Supporting Documentation
For
TRU Waste Disposition Program (U)

October 24, 1996

Prepared For:

WSRC TRU Waste Program
Savannah River Site

Prepared By:

WSRC with Vitech Corporation

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DISCLAIMER

ACKNOWLEDGMENT

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EXECUTIVE SUMMARY

The Strategic Plan for Savannah River Site (SRS) Transuranic Waste provides the basis for activities necessary to provide safe, cost-competitive and environmentally sound services for the storage, treatment and transport of certified TRU waste packages resulting from past, on-going and future Department of Energy (DOE) missions.

This Plan was developed using a systems engineering process. This process was used to identify the functions that satisfy the requirements for an integrated plan. The Strategic Plan will be used to develop and implement detailed tactical plans with a final goal to disposition all TRU waste stored or generated at the SRS by the year 2033.

The strategy adopted in this Plan consists of three interrelated initiatives identified as the Blue, Yellow and Green Initiatives. The Blue Initiative supports the early shipment of certified plutonium 239 TRU waste drums to the Waste Isolation Pilot Plant (WIPP) in 1999, begins to reduce the waste storage mortgage and builds the characterization and transportation infrastructure necessary to support the overall TRU Program.

The Yellow Initiative continues the process by repackaging those waste packages that only fail waste container requirements. This repackaged waste can then be certified and shipped to WIPP. Infrastructure continues to improve while the waste mortgage is further decreased.

The Green Initiative provides for more robust processing (size reduction, repackaging plutonium 238 wastes) to correct the remaining failure parameters. It also pursues the development of alternative transportation configurations which, when used in conjunction with more robust processing, allow for the transportation and disposal of the remaining TRU wastes at SRS thus reaching the End State Goal.

The three Initiatives provide a balance of short and long term objectives to reduce the inventory and risk associated with continued storage. The Plan outlines the activities that must be completed, suggests alternatives that require consideration, defines the key decisions and when they need to be made, and proposes an implementation schedule for achieving success.

This Plan is the first step in defining the future activities needed to dispose of SRS TRU waste. Using this Plan as a roadmap, detailed tactical schedules will be developed. Additional steps are required to:

- prioritize major action items.
- develop the details necessary for integrated resource loaded tactical schedules.
- identify responsible persons.
- develop cost estimates that align the necessary activities with projected funding levels over the next several years.
- optimize the implementation schedule.

The SRS TRU waste program must also interface site activities with the National TRU Program efforts so that existing capabilities across the DOE complex can be consolidated and utilized. Complex wide capabilities should be used to solve the TRU storage and disposal issues at all sites.

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STRATEGIC PLAN FOR SAVANNAH RIVER SITE (SRS) TRANSURANIC (TRU) WASTE

1.0 INTRODUCTION

Transuranic (TRU) waste is radioactive waste containing alpha-emitting radionuclides that have an atomic number greater than 92 (e.g., plutonium 239) and that have half-lives greater than twenty years in concentrations greater than 100 nanocuries per gram (nCi/g) of waste. To ensure safe disposition of TRU waste, the Department of Energy (DOE) has constructed the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico. When WIPP becomes operational, all TRU wastes will be transported from the point of generation to WIPP for disposal. The WIPP Waste Acceptance Criteria, DOE/WIPP-0069, serves as the primary directive for assuring the safe handling, transportation, and disposal of all TRU waste sent to the WIPP facility. The WIPP Waste Acceptance Criteria identifies strict requirements, including waste certification, that must be met by participating sites before these TRU wastes may be shipped for disposal at the WIPP facility. It is Savannah River Site's (SRS) responsibility to fully implement a TRU program which satisfies the requirements and objectives of WIPP and the National TRU Program. This document provides the strategic plan for implementing the SRS TRU program. Detailed information supporting this plan is contained in the Supporting Document for TRU Waste Disposition.

1.1 HISTORICAL PERSPECTIVE

The production of nuclear materials at the Savannah River Site resulted in the generation of over 10,000 cubic meters (the equivalent of over 50,000 fifty five (55) gallon drums) of waste contaminated with transuranic isotopes that has been packaged and placed in storage at the site since 1974. Of this total inventory, over half is stored in 55 gallon drums, another third of the waste is in large black (carbon steel) boxes, with the remainder in concrete casks, poly boxes, and other odd-sized containers.

At SRS, the radiochemical separations process (the canyons, FB-Line, HB-Line, and 235-F), the analytical process control laboratories (772-F and 772-1F) and research activities at the Savannah River Technology Center generate TRU waste. Environmental Restoration and Decontamination and Decommissioning activities also generate some TRU waste. The Solid Waste Disposal Facility in E-Area receives TRU waste from these facilities (generators).

