Stat (3)

NOV 0 6 1995 **ENGINEERING DATA TRANSMITTAL**

Page 1 of 1

1. EDT № 614193

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|---|---|---|
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| 5. Proj./Prog./Dept./Div.: | 6. Cog. Engr.: | 7. Purchase Order No.: |
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| | | 10. System/Bldg./Facility: B Plant |
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| 1 | WHC-SD-WM-FAR-001 | N/A | 0 | B Plant Function Analysis Report | N/A | 2 | 1 | 1 |
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16. KEY

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

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

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| 1 | 1 | Cog.Eng. D.P. Lund | DP Lund | 10-12-95 | R3-56 | Central Files | KMB | 11/2/95 | A3-88 ~~L8-04~~ | | |
| 1 | 1 | Cog. Mgr. R.R. Borisch | R.R. Borisch | 10-17-95 | R3-56 | ~~DGTI~~ | KMB | 11/2/95 | ~~L8-07~~ | | |
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| 1 | 1 | B Plant; D.K. Smith | | | S6-60 | | | | | | |
| 1 | 1 | B Plant; J.W. Gehrke | JW Gehrke | 10-20-95 | S6-70 | | | | | | |

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## RELEASE AUTHORIZATION

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| **Document Number:** | WHC-SD-WM-FAR-001, REV 0 |
| **Document Title:** | B Plant 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 31

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7. Abstract

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


8. RELEASE STAMP

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STA. 4

# B PLANT
# FUNCTION ANALYSIS REPORT

September 1995

Prepared for:

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

Prepared by:
B Plant Working Group

# TABLE OF CONTENTS

# 1.0 INTRODUCTION

## 1.1 OBJECTIVE

This report compiles the products of several steps in the system engineering approach and defines the content and organization of the Hanford Site cleanup effort for the B Plant facility. A summary of the steps are listed below:

- Functional Analysis: The functions that B Plant 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), and interdependencies among the functions. The funtional analysis effort produces a functional hierarchy with detailed description of all functions and interfaces to the lowest level.

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

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

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

This report contains the products from the first three steps described above. The sections in this report are: 2.0 B Plant Functions, 3.0 Functional Interfaces and Dependencies, 4.0 Requirements Identification and Allocations, and 5.0 Issues. Addendums provide all of the detailed back up information relating to B Plant. The addendums are reports generated from RDD-100, a computer program by Ascent Logic.

## 1.2 MISSION STATEMENT

The B Plant Mission Statement was developed during mission analysis and is reported in WHC-SD-WM-MAR-006 B Plant Mission Analysis Report. It is repeated below:

> "The B Plant mission is to safely and cost effectively transition the facility to a "shut-down" status (i.e., a safe, minimal surveillance configuration awaiting D&D) within five years of project authorization. Currently available technologies will be applied in innovative ways to support the B Plant mission. Freed-up intellectual and physical resources will be applied to other Hanford Site mission objectives."

## 2.0 B PLANT FUNCTIONS

Identifying B Plants functions and subfunctions creates a functional hierarchy called a tree. The analysis begins with the top level function, "Deactivate B Plant". It is broken down into a number of major, necessary, and sufficient functions that, when completed in the prescribed logic, will ensure that B Plant'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 B Plant 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 B Plant mission.

The ultimate function of the B Plant system is to perform operations that satisfy the mission need and correct the problem identified in WHC-SD-WM-MAR-006 B Plant Mission Analysis Report repeated below:

> " Overall, the B Plant complex is currently in a surveillance and maintenance state since the completion of its previous processing mission of separating and concentrating cesium and strontium solutions. Portions of B Plant remain active to support WESF operations. The remainder of the plant is inactive. Past activities have left behind radioactive and hazardous materials, highly contaminated systems, subsystems, structures and equipment, and also contaminated soil around the plant. The continuing operations of ensuring the safe storage of the legacy material inventory and contaminants and of maintaining the facility are expensive. The aging facility and infrastructure (steam, water, ventilation) are deteriorating and require significant upgrades in the near future to continue supporting the WESF facility which will store Cs and Sr materials. At the present time, no future mission for the B Plant facility has been identified. Therefore, B Plant must be placed in a condition that requires minimal surveillance and maintenance until decontamination and decommissioning (D&D) activities are performed. Present environmental, safety, and health (ESH) risks are acceptable when current standards for intact, enclosed structures are applied. These risks must be reevaluated prior to any D&D activities which

might change any present containment barriers, especially those providing radiological containment."

## 2.1 RELATIONSHIP TO HANFORD SITE FUNCTIONAL HIERARCHY

The B Plant mission statement developed during the B Plant 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 4.1.2 Deactivate Facilities with Radioactive and Hazardous Materials (Type 2 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 B Plant mission begins with function 4.1.2.1 Deactivate B Plant.

## 2.2 FUNCTION HIERARCHY

The detailed B Plant functional hierarchy is presented in Addendum 1. It begins at level four (4.1.2.1 Deactivate B Plant) and continues to level six and in some places level seven.

## 2.3 FUNCTION DEFINITION TABLE

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

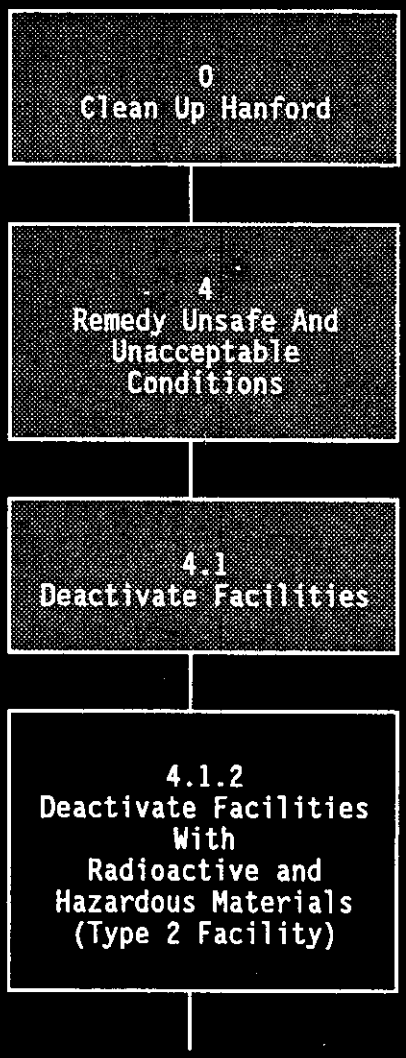



Figure 1. Hanford Site Function Hierarchy

## 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, (both physical and intellectual), enter from the bottom. Inputs, outputs, controls and resources are all defined for each system function.

## 3.1 IDEF DIAGRAMS

The B Plant interface diagrams are provided in the form of IDEF (ICOM Definition Method, ICOM is Input Controls Output Mechanisms) diagrams produced from the RDD system model and are found in Addendum 3.

## 3.2 INTERFACE DEFINITIONS

The B Plant interface definitions, presented in Addendum 4, provide descriptions of all the interfaces found on the IDEF diagrams in Addendum 3. Inputs, outputs, controls and resources are all considered interfaces.

## 4.0 ISSUES

Listed below are the issues identified in WHC-SD-WM-MAR-006 B Plant Mission Analysis Report. 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.

