1.3.2.5
Maintain FFTF Environmental Compliance Documentation
4.1.1.4.1.3.2.6
Maintain FFTF Inventory Documentation
4.1.1.4.1.4.1
Provide FFTF Training
4.1.1.4.1.4.2
Maintain FFTF Qualification and Certification
4.1.1.4.1.4.3
Maintain FFTF Training Documentation
4.1.1.4.1.5.1
Support FFTF Independent Oversight Audits
4.1.1.4.1.5.2
Perform FFTF Management Assessments


4.1.1.4.2
Determine FFTF Deactivation Plan, Negotiate Turnover Endpoint, and Provide System Shutdown Plans
4.1.1.4.2.1
Characterize and Document FFTF Initial State
4.1.1.4.2.2
Maintain Current FFTF Transition Plan
4.1.1.4.2.3
Negotiate FFTF Turnover Endpoint
4.1.1.4.2.4
Revise FFTF Turnover Configuration
4.1.1.4.2.1.1
Provide Data
4.1.1.4.2.1.2
Summarize & Document FFTF Initial State
4.1.1.4.2.2.1
Assess Transition Requirements
4.1.1.4.2.2.2
Revise Capability Needs
4.1.1.4.2.2.3
Revise Transition Plan
4.1.1.4.2.2.4
Manage Transition
4.1.1.4.2.3.1
Negotiate FFTF Endpoint Criteria
4.1.1.4.2.3.2
Revise Turnover Endpoint and Criteria
4.1.1.4.2.4.1
Define FFTF Turnover State
4.1.1.4.2.4.2
Develop Engineering Work Packages and Supporting Analyses


4.1.1.4.3
Reconfigure FFTF Facilities For Minimum Surveillance (and Maintenance)
4.1.1.4.3.1
Deactivate FFTF Non-Essential Systems, Components, & Structures
4.1.1.4.3.1.1
Deactivate FFTF Utilities
4.1.1.4.3.1.2
Deactivate FFTF Systems
4.1.1.4.3.2
Modify FFTF For Minimum Cost, Utilities For Continued Service
4.1.1.4.3.2.1
Modify Fluid Systems
4.1.1.4.3.2.2
Modify FFTF HVAC
4.1.1.4.3.2.3
Modify FFTF Security System
4.1.1.4.3.2.4
Modify FFTF Utilities
4.1.1.4.3.3
Disposition FFTF Sodium, Resources & Waste
4.1.1.4.3.3.1
Disposition Sodium
4.1.1.4.3.3.1.1
Drain Sodium
4.1.1.4.3.3.1.2
Accomodate Sodium Residuals
4.1.1.4.3.3.1.3
Store Sodium
4.1.1.4.3.3.1.4
React Sodium
4.1.1.4.3.3.1.5
Transport Reaction Product
4.1.1.4.3.3.2
Disposition Resources & Waste
4.1.1.4.3.3.2.1
Prepare FFTF Resources and Waste for Disposition
4.1.1.4.3.3.2.2
Package FFTF Dispositioned Resources & Waste
4.1.1.4.3.3.2.3
Transport FFTF Dispositioned Resources & Waste
4.1.1.4.3.3.2.4
Prepare FFTF Resource/Waste Documentation
4.1.1.4.3.4
Transfer FFTF Facilities
4.1.1.4.3.4.1
Turnover FFTF
4.1.1.4.3.4.2
Turnover FFTF Information


4.1.1.4.4
Disposition Fuel
4.1.1.4.4.1
Unload Reactor
4.1.1.4.4.2
Transfer Fuel
4.1.1.4.4.3
Prepare For Interim Storage
4.1.1.4.4.4
Store Until Final Disposition
4.1.1.4.4.5
Ship Fuel
4.1.1.4.4.3.1
Wash & Dry Fuel
4.1.1.4.4.3.2
Package Fuel
4.1.1.4.4.3.3
Transfer Container to Interim Storage Cask
4.1.1.4.4.3.4
Transfer Interim Storage Cask to Interim Storage Area
4.1.1.4.4.4.1
Provide Safeguards & Security
4.1.1.4.4.3.2.1
Package Irradiated Fuel Into Core Component Container
4.1.1.4.4.3.2.2
Package Unirradiated Fuel Into Core Component Container
4.1.1.4.4.3.2.3
Package Other Fuel Into Core Component Container
4.1.1.4.4.3.2.4
Package Sodium Bonded Fuel

ADDENDUM 2 - FUNCTION DEFINITIONS

Function	Definitions
4.1.1.4	**Deactivate FFTF Facility** *Deactivates contaminated buildings, utilities, and services; stabilizes and safely stores or removes radioactive and hazardous materials; prepares turnover packages and transitions useable resources associated with the FFTF complex.*
4.1.1.4.1	**Maintain FFTF Safety, Security, & Compliance Envelope** *Maintains the facility structure, qualified staff, safe, secure, and compliant equipment, documentation and provides assessment of safety, security, and compliance states. Provides all necessary resources for safe, secure, and compliant operation in accordance with governing safety codes and regulations.*
4.1.1.4.1.1	**Maintain Safe, Secure, & Compliant Operations** *Performs necessary surveillance, access control, property material, and waste management to maintain the FFTF Facility in compliance with government requirements while the facility is being deactivated.*
4.1.1.4.1.1.1	**Provide FFTF Surveillance** *Provides surveillance of the FFTF operations and operating systems, develop action plans, perform Tech Spec surveillance procedures, environmental monitoring, RCRA tracking, and surveillance of safety analysis compliance.*
4.1.1.4.1.1.2	**Provide FFTF Access Control** *Provides access control to and internal to the FFTF for safeguards and security, safety, and radiological purposes.*
4.1.1.4.1.1.3	**Provide FFTF Work Control** *Provides a job control system for FFTF activities.*
4.1.1.4.1.1.4	**Provide FFTF Property Management** *Provides property management for the facility in accordance with DOE orders and WHC procedures.*
4.1.1.4.1.1.5	**Provide FFTF Non-Hazardous Material/Waste Management** *Contains, controls, and documents non-hazardous material and waste in accordance with safe and applicable standards. (landfill)*
4.1.1.4.1.1.6	**Provide FFTF Hazardous Material/Waste Management** *Provides containment, control, and documentation of hazardous materials and wastes in conformance with safety requirements and all applicable hazardous material/wastes codes and regulations.*
4.1.1.4.1.1.7	**Provide Radioactive/TRU Material/Waste Management** *Provides containment, control, and documentation of radioactive material and waste in accordance with safety requirements and all applicable codes and regulations.*
4.1.1.4.1.1.8	**Provide SNM/NM/NF Material/Waste Management** *Provides all special SNM/NM/NF management operations in accordance with applicable codes and regulations including proper surveillance and security.*
4.1.1.4.1.1.9	**Perform Occurrence Reporting** *Executes procedures for reporting and processing of reports of events or conditions that could adversely affect safety, health, environment, quality assurance, security, or operations.*
4.1.1.4.1.2	**Maintain Safe, Secure, & Compliant FFTF Systems, Equipment, & Structures** *Maintains, operates, and engineers the FFTF systems and infrastructure in the operational condition dictated by approved safety and compliance documentation (includes environmental regulations).*