Since 1974, SRS has placed TRU waste in safe retrievable storage on above ground concrete pads. Some pads have been covered with soil. In 1986, the process of covering pads with soil was discontinued based on the anticipated opening of the WIPP. On a parallel path with storage, SRS has continuously pursued efforts to develop TRU waste processing capabilities so that the waste inventory could be certified and shipped to WIPP. Due to budget constraints and changing WIPP requirements, these efforts could not be fully completed. Now, with the finalization of the activities required to open WIPP in November 1997, and a clearer picture of the requirements, SRS can finalize the plan that will be used to dispose of SRS TRU Waste.

1.2 MISSION AND VISION

A fully implemented SRS TRU waste program must contain all of the elements necessary to disposition SRS waste at WIPP in accordance with the Mission and Vision statements below.

MISSION:

To provide safe, cost-competitive and environmentally sound services for the storage, treatment and transport (for disposal at WIPP) in New Mexico or at another approved repository) of certified waste packages resulting from past, on-going, and future DOE missions.

VISION:

To be recognized as the "Best in Class", customer oriented service organization which has developed steady state treatment, storage and disposal strategies (for existing and newly generated waste packages) that are consistent with the national waste program, address stake holder concerns, and support future site missions.

The Strategic Plan provides a solution for TRU waste disposition by identifying the activities that must be completed, including consideration of alternatives and key decisions that must be made, and proposes an implementation schedule for achieving a comprehensive SRS TRU Waste Program.

1.3 STRATEGIC PLAN OBJECTIVES

The primary objectives used for developing this Plan are:

- Maintain continued safe storage of TRU waste.
- Support WIPP startup by having waste packages ready for shipment by 10/99.
- Identify the issues and activities required to retrieve TRU waste from SRS storage, process the TRU waste to meet WIPP waste acceptance criteria requirements and transport the TRU waste to WIPP for final disposition. Emphasis is placed on providing timely disposition of the high activity waste and wastes requiring retrieval.
- Identify alternatives for issue resolution, characterization, processing, transportation and disposal, that may be cost effective.
- Segregate any non mixed Low Level Waste drums that are currently being managed as TRU waste, then determine and implement any necessary processing and disposal activities. Identify the possible disposition alternatives for Mixed Low Level Waste drums.
- Disposition all legacy SRS TRU waste by 2033 (WIPP repository closing date).

The primary assumptions of the Plan are:

- TRU Waste will go to WIPP or other acceptable repository for disposal.
- WIPP will open in November, 1997 and will operate according to the WIPP Strategic Plan.
- WIPP will receive approval of the No Migration Variance Petition which will allow disposal of Mixed TRU wastes without processing to meet Land Disposal Restriction standards for hazardous wastes.
- Any additional WIPP waste acceptance criteria revisions will not prohibit shipment of TRU waste packages certified according to the WIPP Waste Acceptance Criteria, Revision 5, requirements.
- All SRS TRU waste will be certified prior to shipment to WIPP.

The primary elements of this Plan are:

- a strategy based on current capabilities, i. e. TRU waste will be sent to WIPP in the currently available/approved transport container, Transuranic Package Transporter II (TRUPACT II).

- the development of alternatives which may enhance safety and cost effectiveness and facilitate integration of DOE complex capabilities.

- a proposed phased schedule for implementation.

- recommendations for and prioritization of the activities associated with transportation alternatives, reduction in characterization requirements and Mixed Low Level Waste segregation.

The strategy outlined in this plan provides the foundation for annual and out-year planning efforts. Prioritizing activities, allocating resources, and optimizing the schedule must be performed to complete the planning process.

1.4 REGULATORY DRIVERS

This plan provides a strategy for managing SRS's legacy of transuranic waste from generation or retrieval to final disposal. It is estimated that about 90% (most of the waste generated prior to 1990) of the TRU wastes at SRS are Mixed TRU wastes, i.e., they also contain hazardous constituents. As with all mixed wastes, different requirements are applicable to the radioactive and hazardous components of the waste. The radioactive component of Mixed TRU waste is regulated by DOE, for management and disposal, and the Nuclear Regulatory Commission, for transportation on public roads. The WIPP facility had been identified for disposal of defense-related TRU waste, and 40 CFR 191 and 194 were promulgated to regulate disposal at WIPP. At SRS, management of TRU waste has been directed toward storing and preparing the waste for eventual shipment and disposal at WIPP. DOE Order 5820.2A defines DOE requirements for managing radioactive waste, including TRU. The hazardous component is similarly regulated by the Resource Conservation and Recovery Act (RCRA), as well as state laws and regulations, including the South Carolina Hazardous Waste Management Regulations. Many other requirements and drivers for the management of the SRS transuranic waste inventory relate to these high level requirements, such as the Approved Site Treatment Plan and Consent Order (95-22-HW) between SRS and the state of South Carolina which mandates compliance with the Federal Facilities Compliance Act (FFCAct), legislation designed to bring federal facilities into compliance with RCRA, and site-specific requirements (WIPP Waste Acceptance Criteria) related to preparing TRU wastes for disposal at that facility.