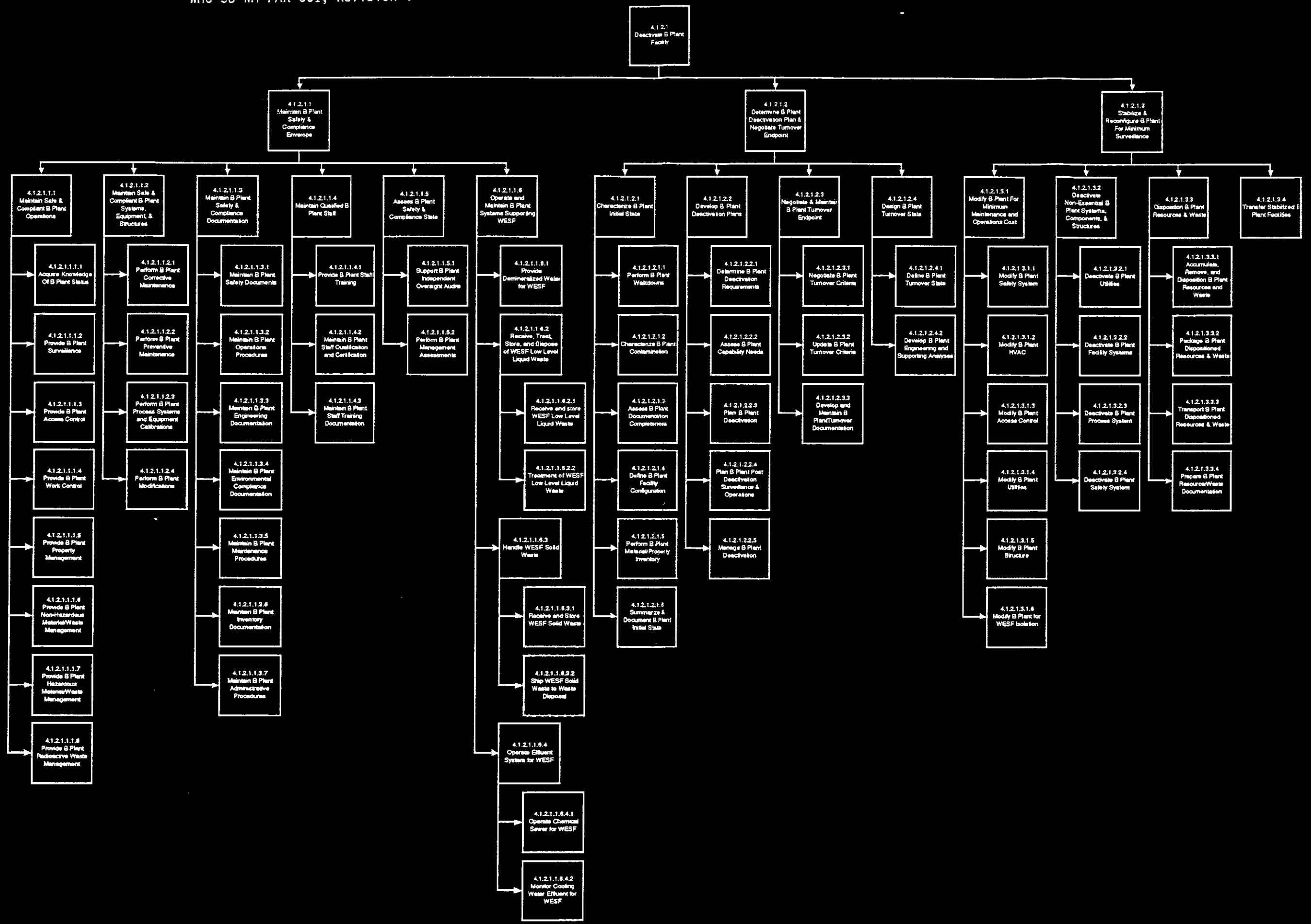
- B Plant needs to be provided the time duration between deactivation completion and start of D&D. If this period is long enough, renovation to the facilities may be needed to maintain the ESH envelope.

- B Plant can not complete deactivation until the critical WESF support systems are replaced and the systems in the two facilities are physically isolated from each other. Therefore, providing the critical support systems to WESF is included in the B Plant deactivation scope of work.

- Minimal decontamination is currently planned for the highly radioactive structure, process equipment, and existing canyon filter system. Therefore, an active ventilation system is required to ensure containment. If a passive ventilation system is desired, the highly radioactive structure must be decontaminated.

- The acceptance criterion for transfer of B Plant to the D&D contractor have not been completely defined. The determination of responsibilities, the end-point criteria, and the activities to be performed and the interfaces are not clear.

# ADDENDUM 1 - FUNCTIONAL HIERARCHY


4.1.2.1 Deactivate B Plant Facility
4.1.2.1.1 Maintain B Plant Safety & Compliance Envelope
4.1.2.1.2 Determine B Plant Deactivation Plan & Negotiate Turnover Endpoint
4.1.2.1.3 Stabilize & Reconfigure B Plant For Minimum Surveillance
4.1.2.1.1.1 Maintain Safe & Compliant B Plant Operations
4.1.2.1.1.2 Maintain Safe & Compliant B Plant Systems, Equipment, & Structures
4.1.2.1.1.3 Maintain B Plant Safety & Compliance Documentation
4.1.2.1.1.4 Maintain Qualified B Plant Staff
4.1.2.1.1.5 Assess B Plant Safety & Compliance State
4.1.2.1.1.6 Operate and Maintain B Plant Systems Supporting WESF
4.1.2.1.2.1 Characterize B Plant Initial State
4.1.2.1.2.2 Develop B Plant Deactivation Plans
4.1.2.1.2.3 Negotiate & Maintain B Plant Turnover Endpoint
4.1.2.1.2.4 Design B Plant Turnover State
4.1.2.1.3.1 Modify B Plant For Minimum Maintenance and Operations Cost
4.1.2.1.3.2 Deactivate Non-Essential B Plant Systems, Components, & Structures
4.1.2.1.3.3 Disposition B Plant Resources & Waste
4.1.2.1.3.4 Transfer Stabilized B Plant Facilities
4.1.2.1.1.1.1 Acquire Knowledge Of B Plant Status
4.1.2.1.1.1.2 Provide B Plant Surveillance
4.1.2.1.1.1.3 Provide B Plant Access Control
4.1.2.1.1.1.4 Provide B Plant Work Control
4.1.2.1.1.1.5 Provide B Plant Property Management
4.1.2.1.1.1.6 Provide B Plant Non-Hazardous Material/Waste Management
4.1.2.1.1.1.7 Provide B Plant Hazardous Material/Waste Management
4.1.2.1.1.1.8 Provide B Plant Radioactive Waste Management
4.1.2.1.1.2.1 Perform B Plant Corrective Maintenance
4.1.2.1.1.2.2 Perform B Plant Preventive Maintenance
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4.1.2.1.1.2.4 Perform B Plant Modifications
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4.1.2.1.1.3.6 Maintain B Plant Inventory Documentation
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4.1.2.1.1.6.1 Provide Demineralized Water for WESF
4.1.2.1.1.6.2 Receive, Treat, Store, and Dispose of WESF Low Level Liquid Waste
4.1.2.1.1.6.2.1 Receive and store WESF Low Level Liquid Waste
4.1.2.1.1.6.2.2 Treatment of WESF Low Level Liquid Waste
4.1.2.1.1.6.3 Handle WESF Solid Waste
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4.1.2.1.1.6.4 Operate Effluent System for WESF
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4.1.2.1.1.6.4.2 Monitor Cooling Water Effluent for WESF
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4.1.2.1.2.1.2 Characterize B Plant Contamination
4.1.2.1.2.1.3 Assess B Plant Documentation Completeness
4.1.2.1.2.1.4 Define B Plant Facility Configuration
4.1.2.1.2.1.5 Perform B Plant Material/Property Inventory
4.1.2.1.2.1.6 Summarize & Document B Plant Initial State
4.1.2.1.2.2.1 Determine B Plant Deactivation Requirements
4.1.2.1.2.2.2 Assess B Plant Capability Needs
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4.1.2.1.2.2.4 Plan B Plant Post Deactivation Surveillance & Operations
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4.1.2.1.2.3.2 Update B Plant Turnover Criteria
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4.1.2.1.2.4.2 Develop B Plant Engineering and Supporting Analyses
4.1.2.1.3.1.1 Modify B Plant Safety System
4.1.2.1.3.1.2 Modify B Plant HVAC
4.1.2.1.3.1.3 Modify B Plant Access Control
4.1.2.1.3.1.4 Modify B Plant Utilities
4.1.2.1.3.1.5 Modify B Plant Structure
4.1.2.1.3.1.6 Modify B Plant for WESF Isolation
4.1.2.1.3.2.1 Deactivate B Plant Utilities
4.1.2.1.3.2.2 Deactivate B Plant Facility Systems
4.1.2.1.3.2.3 Deactivate B Plant Process System
4.1.2.1.3.2.4 Deactivate B Plant Safety System
4.1.2.1.3.3.1 Accumulate, Remove, and Disposition B Plant Resources and Waste
4.1.2.1.3.3.2 Package B Plant Dispositioned Resources & Waste
4.1.2.1.3.3.3 Transport B Plant Dispositioned Resources & Waste
4.1.2.1.3.3.4 Prepare B Plant Resource/Waste Documentation