Function	Definitions
4.1.1.4.1.2.1	**Perform FFTF Corrective Maintenance** *Performs all maintenance that brings systems and equipment back to their operational states after failure.*
4.1.1.4.1.2.2	**Perform FFTF Preventive Maintenance** *Performs preventive maintenance activities to minimize all unplanned events and premature equipment failures, which includes FFTF equipment, instrumentation, and process systems calibrations to ensure accuracy.*
4.1.1.4.1.2.3	**Perform FFTF Minor Modifications** *Performs minor modifications to FFTF systems or structure to ensure safe and compliant operations during the FFTF deactivation process.*
4.1.1.4.1.3	**Perform FFTF Operations and Maintenance Engineering and Maintain Safety, Safeguards, & Compliance Documentation** *Performs operations and maintenance engineering, develops operations and maintenance engineering packages and maintains all required FFTF safety, compliance, engineering, inventory, and operating documentation during FFTF deactivation.*
4.1.1.4.1.3.1	**Perform FFTF Operations and Maintenence** *Performs operations and maintenance engineering and develops operations and maintenance engineering packages.*
4.1.1.4.1.3.2	**Maintain FFTF Safety, Safeguards and Compliance Documentation** *Maintains all required FFTF Safety, Compliance, engineering, inventory and operating documentation during FFTF deactivation.*
4.1.1.4.1.3.2.1	**Maintain FFTF Safety Documents** *Maintains FSAR documentation as necessary to ensure safe deactivation.*
4.1.1.4.1.3.2.2	**Maintain Operations Procedures** *Maintains operations and administrative procedures and documentation to support economic, safety, or environmental compliance requirements.*
4.1.1.4.1.3.2.3	**Maintain FFTF Engineering Documentation** *Maintains configuration drawings and associated engineering documentation required to operate and maintain FFTF in a safe and compliant status.*
4.1.1.4.1.3.2.4	**Maintain FFTF Maintenance Procedures** *Maintains maintenance procedure documentation necessary for safe, efficient, and compliant operations.*
4.1.1.4.1.3.2.5	**Maintain FFTF Environmental Compliance Documentation** *Maintains appropriate regulatory files and other related environmental documentation to assure and prove environmental compliance.*
4.1.1.4.1.3.2.6	**Maintain FFTF Inventory Documentation** *Maintains nuclear materials documentation in compliance with DOE orders. Also maintains spare parts and equipment inventories.*
4.1.1.4.1.4	**Maintain Qualified FFTF Staff** *Provides FFTF specific training, testing, and training records maintenance to ensure FFTF staff remain trained, qualified, and certified (as required) throughout the FFTF deactivation process. The training levels include nuclear operations, power operations, maintenance, technical and engineering staff and other plant personnel.*

Function	Definitions
4.1.1.4.1.4.1	**Provide FFTF Training** *Provides all training related to the activities necessary to deactivate FFTF and ensure they remain in a safe and compliant condition.*
4.1.1.4.1.4.2	**Maintain FFTF Qualification and Certification** *Provides periodic personnel skills check, assessment, and testing required to maintain necessary qualifications and certifications.*
4.1.1.4.1.4.3	**Maintain FFTF Training Documentation** *Maintains applicable worker training documentation. Documentation includes worker safety and competancy qualification and certification.*
4.1.1.4.1.5	**Assess FFTF Safety, Security, & Compliance State** *Performs/responds to oversight assessments and performs appropriate self assessments of FFTF deactivation activities to evaluate FFTF and operations safety and compliance status.*
4.1.1.4.1.5.1	**Support FFTF Independent Oversight Audits** *Performs and responds to independant oversight audits.*
4.1.1.4.1.5.2	**Perform FFTF Management Assessments** *Performs self assessments which conduct field verification of safe plant conditions and conformance to safe work practices. Utilizes a set of checklists developed to verify compliance with safety, operations, and maintenance programs. Identifies compliant activities which can be optimized. Actions identified are entered into the plant's tracking program.* *Another activity in this area is the Management Overview Program which utilizes managers who make perodic tours of the plant to ensure proper implementation of safe work practices. Deficiencies identified are also documented and tracked to completion.* *A "Safety First" program is in place which is focused on ensuring safe work practices are being followed by facility workers. This is a behavioral based safety program.*
4.1.1.4.2	**Determine FFTF Deactivation Plan, Negotiate Turnover Endpoint, and Provide System Shutdown Plans** *Assess the current state of FFTF, identify and/or negotiate material and equipment disposition requirements, develope plans to deactivate facilities, and negotiate and administratively maintain the desired facility turnover endpoint specifications. Establish archive of FFTF information per spec for turnover to D&D.*
4.1.1.4.2.1	**Characterize and Document FFTF Initial State** *Determine radiation level of cells and develop documentation of initial state.*
4.1.1.4.2.1.1	**Provide Data** *Obtains data to characterize radiation levels in inaccessible areas.*
4.1.1.4.2.1.2	**Summarize & Document FFTF Initial State** *Develops and provides a documentation summary or matrix that clearly and completely defines FFTF state.*
4.1.1.4.2.2	**Maintain Current FFTF Transition Plan** *Develop strategies to best implement transition requirements, funding levels, and regulatory negotiations.*
4.1.1.4.2.2.1	**Assess Transition Requirements** *Compile SRID and perform administative adherence assessments.*