2.0 METHODOLOGY

2.1 Systems Engineering Approach

The systems engineering approach used to define the "Strategic Plan for Savannah River Site (SRS) Transuranic (TRU) Waste" is illustrated in the following diagram. This diagram depicts the system engineering process. These are the basic steps which comprise the process. The square cornered rectangles represent the major system engineering activities performed. The rounded cornered rectangles represent items that are input to and/or output from the activities.

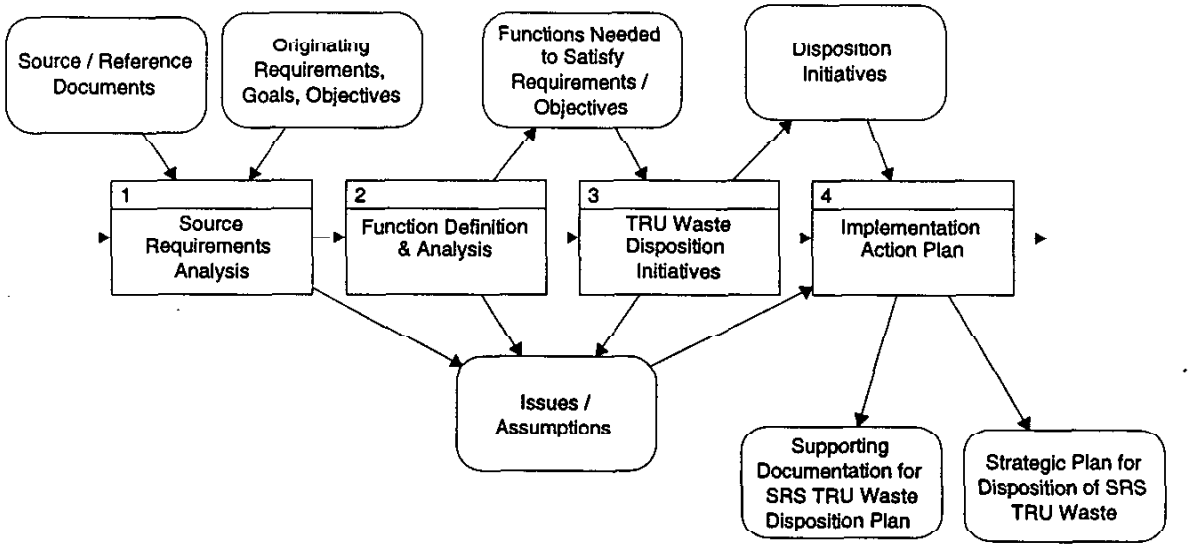


Figure 2.1-1, System Engineering Approach Overview

This systems engineering (SE) process is consistent with the IEEE 1220, "Standard for Application and Management of the Systems Engineering Process". The SE process is an iterative process applied throughout the acquisition and operation life cycle. The process itself leads to a well defined, completely documented, and optimally balanced system. It does not produce the actual system itself, but rather, it produces the complete set of system models and documentation, tailored to the needs of the TRU Waste Program, which fully describes the system to be developed and produced.

A computer-based centralized information repository (database) was used to capture the evolving system specification and supporting rationale. The information in the repository, managed by the commercially available system engineering support tool CORE®, served as the focus for the development team's engineering analysis activities and communication.

A diverse team of subject matter experts was assembled to develop the strategy for the disposal of TRU Waste. The TRU Waste Strategic Planning Team, consisting of the subject matter experts with coaching from a systems engineer, defined the TRU Disposition functional model and supporting documentation. Initially, all SRS TRU waste streams were segregated into distinct waste groups and the requirements for disposing each of those wastes were indentified. An engineering analysis was used to identify the functions that must be performed to satisfy the originating/driving requirements and dispose of any waste container within any waste group stored or generated at

SRS. This set of functions provided the basis for the initiatives presented in the Strategic Plan and the schedule to implement a TRU Waste Program.