# ADDENDUM 2 - FUNCTION DEFINITIONS

| Function | Definitions |
|---|---|
| 4.1.2.1 | **Deactivate B Plant Facility**<br>*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 B Plant complex.* |
| 4.1.2.1.1 | **Maintain B Plant Safety & Compliance Envelope**<br>*Assesses the B Plant facility and its operations and maintains in safe and compliant conditions until all endpoint criteria are met. Provides all necessary resources to safely operate and maintain the facility. Maintains a qualified facility staff, and maintains required facility definition and operating documentation. Dispositions aqueous, solid, tank, and sanitary wastes. Provides support systems for WESF.* |
| 4.1.2.1.1.1 | **Maintain Safe & Compliant B Plant Operations**<br>*Assesses and maintains the B Plant operations in a safe condition that is compliant with applicable environmental requirments, DOE orders, and all other applicable codes, standards, and procedures.* |
| 4.1.2.1.1.1.1 | **Acquire Knowledge Of B Plant Status**<br>*Acquires knowledge of the B Plant status, configuration, facility operating systems, and contents required to maintain safe and compliant operations until deactivation is complete.* |
| 4.1.2.1.1.1.2 | **Provide B Plant Surveillance**<br>*Provides surveillance of the B Plant facilities and operations, develops acutely unsafe condition action plans, performs OSR surveillance procedures, environmental monitoring, RCRA tracking, and surveillance of safety analysis compliance.* |
| 4.1.2.1.1.1.3 | **Provide B Plant Access Control**<br>*Provides access control to and internal to B Plant facilities for safety, security, and radiological purposes.* |
| 4.1.2.1.1.1.4 | **Provide B Plant Work Control**<br>*Provides job control for the preventive and repair maintenance of B Plant systems.* |
| 4.1.2.1.1.1.5 | **Provide B Plant Property Management**<br>*Provides property management for B Plant in accordance with DOE orders and Hanford procedures.* |
| 4.1.2.1.1.1.6 | **Provide B Plant Non-Hazardous Material/Waste Management**<br>*Contains, controls, and documents B Plant non-hazardous material and waste in accordance with applicable standards and procedures.* |
| 4.1.2.1.1.1.7 | **Provide B Plant Hazardous Material/Waste Management**<br>*Provides containment, control, and documentation of B Plant hazardous materials and wastes in conformance with applicable codes, regulations, and procedures.* |
| 4.1.2.1.1.1.8 | **Provide B Plant Radioactive Waste Management**<br>*Provides containment, control, and documentation of B Plant radioactive material and waste in accordance with all applicable codes, regulations, and procedures.* |
| 4.1.2.1.1.2 | **Maintain Safe & Compliant B Plant Systems, Equipment, & Structures**<br>*Maintains the B Plant systems and infrastructure in operational condition as required by approved safety documentation and environmental regulations.* |
| 4.1.2.1.1.2.1 | **Perform B Plant Corrective Maintenance**<br>*All maintenance that brings B Plant systems and equipment back to their operational states after failure or degraded state before failure.* |

| Function | Definitions |
|---|---|
| 4.1.2.1.1.2.2 | **Perform B Plant Preventive Maintenance**<br>*B Plant maintenance surveillance activities to minimize unplanned malfunctions and/or prevent premature equipment failures.* |
| 4.1.2.1.1.2.3 | **Perform B Plant Process Systems and Equipment Calibrations**<br>*Performs B Plant equipment, instrumentation, and process system calibrations to ensure accurate operation.* |
| 4.1.2.1.1.2.4 | **Perform B Plant Modifications**<br>*Performs modifications to B Plant systems or structure to ensure safe and compliant operations during the facility deactivation process.* |
| 4.1.2.1.1.3 | **Maintain B Plant Safety & Compliance Documentation**<br>*Maintains all B Plant safety analysis reports, regulatory compliance, system configuration, and operating documentation.* |
| 4.1.2.1.1.3.1 | **Maintain B Plant Safety Documents**<br>*Maintains documentation necessary to ensure safe operations during B Plant deactivation.* |
| 4.1.2.1.1.3.2 | **Maintain B Plant Operations Procedures**<br>*Maintains B Plant procedures to support safe and environmentally compliant operations.* |
| 4.1.2.1.1.3.3 | **Maintain B Plant Engineering Documentation**<br>*Maintains B Plant configuration drawings and associated engineering documentation required to operate and maintain the facility in a safe and compliant status.* |
| 4.1.2.1.1.3.4 | **Maintain B Plant Environmental Compliance Documentation**<br>*Maintains appropriate regulatory files and environmental documentation to demonstrate B Plant environmental compliance.* |
| 4.1.2.1.1.3.5 | **Maintain B Plant Maintenance Procedures**<br>*Maintains B Plant maintenance procedure documentation necessary for safe, efficient maintenance and repair of facilities and equipment.* |
| 4.1.2.1.1.3.6 | **Maintain B Plant Inventory Documentation**<br>*Maintains spare parts, equipment and other inventory documentation.* |
| 4.1.2.1.1.3.7 | **Maintain B Plant Administrative Procedures**<br>*Maintains all administrative procedures.* |
| 4.1.2.1.1.4 | **Maintain Qualified B Plant Staff**<br>*Provides B Plant facility-specific personnel training to ensure facility staff remain trained, qualified, and certified (as required) during facility deactivation.* |
| 4.1.2.1.1.4.1 | **Provide B Plant Staff Training**<br>*Identify and prepare all training for activities necessary to maintain safe and compliant B Plant operations.* |
| 4.1.2.1.1.4.2 | **Maintain B Plant Staff Qualification and Certification**<br>*Provides periodic B Plant personnel retraining and certification testing.* |
| 4.1.2.1.1.4.3 | **Maintain B Plant Staff Training Documentation**<br>*Maintains applicable B Plant worker training documentation.* |
| 4.1.2.1.1.5 | **Assess B Plant Safety & Compliance State**<br>*Performs and responds to oversight assessments and performs appropriate self assessments of B Plant activities.* |
| 4.1.2.1.1.5.1 | **Support B Plant Independent Oversight Audits**<br>*Assists and responds to independant B Plant oversight audits (non-WHC).* |