Function	Definitions
4.1.1.4.2.2.2	**Revise Capability Needs** *Revise personnel, material, equipment, FFTF, and technology needs necessary to support FFTF transition activities as the transition plan changes.*
4.1.1.4.2.2.3	**Revise Transition Plan** *Revise transition strategy, plans, and schedules as conditions change.*
4.1.1.4.2.2.4	**Manage Transition**
4.1.1.4.2.3	**Negotiate FFTF Turnover Endpoint** *Negotiates the desired FFTF turnover endpoint for turnover to D&D.*
4.1.1.4.2.3.1	**Negotiate FFTF Endpoint Criteria** *Negotiates turnover criteria with D&D or the transition of resources to beneficial uses organization.*
4.1.1.4.2.3.2	**Revise Turnover Endpoint and Criteria** *Revise the negotiated FFTF endpoint and criteria as conditions change.*
4.1.1.4.2.4	**Revise FFTF Turnover Configuration** *Specifies FFTF, equipment, and material status at turnover; develops detailed system shutdown plans and facility engineering work packages; develops deactivation engineering documentation and other supporting analyses.*
4.1.1.4.2.4.1	**Define FFTF Turnover State** *Defines configuration specifics, negotiates turnover FFTF state, and develops negotiated FFTF system shutdown plans.*
4.1.1.4.2.4.2	**Develop Engineering Work Packages and Supporting Analyses** *Provides engineering and supporting analyses to develop FFTF engineering work packages.*
4.1.1.4.3	**Reconfigure FFTF Facilities For Minimum Surveillance (and Maintenance)** *Deactivates nonessential systems, system components, and physical structures, and takes other actions as required to minimize environmental, public, and personnel hazards. Takes these actions consistent with minimizing continuing FFTF costs.*
4.1.1.4.3.1	**Deactivate FFTF Non-Essential Systems, Components, & Structures** *Deactivates non-essential systems, system components, and physical structures while maintaining safety and environmental compliance.*
4.1.1.4.3.1.1	**Deactivate FFTF Utilities** *Deactivates FFTF-specific water, sewer, electrical, and fire systems as appropriate to still maintain minimum safety and environmental compliance.*
4.1.1.4.3.1.2	**Deactivate FFTF Systems** *Deactivates FFTF systems specified in the Fast Flux Test Facility Transition Project Plan, WHC-SD-FF-SSP-004, Rev. 1.*
4.1.1.4.3.2	**Modify FFTF For Minimum Cost, Utilities For Continued Service** *Reconfigures plant systems and structure to minimize cost of maintenance and operation during deactivation phase and while waiting for D&D while retaining minimum acceptable compliance with safety and environmental requirements.*
4.1.1.4.3.2.1	**Modify Fluid Systems** *Makes any appropriate modifications to fluid systems to permit draining and/or long term layup.*
4.1.1.4.3.2.2	**Modify FFTF HVAC** *Modifies HVAC for minimum acceptable heating & ventilation and radiological containment requirements.*

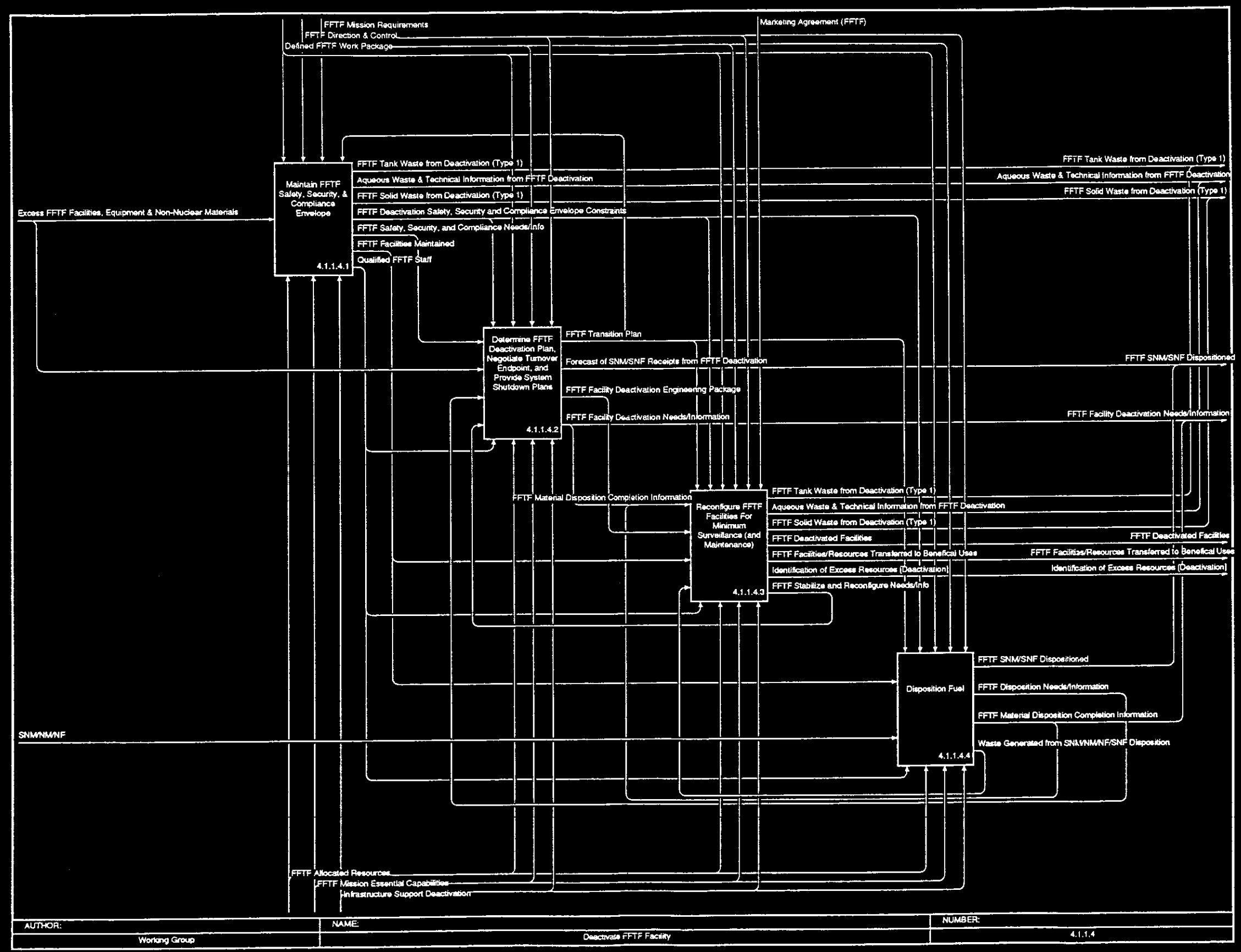
Function	Definitions
4.1.1.4.3.2.3	**Modify FFTF Security System** *Reconfigures security systems consistent with SNM inventory and security requirements.*
4.1.1.4.3.2.4	**Modify FFTF Utilities** *The electrical systems will be configured to provide the minimum necessary power for surveillance. This will involve some electrical bus interconnections and disconnections. Polychlorinated biphenyl oil cooled transformers, where appropriate, will be removed and drained. Minimum lighting will be available for surveillance activities.*
4.1.1.4.3.3	**Disposition FFTF Sodium, Resources & Waste** *Accumulates, packages, and dispositions resources and waste for FFTF. Sodium will be the major effort.*
4.1.1.4.3.3.1	**Disposition Sodium** *Drains sodium, accomodates residuals, stores and reacts sodium, and transports to final disposition.*
4.1.1.4.3.3.1.1	**Drain Sodium** *Drain sodium from FFTF primary and secondary loops, Interm Decay Storage, and Fuel Storage Facility.*
4.1.1.4.3.3.1.2	**Accomodate Sodium Residuals** *Seal frozen sodium residuals in place with an inert gas blanket atmosphere to prevent any significant long term reactions.*
4.1.1.4.3.3.1.3	**Store Sodium** *Stores the FFTF primary, secondary, Interm Decay Storage, and Fuel Storage Facility sodium.*
4.1.1.4.3.3.1.4	**React Sodium** *Converts sodium to a stable material suitable for utilization by TWRS. (This could/may include the Hallam/SRE sodium)*
4.1.1.4.3.3.1.5	**Transport Reaction Product** *Transfer the reaction product to an alternate sponsor or transport to 200 Area for disposition.*
4.1.1.4.3.3.2	**Disposition Resources & Waste** *Prepare, package, transport and document resources and waste.*
4.1.1.4.3.3.2.1	**Prepare FFTF Resources and Waste for Disposition** *Accumulates, drains, collects, and dispositions material, equipment, consumables, etc., and waste or resources for disposal or reuse.*
4.1.1.4.3.3.2.2	**Package FFTF Dispositioned Resources & Waste** *Packages materials for disposal or reuse.*
4.1.1.4.3.3.2.3	**Transport FFTF Dispositioned Resources & Waste** *Transports materials to disposal or reallocation sites.*
4.1.1.4.3.3.2.4	**Prepare FFTF Resource/Waste Documentation** *Prepares any documentation required for disposal or certification for reuse or excess.*
4.1.1.4.3.4	**Transfer FFTF Facilities** *Maintains, and effects transfer of FFTF structures and surrounding area to D&D organizations for remediation or to transition organization for reuse, privatization, etc.*
4.1.1.4.3.4.1	**Turnover FFTF** *Effects transfer of FFTF. After turn over, Surveillance & Maintenance is conducted by the D&D organization.*