Waste Stream Grouping - All of the current, identified SRS TRU waste streams were segregated into distinct groups based on radionuclide, activity, and/or container type. This grouping of the waste streams reduced the total number of separate waste streams evaluated in developing the Strategic Plan.

Source Requirements Analysis - The TRU Waste source requirements analysis consisted of gathering relevant documentation dealing with the TRU Waste Program mission of storing, processing and transporting certified waste packages to WIPP. The inputs to this activity were:

- guiding documents that establish policies, guidelines and minimum requirements by which DOE manages its radioactive and mixed waste and contaminated facilities.
- DOE's requirements to implement the SRS Site Treatment Plan for the development of treatment capacities and technologies.
- Regulations relating to transportation of hazardous material and the manufacture and testing of packaging and containers.
- performance requirements to ensure the public health and safety handling of transuranic (TRU) waste at the WIPP.
- documentation that describes and establishes the CAO QA Program.
- the QAPP that identifies the quality of data necessary and techniques designed to maintain and ensure the required data quality to support regulatory compliance programs associated with the characterization of waste associated with the WIPP facility.

These source documents were analyzed in order to identify/derive the complete set of originating requirements (i.e., starting point requirements) that must be satisfied by the Disposition of SRS TRU Waste Strategy. All identified issues and assumptions needing further analysis were also captured in the repository with the necessary traceability linkages. Traceability linkages between information in the repository provides the basis for common understanding of the interaction of elements, automated analysis, and automated document generation.

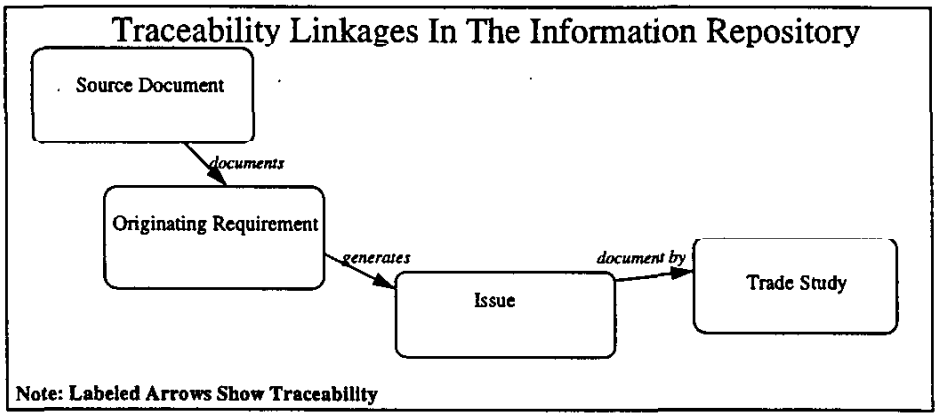


Figure 2.1-2, Traceability Linkages

Next, the system-level external interfaces were identified and modeled in the information repository. The resulting interface model identifies the context in which our system must operate while satisfying the identified originating requirements.

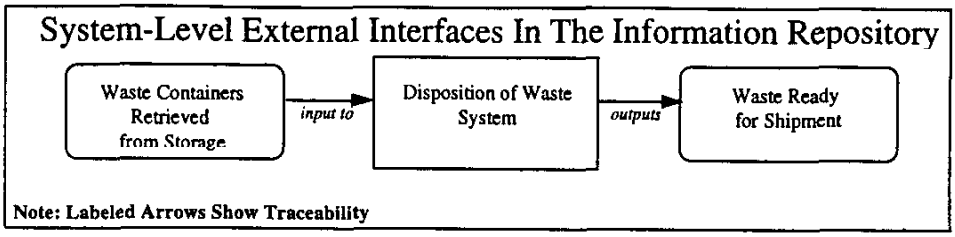


Figure 2.1-3, Interface Diagram

Function Definition and Analysis - Once the originating requirements and system-level external interfaces were identified, the team used this knowledge base to identify and analyze the set of functions the system must perform. A Functional-Flow Block Diagram (FFBD) technique was used to specify the stimulus-response work-flow (i.e., conditional sequences of functions) to be performed by the system. These function-flows provided the ability to better communicate to the development team, and customers, the set of functions, interfaces, and execution order. Examples of FFBDs are illustrated in the following diagram.