| Function | Definitions |
|---|---|
| 4.1.2.1.1.5.2 | **Perform B Plant Management Assessments**<br>*Management will do self assessments of specific areas of responsibility to ensure adequate B-Plant performance to an established set of criteria.* |
| 4.1.2.1.1.6 | **Operate and Maintain B Plant Systems Supporting WESF**<br>*Provide needed support to WESF until WESF becomes self sufficient or is deactivated.* |
| 4.1.2.1.1.6.1 | **Provide Demineralized Water for WESF**<br>*Operate equipment to produce demineralized water; sample and analyze water; and store and pump to WESF, as needed.* |
| 4.1.2.1.1.6.2 | **Receive, Treat, Store, and Dispose of WESF Low Level Liquid Waste**<br>*Receive, treat, store and dispose of low level liquid waste from WESF.* |
| 4.1.2.1.1.6.2.1 | **Receive and store WESF Low Level Liquid Waste**<br>*Receive pumped low level liquid waste from WESF and store in tankage.* |
| 4.1.2.1.1.6.2.2 | **Treatment of WESF Low Level Liquid Waste**<br>*Sample and analyze stored low level liquid waste and treat, as necessary, for disposal.* |
| 4.1.2.1.1.6.3 | **Handle WESF Solid Waste**<br>*Receive, store, monitor and ship WESF solid waste to disposal.* |
| 4.1.2.1.1.6.3.1 | **Receive and Store WESF Solid Waste**<br>*Receive drummed solid waste for WESF, monitor and store.* |
| 4.1.2.1.1.6.3.2 | **Ship WESF Solid Waste to Waste Disposal**<br>*Prepare documentation, obtain approvals, and ship WESF solid waste for disposal.* |
| 4.1.2.1.1.6.4 | **Operate Effluent System for WESF**<br>*Provide facilities and monitoring for moving WESF liquid effluents to disposal.* |
| 4.1.2.1.1.6.4.1 | **Operate Chemical Sewer for WESF**<br>*Provide piping,monitoring, treatment, and pumping of WESF liquid effluents from chemical sewer to B Pond.* |
| 4.1.2.1.1.6.4.2 | **Monitor Cooling Water Effluent for WESF**<br>*Provide piping and monitoring of cooling water from WESF to B Pond.* |
| 4.1.2.1.2 | **Determine B Plant Deactivation Plan & Negotiate Turnover Endpoint**<br>*Assesses the current state of B Plant, identifies and/or negotiates facilities, equipment, and material disposition requirements, develops plans to deactivate facilities, and negotiates and maintains the desired facility turnover endpoint specifications. Establishes and maintains a long-term archive of facility information.* |
| 4.1.2.1.2.1 | **Characterize B Plant Initial State**<br>*Identifies the current state of the B Plant infrastructure, process systems and other facility systems, facility contents, equipment, instrumentation, and utilities.* |
| 4.1.2.1.2.1.1 | **Perform B Plant Walkdowns**<br>*Performs walkdowns to compare actual B Plant facility state with available documentation.* |
| 4.1.2.1.2.1.2 | **Characterize B Plant Contamination**<br>*Assess and perform characterization of B Plant radioactive and hazardous contamination levels as needed for turnover documentation.* |
| 4.1.2.1.2.1.3 | **Assess B Plant Documentation Completeness**<br>*Determine by audit if existing B Plant documentation for turnover activities and sampling are adequate.* |

| Function | Definitions |
|---|---|
| 4.1.2.1.2.1.4 | **Define B Plant Facility Configuration**<br>*Reviews B Plant configuration drawings to determine accuracy to endpoint standards and develop additional configuration control documents as required to document actual configuration of facility infrastructure, utilities, process systems, equipment, and instrumentation.* |
| 4.1.2.1.2.1.5 | **Perform B Plant Material/Property Inventory**<br>*Inventory all B Plant property and materials being turned over to D & D.* |
| 4.1.2.1.2.1.6 | **Summarize & Document B Plant Initial State**<br>*Develops and provides a B Plant documentation summary or matrix that clearly and completely defines facility state.* |
| 4.1.2.1.2.2 | **Develop B Plant Deactivation Plans**<br>*Develops strategies to best meet B Plant deactivation requirements, plans the facility deactivation, and identifies and/or negotiates facility equipment disposition requirements.* |
| 4.1.2.1.2.2.1 | **Determine B Plant Deactivation Requirements**<br>*Determines and documents all B Plant specific transition requirements for negotiated turnover endpoints.* |
| 4.1.2.1.2.2.2 | **Assess B Plant Capability Needs**<br>*Assesses and documents personnel, material, equipment, facility, and technology needs necessary to support B Plant deactivation activities.* |
| 4.1.2.1.2.2.3 | **Plan B Plant Deactivation**<br>*Develops B Plant deactivation strategy, plans, and schedules.* |
| 4.1.2.1.2.2.4 | **Plan B Plant Post Deactivation Surveillance & Operations**<br>*Plan post deactivation remote monitoring, walkthroughs, winterization, animal intrusion checks, and water intrusion/leakage checks. Plan maintenance and operation of facility canyon ventilation filter system.* |
| 4.1.2.1.2.2.5 | **Manage B Plant Deactivation**<br>*Develops plan for management of deactivation activities.* |
| 4.1.2.1.2.3 | **Negotiate & Maintain B Plant Turnover Endpoint**<br>*Negotiate and maintains the minimum B Plant facility turnover endpoint specifications.* |
| 4.1.2.1.2.3.1 | **Negotiate B Plant Turnover Criteria**<br>*Negotiates B Plant turnover criteria with D&D or the transition of resources for beneficial uses.* |
| 4.1.2.1.2.3.2 | **Update B Plant Turnover Criteria**<br>*Maintain the negotiated B Plant deactivation turnover criteria.* |
| 4.1.2.1.2.3.3 | **Develop and Maintain B PlantTurnover Documentation**<br>*Document responsibilities for deactivation and post deactivation activities such as maintenance and operation of B Plant ventilation system. Provide characterization data defining end-state at turnover to D & D.* |
| 4.1.2.1.2.4 | **Design B Plant Turnover State**<br>*Specifies B Plant turnover facility, equipment, and material status; develops facility deactivation turnover specification; develops deactivation engineering documentation and other supporting analyses.* |
| 4.1.2.1.2.4.1 | **Define B Plant Turnover State**<br>*Defines configuration specifics, negotiates turnover facility state, and develops negotiated facility deactivation turnover specification.* |