Function	Definitions
4.1.1.4.3.4.2	**Turnover FFTF Information** *Transfers actual information on FFTF status and characterization to receiving organization. Characterize radioactivity of reactor vessel and its components/contents at turnover.*
4.1.1.4.4	**Disposition Fuel** *For irradiated fuel (includes DNM/gas leakers), unload from reactor, transfer to IEM cell, wash, dry, package, store and ship to interim storage.* *For unirradiated fuel assemblies, transfer, wash, dry, package, and transport to Plutonium Finishing Plant for interim storage. Also includes slightly irradiated IC, IIC & IIID fuel.* *For sodium bonded test assemblies, wash, load into new pin containers, and transport in licensed T-3 cask to ANL-W in Idaho.* *For lithium bonded assemblies, wash, disassemble, remove lithium from pins, and transport to 300 Area.*
4.1.1.4.4.1	**Unload Reactor** *Defuel the reactor by transfering fuel to IDS and FSF and replace the fuel in the reactor vessel with irradiated non-fuel core components.*
4.1.1.4.4.2	**Transfer Fuel** *Transfer the fuel from the Fuel Storage Facility and Interim Decay Storage to the Interim Examination and Maintenance Cell.*
4.1.1.4.4.3	**Prepare For Interim Storage** *Wash, dry and package fuel.*
4.1.1.4.4.3.1	**Wash & Dry Fuel** *Wash and dry the fuel assemblies one at a time in the Interim Examination and Maintenance Cell sodium removal system.*
4.1.1.4.4.3.2	**Package Fuel** *Package fuel in a Core Component Container.*
4.1.1.4.4.3.2.1	**Package Irradiated Fuel Into Core Component Container**
4.1.1.4.4.3.2.2	**Package Unirradiated Fuel Into Core Component Container**
4.1.1.4.4.3.2.3	**Package Other Fuel Into Core Component Container**
4.1.1.4.4.3.2.4	**Package Sodium Bonded Fuel** *- Load into T-3 Shipping Cask* *- Ship to ANL-W*
4.1.1.4.4.3.3	**Transfer Container to Interim Storage Cask**
4.1.1.4.4.3.4	**Transfer Interim Storage Cask to Interim Storage Area**
4.1.1.4.4.4	**Store Until Final Disposition** *Store in Interim Storage Area until final disposition.*
4.1.1.4.4.4.1	**Provide Safeguards & Security** *Provide safeguards and security for the fuel.*
4.1.1.4.4.5	**Ship Fuel** *Transport fuel to storage destination.*