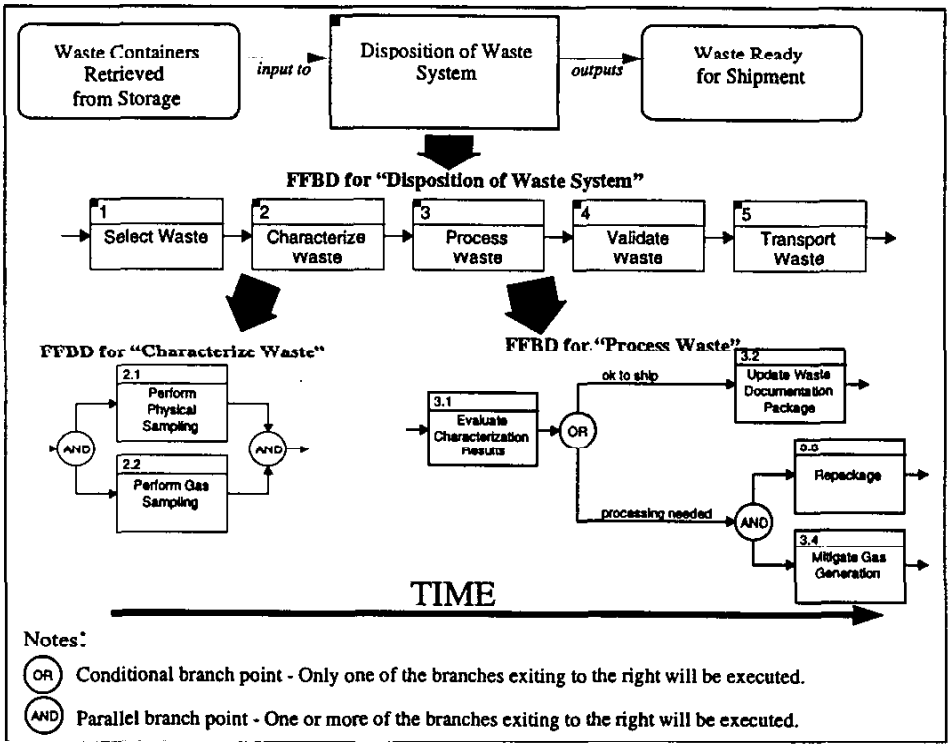


Figure 2.1-4, Functional Flow Block Diagram

The TRU Waste Strategic Planning Team used a top down decomposition approach which defines a system's functions level by level. The TRU Waste Disposition Program was decomposed into these top-level functional areas: Select Waste, Characterize Waste, Process Waste, Validate Waste and Transport Waste, defined as follows:

Select Waste - the selection of a TRU waste container, or group of containers, based on existing information. The container is selected and/or retrieved from storage in the Solid Waste Management Facility.

Characterize Waste - the characterization of a container, including documentation reviews and additional characterization, as necessary to determine whether or not the waste meets WIPP waste acceptance criteria requirements or requires processing.

Process Waste - If a waste package does not meet WIPP waste acceptance criteria requirements, the waste is processed to meet these requirements and re-characterized. Processing may include Size/Weight reduction, *Sorting, Segregating, Repackaging, and/or mitigate gas generation. Note that many large containers, because of* their size, require size reduction and repackaging before they can be characterized, processed, and/or shipped.

Validate Waste - provides the final assurance and the documentation needed to verify that a waste package meets all requirements prior to its shipment to WIPP.

Transport Waste - If the waste package meets all requirements, the waste package is brought to a transport dock (area) where it is loaded into the approved transport container and shipped, over an approved transport corridor, to WIPP.

Figure 2.1-5 shows a flow chart linking these functions, i.e. the functional flow.

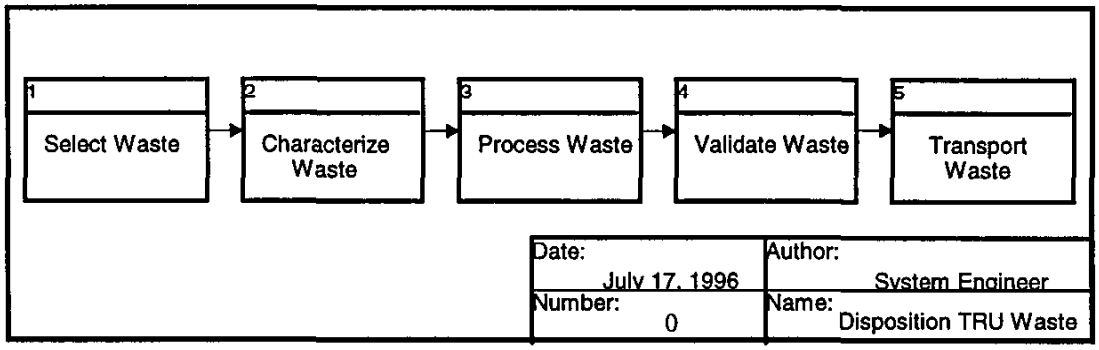


Figure 2.1-5, High Level Functional Flow for TRU Waste Disposition

These high level functions were traced back to the originating requirements / assumptions they were developed to satisfy. Establishing these traceability linkages kept the team focused on identifying only those functions needed to satisfy the originating requirements.