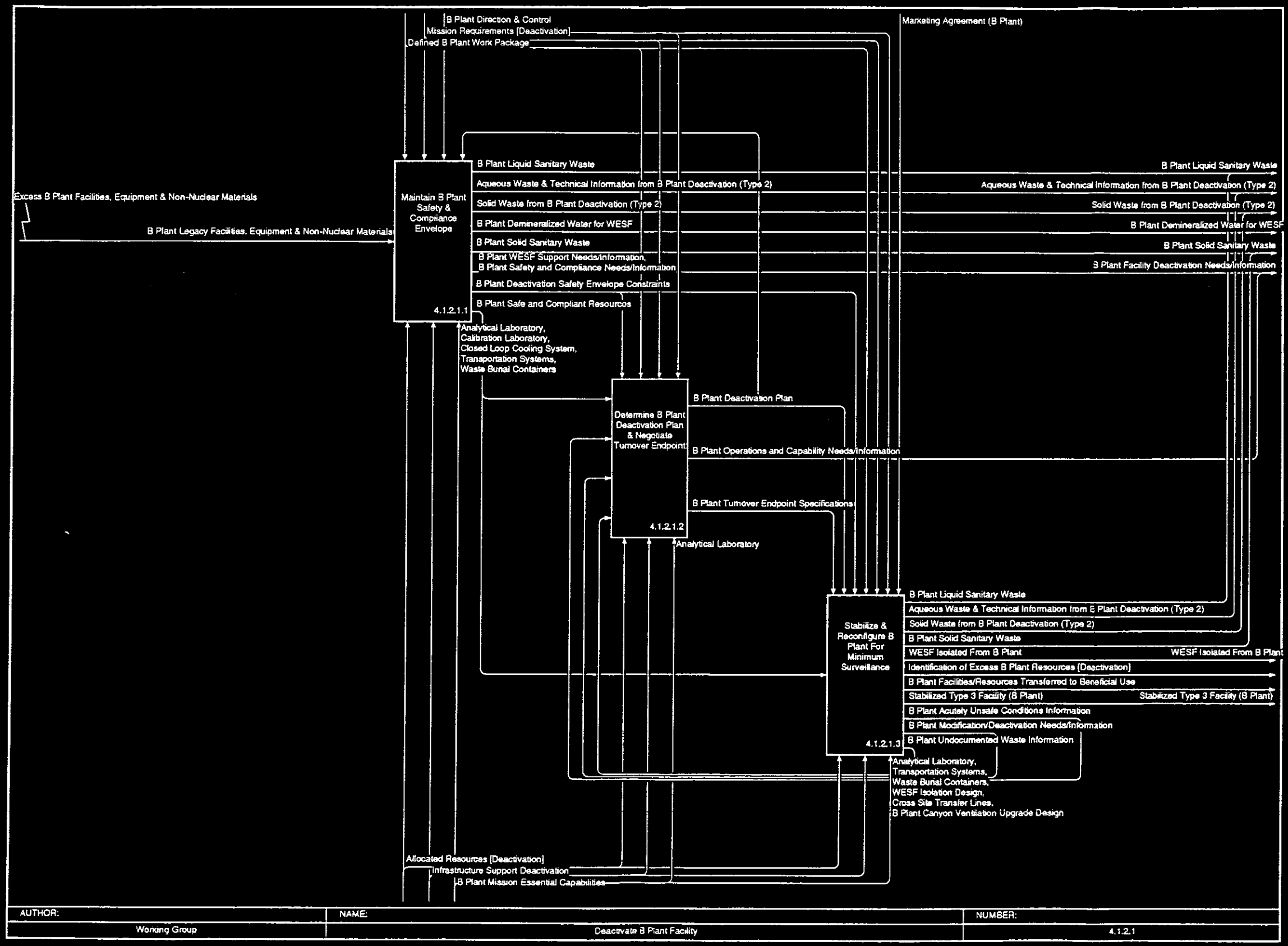
| Function | Definitions |
|---|---|
| 4.1.2.1.2.4.2 | **Develop B Plant Engineering and Supporting Analyses**<br>*Provides B Plant engineering and supporting analyses to support deactivation. Examples include safety analyses, transportation analyses, and development of regulatory and permitting documentation. Determine radiological containment requirements.* |
| 4.1.2.1.3 | **Stabilize & Reconfigure B Plant For Minimum Surveillance**<br>*Deactivates B Plant nonessential systems, components, and structures, and takes other actions as required to minimize environmental, public, and personnel hazards. Takes these actions consistent with minimizing continuing facility operating costs and meeting negotiated turnover endpoint criteria. Dispositions B Plant resources and wastes and transfers resources for other beneficial uses.* |
| 4.1.2.1.3.1 | **Modify B Plant For Minimum Maintenance and Operations Cost**<br>*Reconfigures B Plant systems and structure to minimize cost of maintenance and operation during long-term surveillance mode before D & D.* |
| 4.1.2.1.3.1.1 | **Modify B Plant Safety System**<br>*Makes appropriate modifications to B Plant safety and fire protection systems such as elimination of conversion (wet to dry) of fire systems as supported by current SAR.* |
| 4.1.2.1.3.1.2 | **Modify B Plant HVAC**<br>*Modifies B Plant heating, ventilation and air conditioning for minimum acceptable heating, ventilation and radiological containment requirements.* |
| 4.1.2.1.3.1.3 | **Modify B Plant Access Control**<br>*Reconfigures B Plant access control systems.* |
| 4.1.2.1.3.1.4 | **Modify B Plant Utilities**<br>*Modifies or downsizes B Plant utility systems to satisfy reduced needs.* |
| 4.1.2.1.3.1.5 | **Modify B Plant Structure**<br>*Modifies B Plant structures, if savings can be obtained (e.g., adding a firewall rather than maintaining a fire suppression system).* |
| 4.1.2.1.3.1.6 | **Modify B Plant for WESF Isolation** |
| 4.1.2.1.3.2 | **Deactivate Non-Essential B Plant Systems, Components, & Structures**<br>*Deactivates B Plant non-essential systems, system components, and physical structures while maintaining safety and environmental compliance.* |
| 4.1.2.1.3.2.1 | **Deactivate B Plant Utilities**<br>*Deactivates B Plant water, sewer, electrical, HLAN, steam, telephone, power, fire systems, as appropriate, to still maintain minimum safety and environmental compliance.* |
| 4.1.2.1.3.2.2 | **Deactivate B Plant Facility Systems**<br>*Deactivates B Plant systems as much as possible to minimize operating and maintenance costs and still maintain minimum safety and environmental compliance.* |
| 4.1.2.1.3.2.3 | **Deactivate B Plant Process System**<br>*Deactivates, drains, flushes, and removes B Plant process systems in accordance with negotiated turnover specifications.* |
| 4.1.2.1.3.2.4 | **Deactivate B Plant Safety System**<br>*Deactivate B Plant fire suppression systems to extent possible and still maintain safety.* |
| 4.1.2.1.3.3 | **Disposition B Plant Resources & Waste**<br>*Accumulates, packages, and dispositions B Plant resources and waste.* |

| Function | Definitions |
|---|---|
| 4.1.2.1.3.3.1 | **Accumulate, Remove, and Disposition B Plant Resources and Waste**<br>*Accumulates, drains, collects, and dispositions B Plant material, equipment, consumables, and waste or resources for disposal or reuse.* |
| 4.1.2.1.3.3.2 | **Package B Plant Dispositioned Resources & Waste**<br>*Packages B Plant materials for disposal or reuse.* |
| 4.1.2.1.3.3.3 | **Transport B Plant Dispositioned Resources & Waste**<br>*Transports B Plant materials to disposal or reuse sites.* |
| 4.1.2.1.3.3.4 | **Prepare B Plant Resource/Waste Documentation**<br>*Prepares B Plant documentation required for disposal or certification for reuse or excess.* |
| 4.1.2.1.3.4 | **Transfer Stabilized B Plant Facilities**<br>*Maintains and effects transfer of B Plant structure and surrounding area to D&D organizations for remediation or to transition organization for reuse.* |