ADDENDUM 3 - IDEFO DIAGRAMS

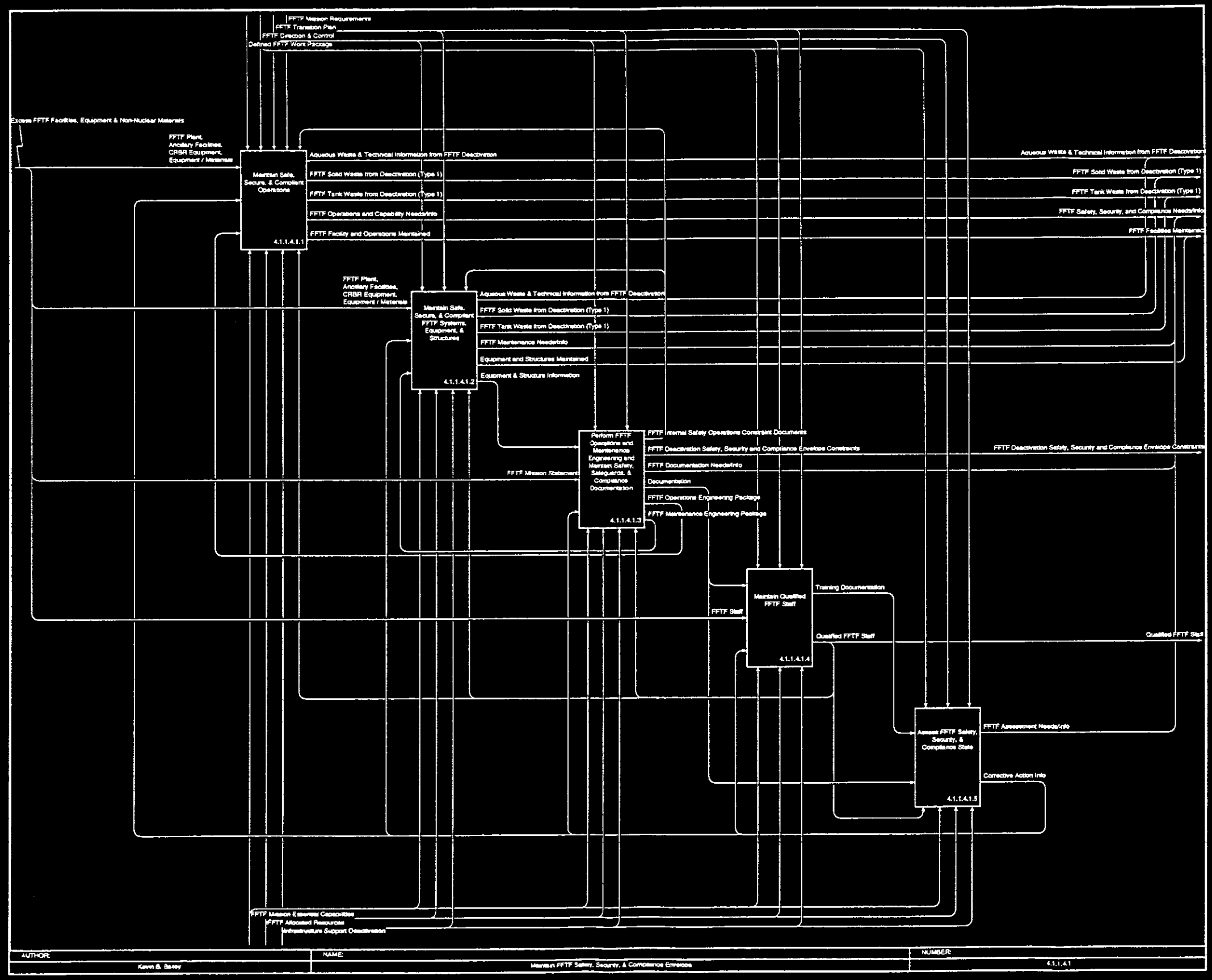
IDEF0 Diagram
[4.1.1.4] Deactivate FFTF Facility

October 4, 1995 12:42:03 pm



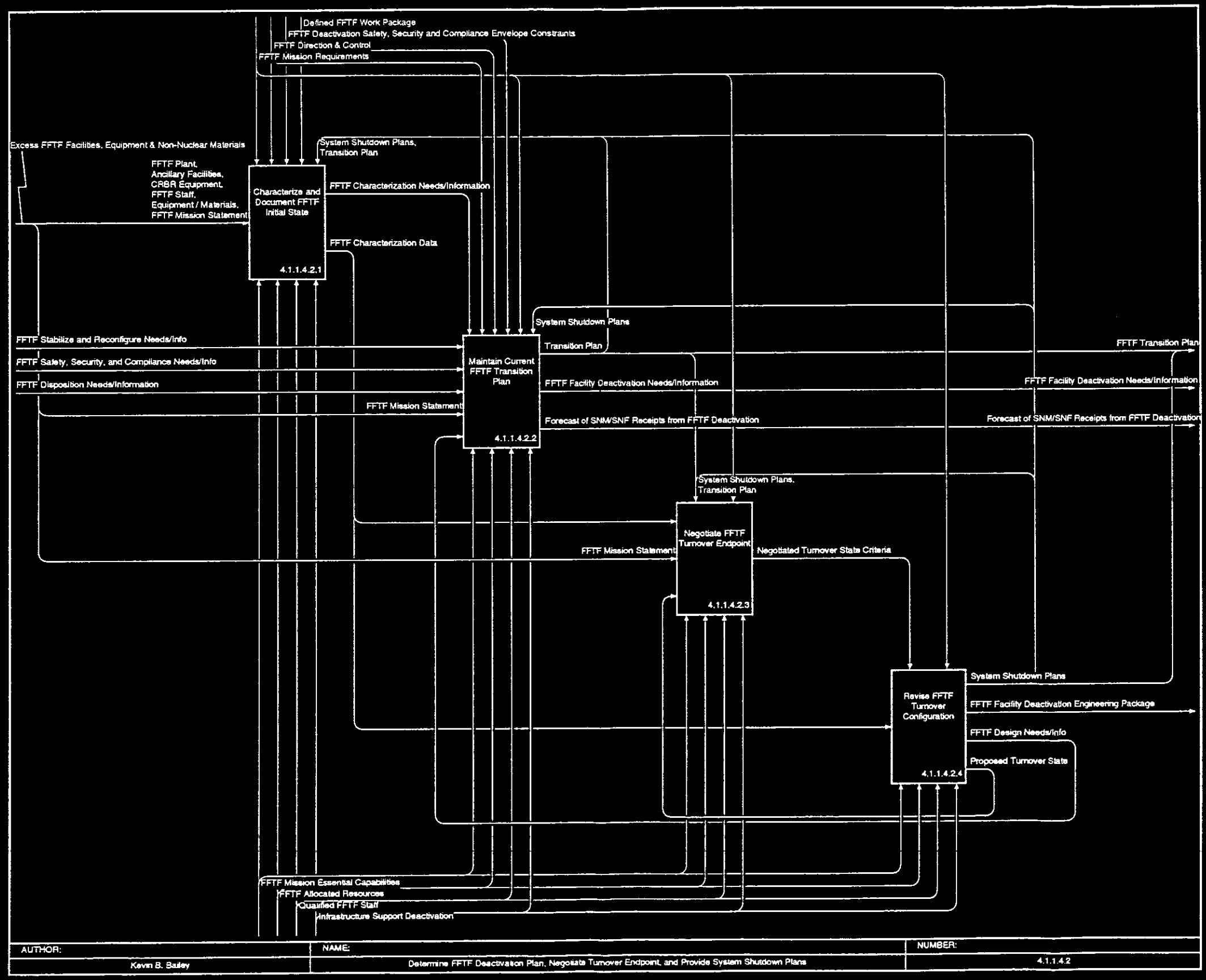
IDEF0 Diagram
[4.1.1.4.1] Maintain FFTF Safety, Security, & Compliance Envelope