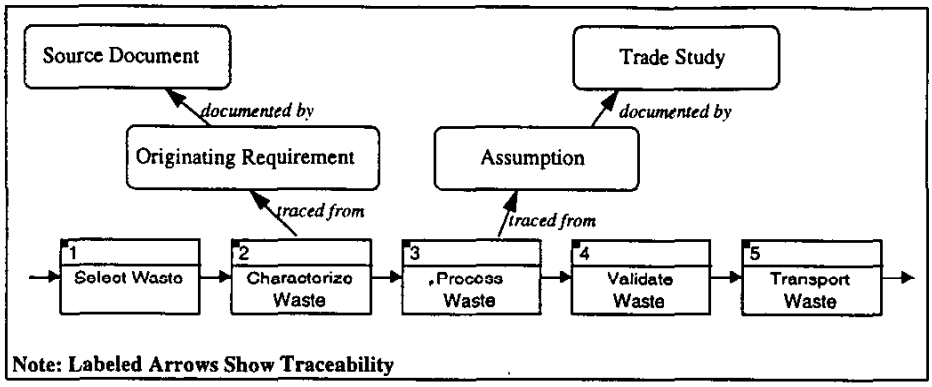


Figure 2.1-6, Function Traceability Linkages

Each function was broken down into subfunctions to detail the specific sequence of actions, including optional paths, necessary to achieve the function. This second level set of subfunctions were arranged sequentially to provide the functional flow for the program.
Detailed descriptions were written for each function and the appropriate requirements, conditions, and inputs/outputs were linked to each function.

Additionally, during this functional analysis activity, interfaces between the functions were developed. These are depicted on an N^2 Diagram as follows.

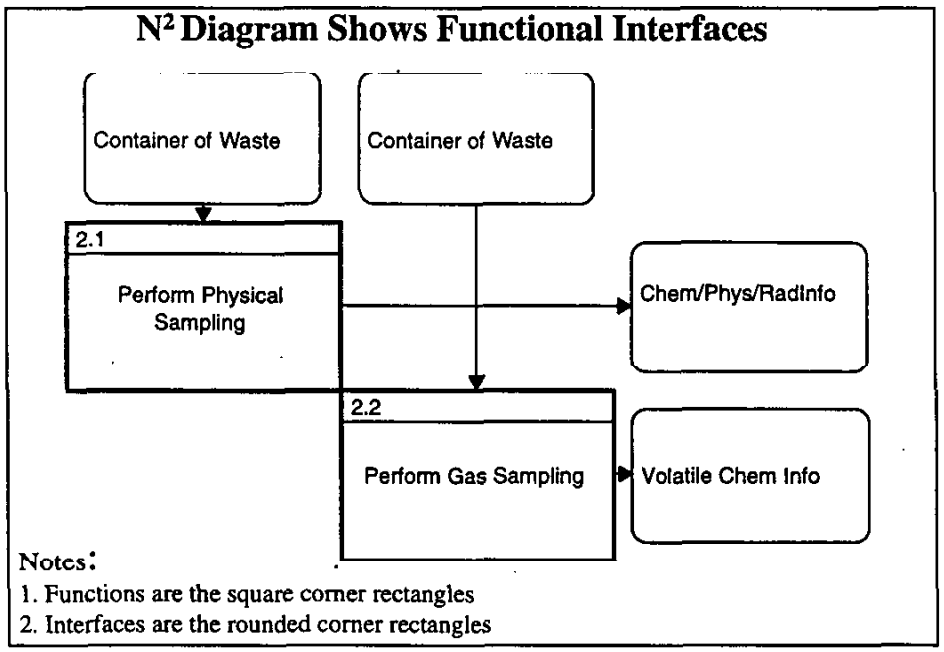


Figure 2.1-7, N^2 Diagram

Collectively the functions, interfaces, and traceability to supporting information constitute a complete system description at each decomposition level. Each waste group was then "walked through" the detailed program functional flow to verify completeness, identify activities, and determine those activities that were common among the waste groups, and to identify the issues. These functions represent the physical actions necessary to disposition the waste. All activities required to perform these functions were linked to the appropriate functions. Figure 2-8 summarizes these functions and activities:

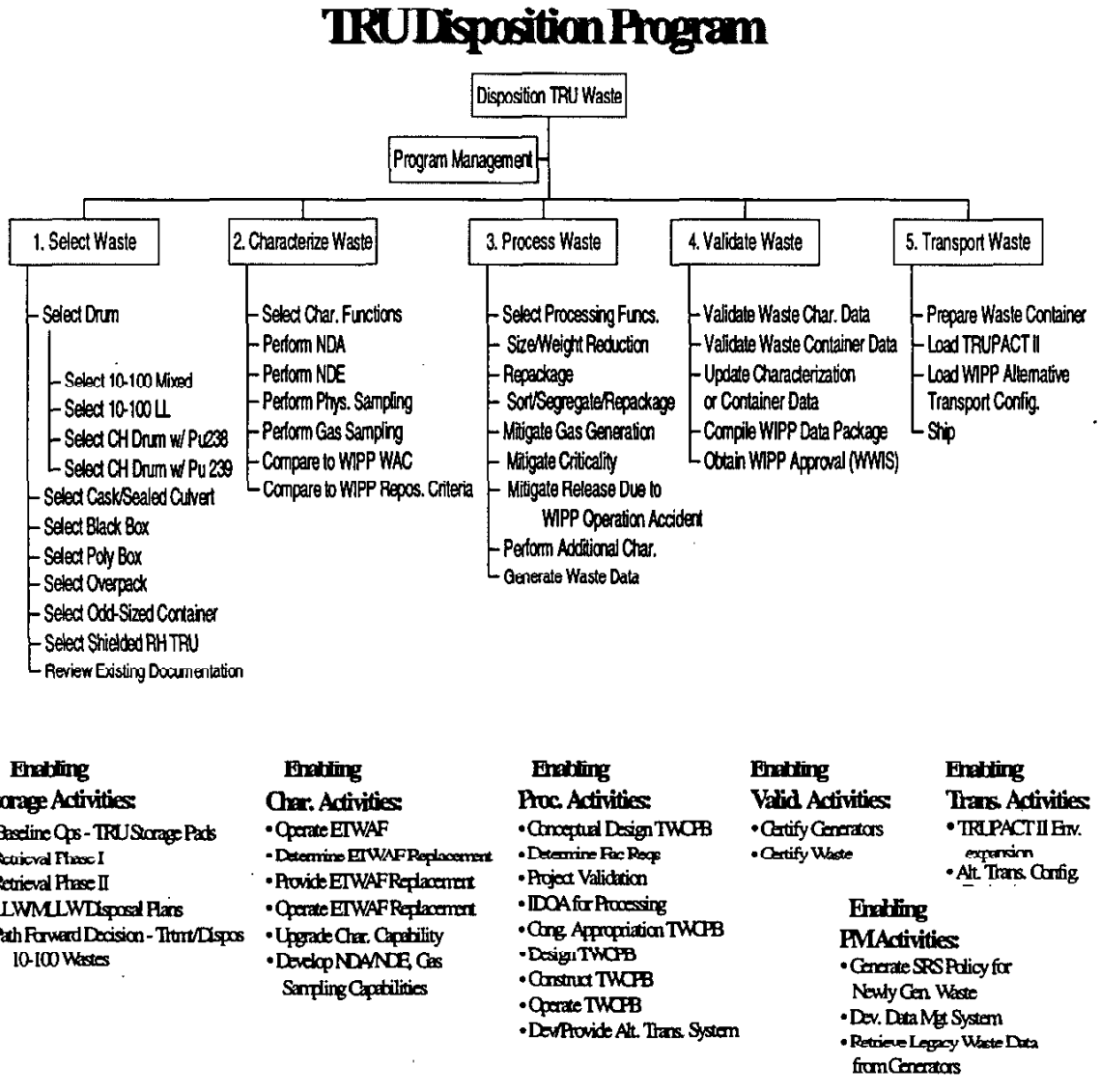


Figure 2.1-8, TRU Program Functions

This set of activities, in conjunction with the functions, provided the basis for the waste disposition initiatives presented in the Strategic Plan. These initiatives provided the knowledge base needed to support the development of an implementation action plan and schedule to implement the TRU Waste Program.

The following sections provide additional information and supporting detail from the above process.