# ADDENDUM 3 - IDEFO DIAGRAMS

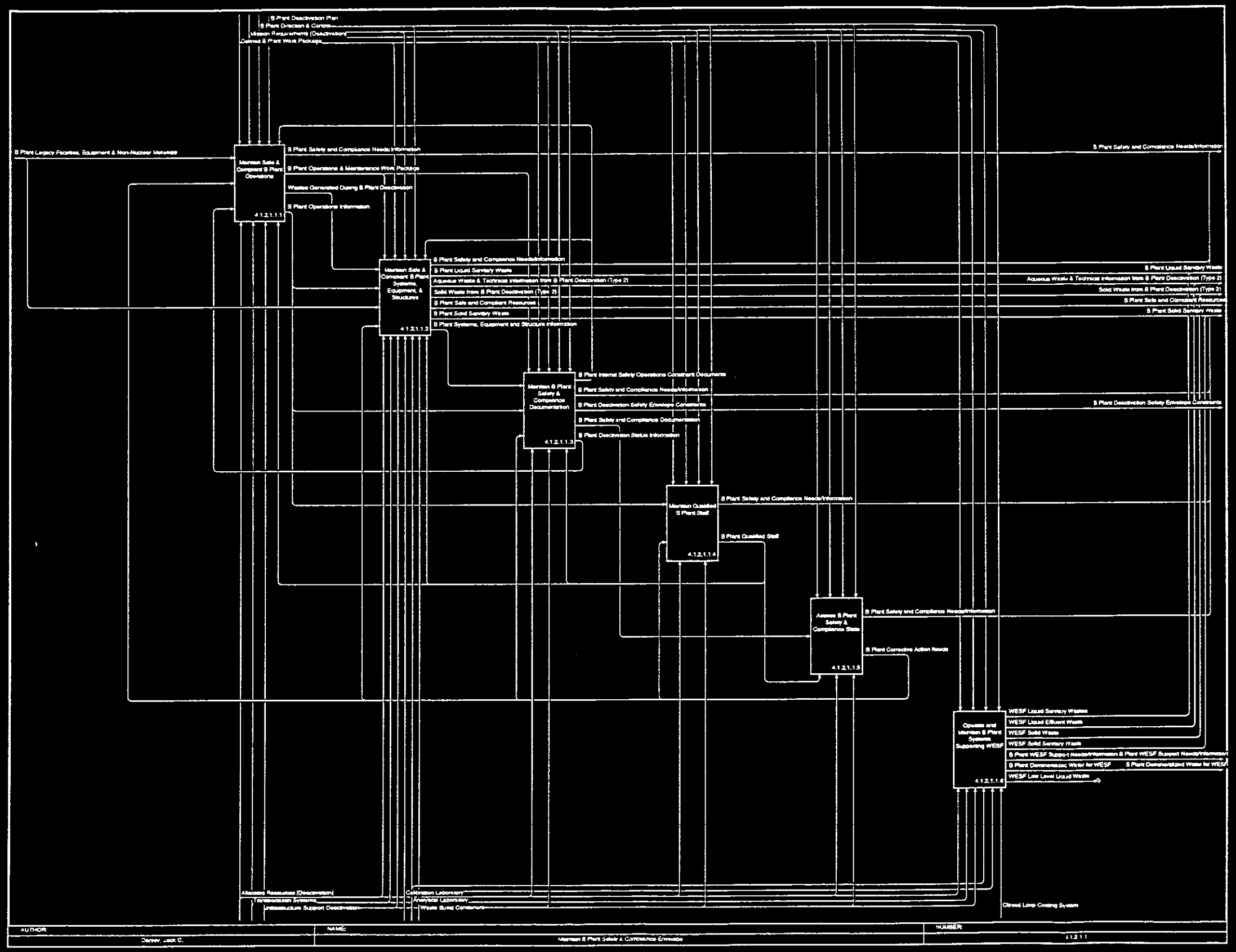
IDEF0 Diagram
[4.1.2.1] Deactivate B Plant Facility

October 10, 1995 3:53:53 pm



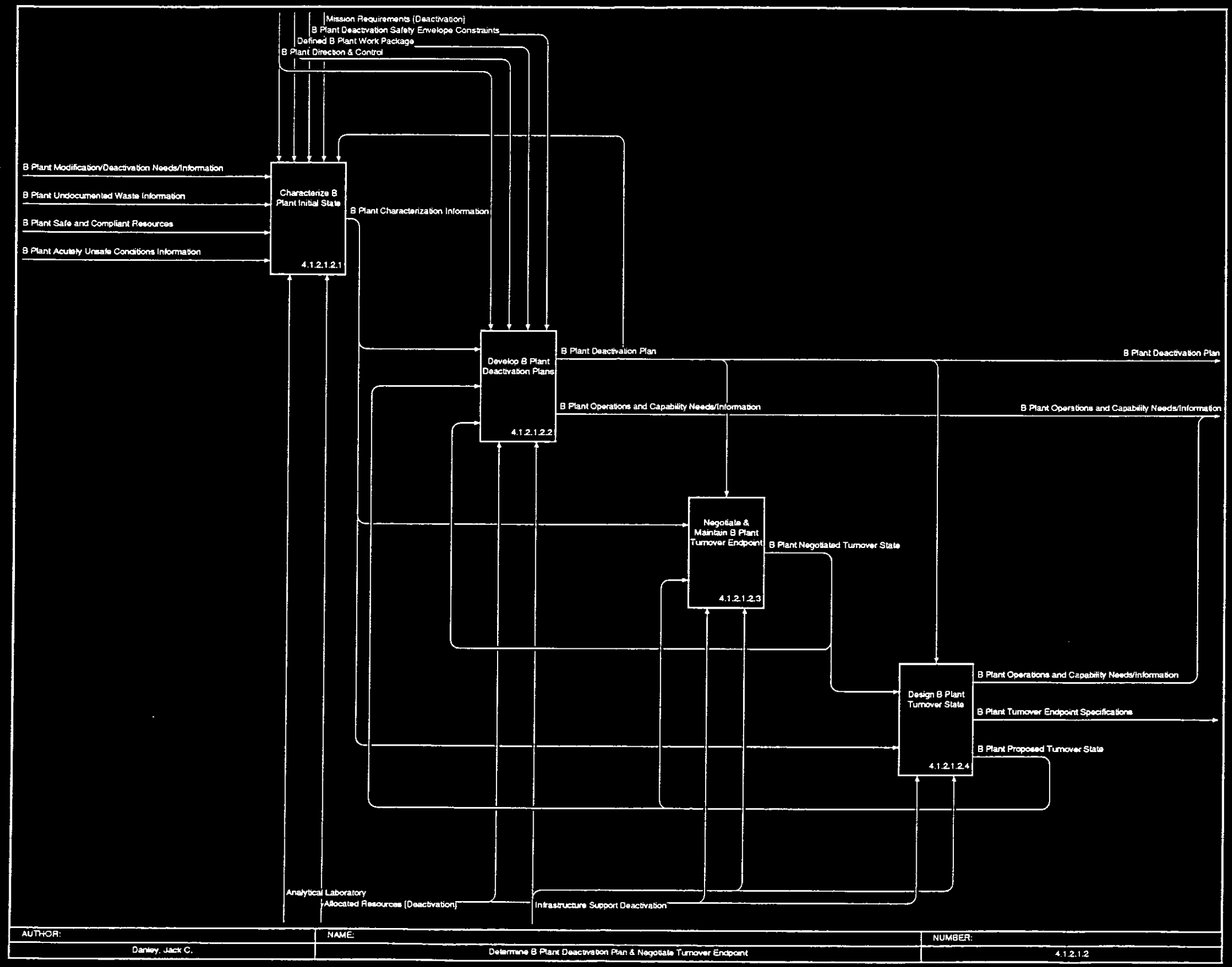
IDEF0 Diagram
[4.1.2.1.1] Maintain B Plant Safety & Compliance Envelope