October 4, 1995 12:42:03 pm



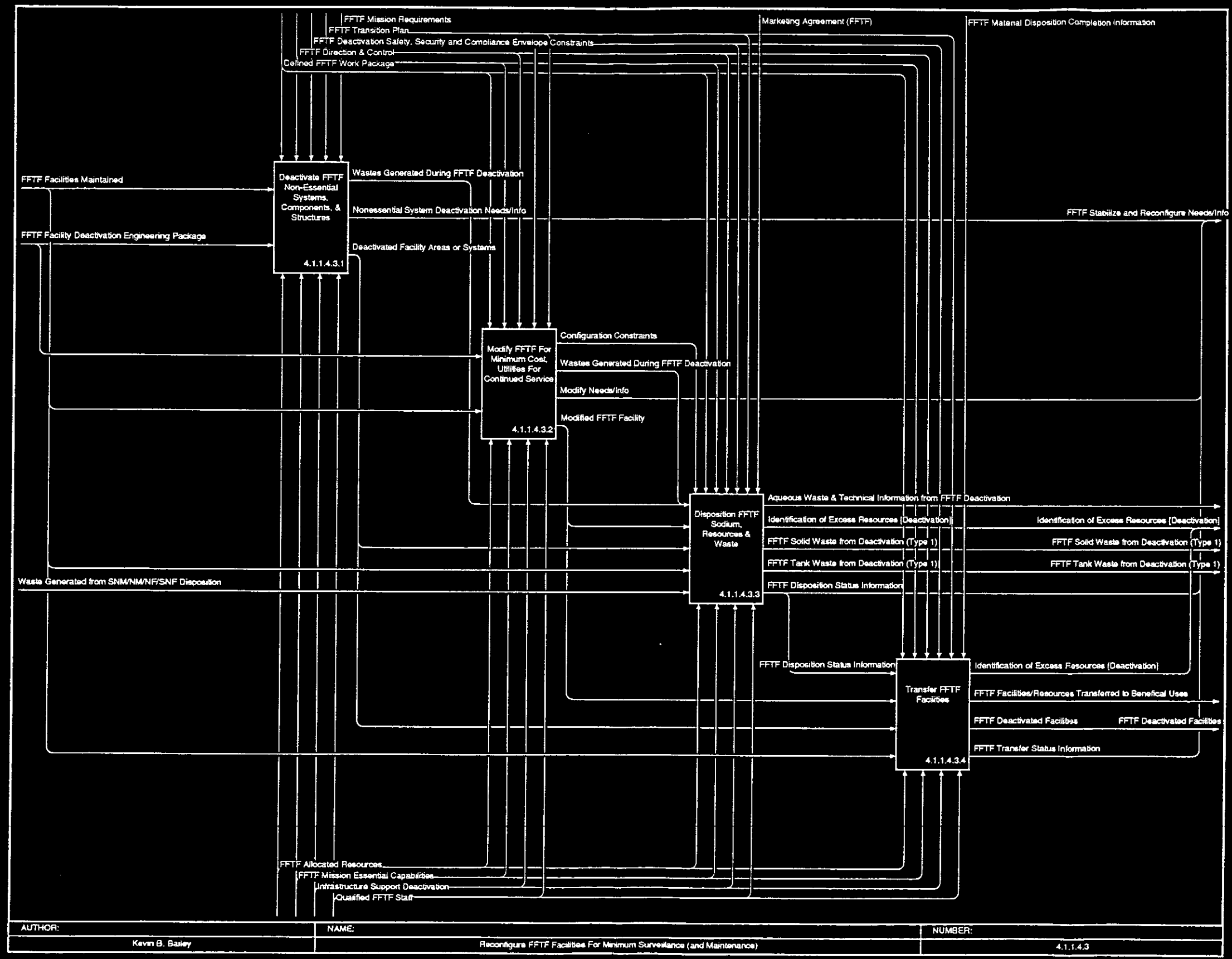
IDEF0 Diagram

[4.1.1.4.2] Determine FFTF Deactivation Plan, Negotiate Turnover Endpoint, and Provide System Shutdown Plans

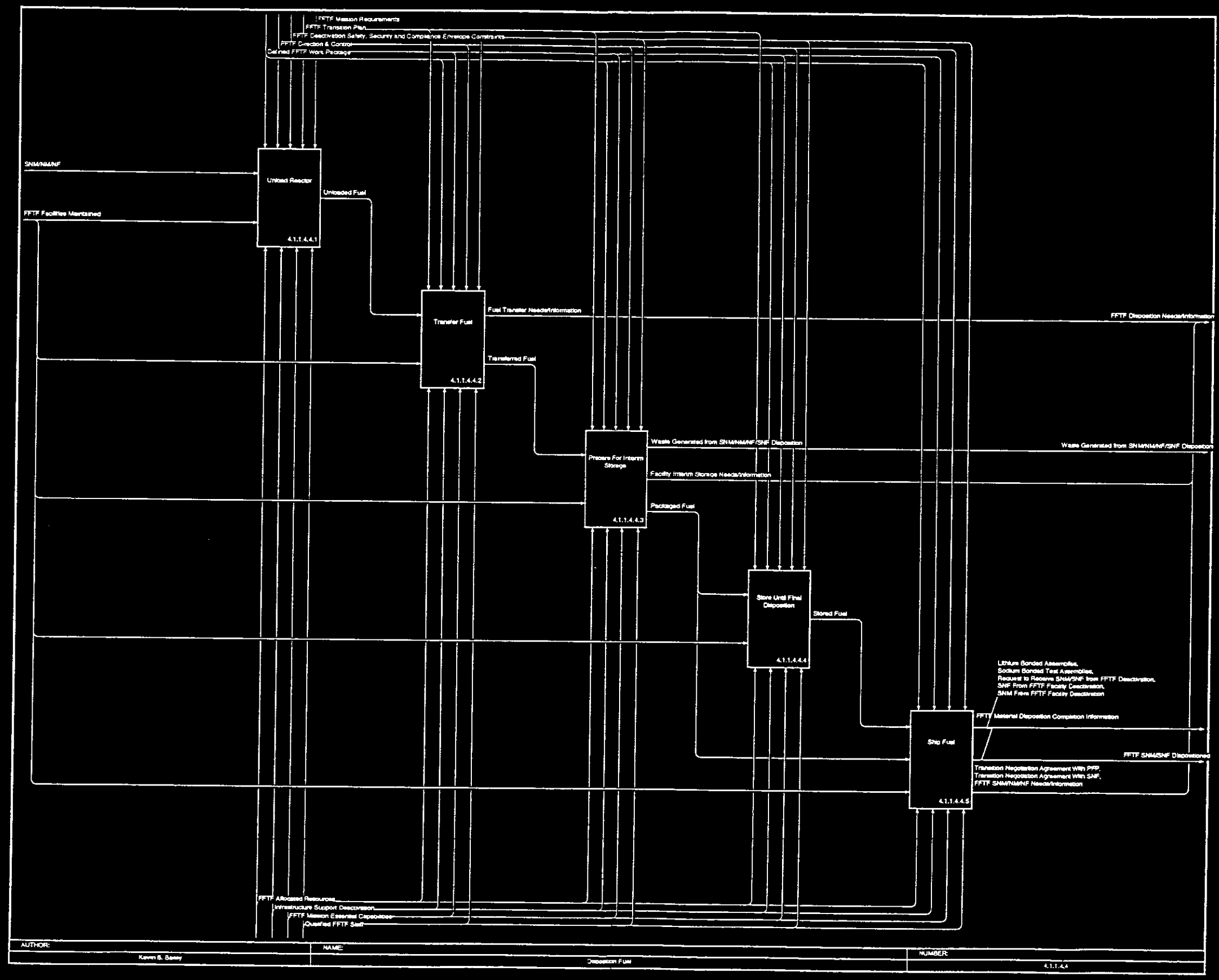


IDEF0 Diagram
[4.1.1.4.3] Reconfigure FFTF Facilities For Minimum Surveillance (and Maintenance)

October 4, 1995 12:42:03 pm



AUTHOR:	NAME:	NUMBER:
Kevin B. Bailey	Reconfigure FFTF Facilities For Minimum Surveillance (and Maintenance)	4.1.1.4.3


FFTF Mission Requirements
FFTF Transition Plan
FFTF Deactivation Safety, Security and Compliance Envelope Constraints
FFTF Direction & Control
Defined FFTF Work Package
SNM/NM/NF
FFTF Facilities Maintained
Unload Reactor
4.1.1.4.4.1
Unloaded Fuel
Transfer Fuel
4.1.1.4.4.2
Fuel Transfer Needs/Information
Transferred Fuel
Prepare For Interim Storage
4.1.1.4.4.3
Waste Generated from SNM/NM/NF/SNF Disposition
Facility Interim Storage Needs/Information
Packaged Fuel
Store Until Final Disposition
4.1.1.4.4.4
Stored Fuel
Ship Fuel
4.1.1.4.4.5
FFTF Disposition Needs/Information
Waste Generated from SNM/NM/NF/SNF Disposition
Lithium Bonded Assemblies,
Sodium Bonded Test Assemblies,
Request to Receive SNM/SNF from FFTF Deactivation,
SNF From FFTF Facility Deactivation,
SNM From FFTF Facility Deactivation
FFTF Material Disposition Completion Information
FFTF SNM/SNF Dispositioned
Transition Negotiation Agreement With PFP,
Transition Negotiation Agreement With SNF,
FFTF SNM/NM/NF Needs/Information
FFTF Allocated Resources,
Infrastructure Support Deactivation,
FFTF Mission Essential Capabilities,
Qualified FFTF Staff
AUTHOR:
Kevin S. Sasey
NAME:
Disposition Fuel
NUMBER:
4.1.1.4.4

ADDENDUM 4 - INTERFACE DEFINITIONS

Interface	*Constituents*
Ancillary Facilities *All ancillary support facilities located inside the FFTF fenceline. Facility numbers are as follows: 403, 436, 451-B, 4701-A, 4701-B, 4701-C, 4702, 4704, 4706, 4707, 4710, MASF, and 4703.*	
Aqueous Waste & Technical Information from FFTF Deactivation *Waste water containing TRU, radioactive or hazardous materials resulting from deactivation of FFTF.*	• 400 Area Secondary Cooling Water
CRBR Equipment *Clinch River Breader Reactor (CRBR) hardware which was excessed from that project and portions of which will be utilized for the sodium storage facility. The remainder will be excessed.*	
Configuration Constraints *Constraints placed on the disposition of resources and waste by modifications to the facility to minimize cost, maintenance, surveillance, and security.*	
Corrective Action Info	
Deactivated Facility Areas or Systems	
Defined FFTF Work Package *Documentation describing the project specific work; work authorization, description, procedures, resource limits and schedules.*	
Documentation *NFPA, OSHA, and other safety and compliance paperwork for type 3 and type 4. facilities. For type 1 and type 2 facilities, SAR's and OSR's are also included.*	
Equipment & Structure Information *Equipment & structure status, Compliance state, Design & configuration info.*	
Equipment / Materials	
Equipment and Structures Maintained	
Excess FFTF Facilities, Equipment & Non-Nuclear Materials *FFTF facilities, including all equipment and materiel associated with those facilities, that supported the Hanford production mission and are not needed to support the cleanup mission*	• Ancillary Facilities • CRBR Equipment • Equipment / Materials • FFTF Mission Statement • FFTF Plant • FFTF Staff

Interface	*Constituents*
FFTF Allocated Resources *Financial resources authorized to the implementing organization for completion of the function*	
FFTF Assessment Needs/Info	
FFTF Characterization Data *Information collected from facility walkdowns and documentation review about the actual physical configuration of the facility, status of process and other facility systems, material contents, and contamination areas and levels.*	
FFTF Characterization Needs/Information *Identification of needed characterization data regarding configuration of facility, status of process and other facility systems, material contents, SNM, and contamination areas and levels.*	
FFTF Deactivated Facilities *FFTF facilities, excluding associated materials and equipment, that have been stabilized and turnover for D&D in accordance with acceptance criteria defined for initiation of D&D activities*	
FFTF Deactivation Safety, Security and Compliance Envelope Constraints *Constraints required to maintain the safety, security, and compliance envelope. Examples include HVAC system requirements/configuration, electrical system requirements/configuration, instrument requirements/configuration, material storage configuration/location, fire alarm system, etc.*	
FFTF Design Needs/Info	
FFTF Direction & Control *Project specific management guidance based on the status of implementation of the Defined Work Packages*	
FFTF Disposition Needs/Information	• FFTF SNM/NM/NF Needs/Information • Facility Interim Storage Needs/Information • Fuel Transfer Needs/Information • Transition Negotiation Agreement With PFP • Transition Negotiation Agreement With SNF
FFTF Disposition Status Information	