October 10, 1995 3:53:53 pm



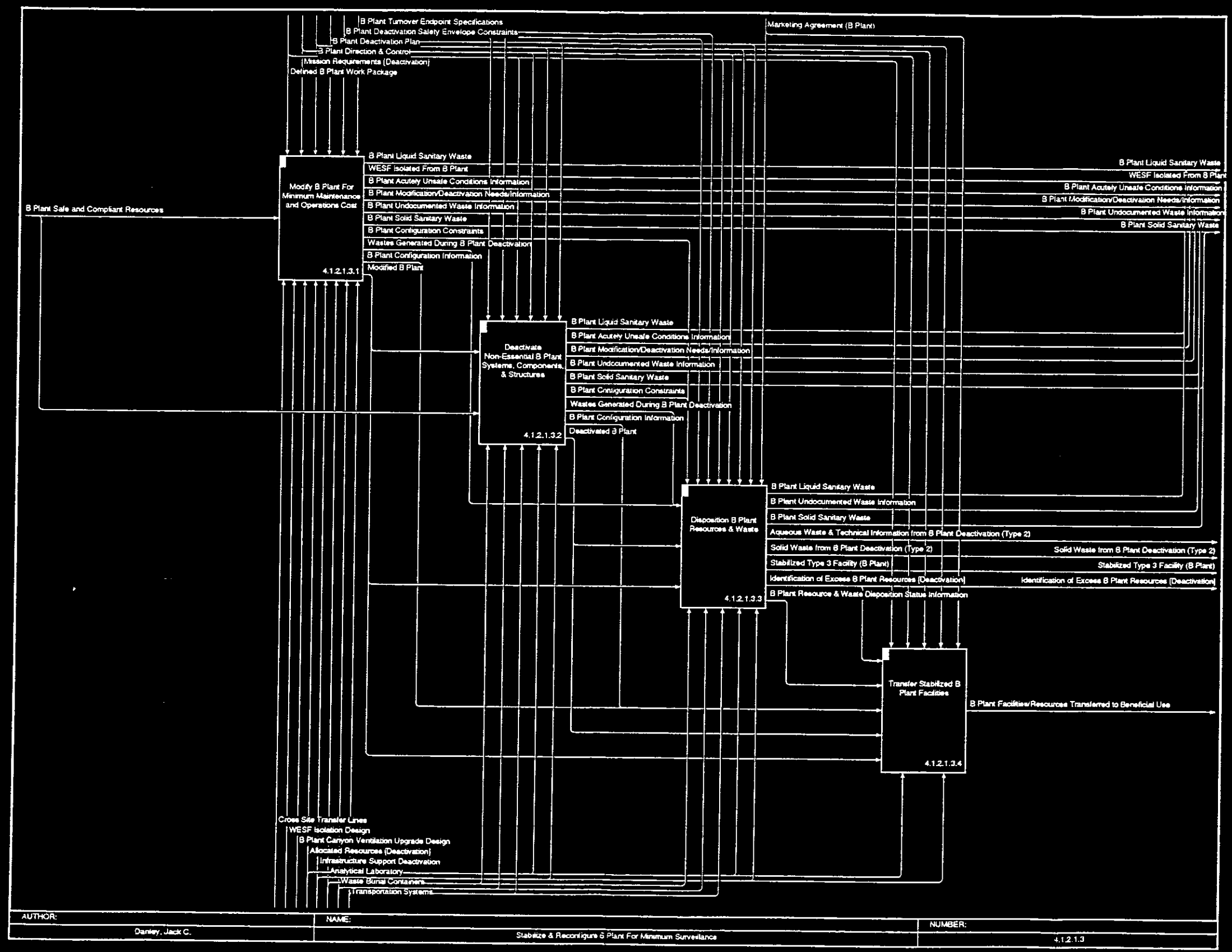
IDEF0 Diagram
[4.1.2.1.2] Determine B Plant Deactivation Plan & Negotiate Turnover Endpoint

October 10, 1995 3:53:53 pm



IDEF0 Diagram
[4.1.2.1.3] Stabilize & Reconfigure B Plant For Minimum Surveillance

October 10, 1995 3:53:53 pm



# ADDENDUM 4 - INTERFACE DEFINITIONS

| Interface | Constituents |
|---|---|
| **Allocated Resources [Deactivation]**<br>*Financial resources authorized to the implementing organization for completion of the function* | • FFTF Allocated Resources<br>• K Basin Allocated Resources<br>• PFP Allocated Resources<br>• PUREX Allocated Resources |
| **Analytical Laboratory**<br>*Radiochemical and analytical chemistry services.* | |
| **Aqueous Waste & Technical Information from B Plant Deactivation (Type 2)**<br>*Waste water containing radioactive or hazardous materials resulting from deactivation of B Plant.* | • B Plant Cooling Water<br>• B Plant chemical sewer<br>• WESF Liquid Effluent Waste |
| **B Plant Acutely Unsafe Conditions Information**<br>*Nuclear or chemically unsafe B Plant conditions. Information describing these conditions (detected during the cleanup operations) needed to be immediately fed back to the program management function for consideration which may result in new direction & control, defined work packages, and/or mission requirements.* | |
| **B Plant Canyon Ventilation Upgrade Design**<br>*Design team, engineering studies, system designs, specifications, acceptance criteria, and procedures for canyon ventilation upgrade.* | |
| **B Plant Characterization Information**<br>*Information collected from B Plant 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.* | |
| **B Plant Configuration Constraints**<br>*Constraints placed on the disposition of B Plant resources and waste by modifications to the facility to minimize cost, maintenance, surveillance, and security.* | |
| **B Plant Configuration Information**<br>*Status on how the B Plant should be modified to minimize cost, maintenance, surveillance, and security.* | |
| **B Plant Corrective Action Needs**<br>*Actions that must be taken to ensure the safety and compliance envelope of the B Plant is maintained.* | |
| **B Plant Deactivation Plan**<br>*Plan containing the requirements defined in the turnover specification that must be met before the D&D contractor will accept the B Plant facility. Certain systems may need to be deactivated. Contaminated areas will need stabilization. Materials and equipment may need to be removed.* | |