Interface	*Constituents*
FFTF Documentation Needs/Info	
FFTF Facilities Maintained	• Equipment and Structures Maintained • FFTF Facility and Operations Maintained
FFTF Facilities/Resources Transferred to Benefical Uses	
FFTF Facility Deactivation Engineering Package *A work package containing design media and info on what deactivation activities need to be performed, the requirements for performance of the work, directions on performance of the work, inspections and documentation requirements, description of necessary tools and type of personnel training required.*	
FFTF Facility Deactivation Needs/Information *Information, developed during performance of FFTF facility deactivation activities, provided to program management functions to support decision-making essential to managing the deactivation process.*	• FFTF Material Disposition Completion Information
FFTF Facility and Operations Maintained	
FFTF Internal Safety Operations Constraint Documents *Safety analysis reports, radiological safety procedures, occupational safety codes and standards, DOE safety orders, etc.*	
FFTF Maintenance Engineering Package *A work package containing design media and info on what maintenance activities need to be performed, the requirements for performance of the work, directions on performace of the work, inspections and documentation requirements, description of necessary tools and type of personnel training required.*	
FFTF Maintenance Needs/Info	
FFTF Material Disposition Completion Information *This information identifies that the fuel disposition from the FFTF plant has been completed.*	
FFTF Mission Essential Capabilities *Mission essential capabilities in the form of all physical resources, manpower, technology, infrastructure, expertise required by all the other functions to conduct their submissions.*	

Interface	*Constituents*
FFTF Mission Requirements *Externally- and internally-imposed product specifications and process constraints derived from all applicable laws, directives, policies, standards, agreements with stakeholders, engineering studies, safety analyses, and findings from surveillances and audits, applicable to deactivation of FFTF.*	
FFTF Mission Statement	
FFTF Operations Engineering Package *A work package containing design media and info on what operations activities need to be performed, the requirements for performance of the work, directions on performance of the work, inspections and documentation requirements, description of necessary tools and type of personnel training required.*	
FFTF Operations and Capability Needs/Info	
FFTF Plant *Facility numbers are as follows: 405, 408-A, 408-B, 408-C, 491-E, 491-W, 4621-E, 4621-W, 4717, 483, 4721, and 4703.*	
FFTF SNM/NM/NF Needs/Information *Information and capability needs identified during performance of FFTF SNM/NM/NF handling, treatment, storage, and/or disposition activities, provided to program management functions to support decision-making essential to managing the SNM/NM/NF material processes.*	
FFTF SNM/SNF Dispositioned *SNM/SNF that has been transported from the FFTF facility during deactivation activities to an on-site storage location pending final disposition in order to place that facility in a deactivated state.*	• Forecast of SNM/SNF Receipts from FFTF Deactivation • Lithium Bonded Assemblies • Request to Receive SNM/SNF from FFTF Deactivation • SNF From FFTF Facility Deactivation • SNM From FFTF Facility Deactivation • Sodium Bonded Test Assemblies
FFTF Safety, Security, and Compliance Needs/Info *Information, developed during performance of facility deactivation activities, provided to program management functions to support decision-making essential to managing the deactivation process.*	• FFTF Assessment Needs/Info • FFTF Documentation Needs/Info • FFTF Maintenance Needs/Info • FFTF Operations and Capability Needs/Info

Interface	*Constituents*
FFTF Solid Waste from Deactivation (Type 1) *Solid waste materials contaminated with radioactive or hazardous materials resulting from deactivating the FFTF and from maintaining the facility prior to deactivation and until demolition or transfer. Materials buried in DSWC. Experimental activated hardware.*	
FFTF Stabilize and Reconfigure Needs/Info	• FFTF Disposition Status Information • FFTF Transfer Status Information • Modify Needs/Info • Nonessential System Deactivation Needs/Info
FFTF Staff	
FFTF Tank Waste from Deactivation (Type 1) *Sodium wash water to 104-AY tank.*	
FFTF Transfer Status Information	
FFTF Transition Plan	• System Shutdown Plans • Transition Plan
Facility Interim Storage Needs/Information	
Forecast of SNM/SNF Receipts from FFTF Deactivation	
Fuel Transfer Needs/Information	
Identification of Excess FFTF Resources [Deactivation] *Identification of excess FFTF resources consisting of excess inventory information.*	
Infrastructure Support Deactivation	
Lithium Bonded Assemblies	
Marketing Agreement (FFTF) *Marketing Agreements consisting of identification of resources to be used in building the local economy which essentially causes transferrable items to be removed from the "disposal" list to the transfer list.*	
Modified FFTF Facility *A facility that has been placed into a configuration that requires minimal cost, maintenance, surveillance, and security.*	
Modify Needs/Info	

Interface	*Constituents*
Negotiated Turnover State Criteria *Turnover is the point when turned over to D & D operations after negoations are complete for dormant state.* *Dormant state is when we can lower cost of people and operation resources , equals turnover state in final. minimum survelience.*	
Nonessential System Deactivation Needs/Info	
Packaged Fuel	
Proposed Turnover State *The turnover endpoint recommended by facility personnel.*	
Qualified FFTF Staff *Staff that has had the necessary training and testing to perform the facility deactivation and material disposition activities in a safe and compliant manner.*	
Request to Receive SNM/SNF from FFTF Deactivation	
SNF From FFTF Facility Deactivation *SNF removed from facilities during deactivation.*	
SNM From FFTF Facility Deactivation *SNM removed from facilities during deactivation and transferred to PFP for temporary storage.*	
SNM/NM/NF	
Sodium Bonded Test Assemblies	
Stored Fuel	
System Shutdown Plans	
Training Documentation	
Transferred Fuel	
Transition Negotiation Agreement With PFP *Negotiated agreement with PFP concerning storage of the green and slightly irradiated fuel.*	
Transition Negotiation Agreement With SNF *Negotiated agreement with SNFP concerning storage of the irradiated fuel.*	
Transition Plan	
Unloaded Fuel	
Waste Generated from SNM/NM/NF/SNF Disposition *Wash water, ion exchanger filters & resin beds.*	

Interface	*Constituents*
Wastes Generated During FFTF Deactivation *Contaminated tools, equipment and materials generated as a direct result of FFTF deactivation activities; including used cleaning solvents, rags, stack filters and similar items requiring processing prior to disposal or transfer to a useful function within or outside the cleanup mission.*	