| Interface | Constituents |
|---|---|
| **B Plant Deactivation Safety Envelope Constraints**<br>*Constraints required to maintain the B Plant safety and compliance envelope. Examples include HVAC system requirements/configuration, electrical system requirements/configuration, instrument requirements/configuration, material storage configuration/location, fire alarm system configuration/location etc.* | |
| **B Plant Deactivation Status Information**<br>*Information on the completeness of B Plant deactivation.* | |
| **B Plant Demineralized Water for WESF**<br>*Demineralized water provided by B Plant for WESF operation and according to WESF specifications.* | |
| **B Plant Direction & Control**<br>*Project specific management guidance based on the status of implementation of the Defined Work Packages.* | |
| **B Plant Facilities/Resources Transferred to Beneficial Use**<br>*Equipment, components, or materials from B Plant deactivation cleaned up to acceptable levels and having a new owner identified.* | |
| **B Plant Facility Deactivation Needs/Information** | • B Plant Operations and Capability Needs/Information<br>• B Plant Safety and Compliance Needs/Information<br>• B Plant WESF Support Needs/Information |
| **B Plant Internal Safety Operations Constraint Documents**<br>*B Plant safety analysis reports, radiological safety procedures, occupational safety codes and standards, DOE safety orders, etc.* | |
| **B Plant Legacy Facilities, Equipment & Non-Nuclear Materials**<br>*Facilities, including all equipment and material associated with those facilities, that supported the Hanford production mission and are not needed to support the cleanup mission.* | |
| **B Plant Liquid Sanitary Waste**<br>*B Plant liquid sanitary waste (sewer) provided to Site infrastructure systems.* | • WESF Liquid Sanitary Wastes |
| **B Plant Mission Essential Capabilities**<br>*Mission essential capabilities in the form of all physical resources, manpower, technology, infrastructure, expertise required by all the other functions to conduct their submissions.* | • Analytical Laboratory<br>• B Plant Canyon Ventilation Upgrade Design<br>• Calibration Laboratory<br>• Closed Loop Cooling System<br>• Cross Site Transfer Lines<br>• Transportation Systems<br>• WESF Isolation Design<br>• Waste Burial Containers |
| **B Plant Modification/Deactivation Needs/Information**<br>*Information on the completeness of B Plant deactivation.* | |

| Interface | Constituents |
|---|---|
| **B Plant Negotiated Turnover State**<br>*Turnover is the B Plant state turned over to D & D operations after negotiations are complete. State is reached when endpoint specifications have been met.* | |
| **B Plant Operations & Maintenance Work Package**<br>*Work packages that identify B Plant operating and maintenance activities required to ensure that the facility safety and compliance envelope and documentation are maintained.* | |
| **B Plant Operations Information**<br>*B Plant information on staffing needs, control information, facility status, required reports, people and resource allocation.* | |
| **B Plant Operations and Capability Needs/Information**<br>*B Plant capabilities and needs discovered while operating the system.* | |
| **B Plant Proposed Turnover State**<br>*The turnover endpoint recommended by B Plant personnel.* | |
| **B Plant Qualified Staff**<br>*Staff that has had the necessary training and testing to perform the B Plant deactivation and material disposition activities in a safe and compliant manner.* | |
| **B Plant Resource & Waste Disposition Status Information**<br>*Status on the completeness of the disposition of B Plant resources.* | |
| **B Plant Safe and Compliant Resources**<br>*All necessary resources for safe and compliant operation of B Plant facilities in accordance with governing safety codes and regulations.* | |
| **B Plant Safety and Compliance Documentation**<br>*Safety and compliance documentation for B Plant program management.* | |
| **B Plant Safety and Compliance Needs/Information**<br>*Safety and compliance needs and information for program management decision-making.* | |
| **B Plant Solid Sanitary Waste**<br>*B Plant solid sanitary waste (garbage) provided to Site infrastructure systems.* | • WESF Solid Sanitary Waste |
| **B Plant Systems, Equipment and Structure Information**<br>*B Plant equipment & structure status, compliance state, design & configuration information.* | |
| **B Plant Turnover Endpoint Specifications**<br>*B Plant requirements that must be met before D & D will accept the B Plant facility.* | |

| Interface | Constituents |
|---|---|
| **B Plant Undocumented Waste Information**<br>*While doing everyday operations we come upon waste previously undocumented. Information must be fed back to the management function. Examples include liquid tank waste, liquid non-tank waste, solid waste, landfill, airborne waste, and non-defined waste.* | |
| **B Plant WESF Support Needs/Information**<br>*WESF support system needs from B Plant.* | |
| **Calibration Laboratory**<br>*Continuous air monitors and measuring and test equipment calibration services.* | |
| **Closed Loop Cooling System**<br>*Closed loop raw water cooling system.* | |
| **Cross Site Transfer Lines**<br>*Double encased underground pipeline fromm B Plant to east area tank farms.* | |
| **Deactivated B Plant**<br>*B Plant which has all non-essential systems, structures, and components deactivated.* | |
| **Defined B Plant Work Package**<br>*Documentation describing the project specific work; work authorization, description, procedures, resource limits and schedules.* | |
| **Excess B Plant Facilities, Equipment & Non-Nuclear Materials**<br>*Stabilized Type 2 facility (B Plant) categorized as excess.* | • B Plant Legacy Facilities, Equipment & Non-Nuclear Materials |
| **Identification of Excess B Plant Resources [Deactivation]**<br>*Identification of excess B Plant resources consisting of excess inventory information.* | |
| **Infrastructure Support Deactivation** | |
| **Marketing Agreement (B Plant)**<br>*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.* | |
| **Mission Requirements [Deactivation]**<br>*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.* | • FFTF Mission Requirements<br>• Mission Requirements (K Basin)<br>• PFP Mission Requirements<br>• PUREX Mission Requirements |
| **Modified B Plant**<br>*B Plant that has been placed into a configuration of minimal cost, maintenance, surveillance, and security.* | |
| **Solid Waste from B Plant Deactivation (Type 2)**<br>*Solid waste from B Plant including radioactive and mixed wastes.* | • WESF Solid Waste |

| Interface | Constituents |
|---|---|
| **Stabilized Type 3 Facility (B Plant)**<br>B Plant (Type 3) facility with stabilized hazardous material. | |
| **Transportation Systems**<br>Services for transport of radioactive, hazardous, and mixed wastes and excess (clean) B Plant resources. | |
| **WESF Isolated From B Plant**<br>Waste Encapsulation Storage Facility decoupled (physically and progammatically) from B Plant. | |
| **WESF Isolation Design**<br>Design team, engineering studies, system designs, specifications, acceptance criteria and procedures for WESF isolation. | |
| **WESF Liquid Effluent Waste**<br>Liquid effluent waste from WESF requiring disposition by B Plant to Aqueous Waste remedy functions. | |
| **WESF Liquid Sanitary Wastes**<br>TimeItem created 091494. Intended to represent sewagw output of the WESF facility. Description is TBD. | |
| **WESF Low Level Liquid Waste**<br>Low level liquid waste from WESF requiring disposition by B Plant to Tank Waste remedy functions. | |
| **WESF Solid Sanitary Waste**<br>TimeItem created 091494. Intended to represent garbage from WESF facility. Description is TBD. | |
| **WESF Solid Waste**<br>Solid waste from WESF requiring disposition by B Plant to solid waste remedy functions. | |
| **Waste Burial Containers**<br>Approved radioactive, hazardous, and mixed waste (remote-handled and contact-handled) burial containers (drums and boxes). | |
| **Wastes Generated During B Plant Deactivation**<br>Contaminated tools, equipment and materials generated as a direct result of B Plant 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. | |