2.2 Waste Groupings

The current SRS TRU waste streams were segregated into the following 11 distinct groups based on radionuclide, activity, and/or container type:

10-100 nCi Mixed Job Control in Drums
10-100 nCi Low Level Non-mixed Job Control in Drums
Contact Handled TRU Pu 238 in Drums
Contact Handled TRU Pu 239 in Drums
Overpack Pu 238 and Pu 239 Drums
Poly Boxes
Black Boxes
Casks
Odd Size Containers
Remote Handled TRU
Newly Generated/Future Streams (ER & D&D Wastes)

The waste streams associated with each group are listed below (note: a waste stream may be associated with more than one group):

10-100 nCi Mixed Job Control in Drums:

W025-221F-HET	W025-772F-HET	W033-221F-HET
W025-221H-HET	W025-773A-HET	W033-221H-HET
W025-235F-HET	W025-999-HET	W033-235F-HET

10-100 nCi Low Level Non-mixed Job Control in Drums:

T000-221F-HET	T000-235F-HET	T000-773A-HET
T000-221H-HET	T000-772F-HET	T000-999-HET

Contact Handled TRU Pu 238 in Drums:
(Includes all but FB-Line drums)

T001-221H-HET	W026-221H-HET	W027-235F-VIT
T001-221H-VIT	W026-221H-VIT	W027-772F-HET
T001-235F-HET	W026-235F-HET	W027-772F-VIT
T001-235F-VIT	W026-235F-VIT	W027-773A-HET
T001-772F-HET	W026-772F-HET	W027-773A-VIT
T001-772F-VIT	W026-772F-VIT	W027-999-HET
T001-773A-HET	W027-221H-HET	W027-999-VIT
T001-773A-VIT	W027-221H-VIT	
T001-999-VIT	W027-235F-HET	

Contact Handled TRU Pu 239 in Drums:

T001-221F-HET	W026-221F-HET	W027-221F-HET
T001-221F-VIT	W026-221F-VIT	W027-221F-VIT

Overpack Pu 238 and Pu 239 Drums:
(Included in CH Pu238 and CH Pu239 Waste in Drums)

Poly Boxes:

T000-221F-VIT	T000-773A-VIT	T001-772F-VIT
T000-221H-VIT	T001-221F-VIT	T001-773A-VIT
T000-235F-VIT	T001-221H-VIT	
T000-772F-VIT	T001-235F-VIT	

Black Boxes:

T000-221H-HET	T001-221H-MET	W027-221F-HET
T000-221H-MET	T001-221H-VIT	W027-221F-MET
T001-221F-HET	W025-221F-HET	W027-221F-VIT
T001-221F-MET	W025-221F-MET	W027-221H-VIT
T001-221F-VIT	W025-221H-HET	
T001-221H-HET	W025-221H-MET	

Casks:

T000-773A-HET	W025-773A-HET	W027-773A-VIT
T001-773A-HET	W027-773A-HET	

Odd Size Containers:

T001-221H-HET	W025-772F-MET	W027-235F-VIT
T001-773A-HET	W025-773A-HET	W027-772F-HET
T001-773A-MET	W025-773A-MET	W027-772F-MET
W025-221F-HET	W027-221F-HET	W027-772F-VIT
W025-221F-MET	W027-221F-MET	W027-773A-HET
W025-221H-HET	W027-221F-VIT	W027-773A-MET
W025-221H-MET	W027-221H-HET	W027-773A-VIT
W025-235F-HET	W027-221H-MET	W027-773A-Clas
W025-235F-MET	W027-221H-VIT	W027-999-VIT
W025-772F-HET	W027-235F-MET	

Remote Handled TRU:

T003-773A-HET	T003-773A-VIT

Newly Generated/Future Streams (ER & D&D Wastes)

To be determined

Container type, e.g. drums, black boxes, etc., was used as the distinguishing parameter for the selection of the waste group in the system model.

2.3 System Model

The following sections document the data and information contained in the system model CORE database files. Descriptions and traceability/relationship information is provided.

2.3.1 Source/Reference Documents

The documents listed in this section contain the requirements and criteria for the disposition of SRS TRU waste.

Source/Reference Documents
1. 49 CFR 171,172,173,177,178 Transportation *Document Date*: October 1, 1986 *Document Author*: Research and Special Programs Administration, Department of Transportation *Description:* Parts 100-178, of 10/1/86, Other Regulations Relating to Transportation: Chapter I - Research and Special Programs Administration. Department of Transportation. prescribes the requirements of the DOT governing the transportation of hazardous material and the manufacture and testing of packaging and containers.
2. Carlsbad Area Office (CAO) Quality Assurance Program Description (QAPD) *Document Number*: DOE 1994b Revision 1 *Document Author*: U.S. Dept. of Energy *Description*: The CAO QAPD is the document that describes and establishes the CAO QA Program. The provisions of this QAPD apply to all programs and projects managed by the CAO. This document serves to identify the sources of all, applicable QA program requirements. The subject requirements are based on criteria contained, or incorporated by reference, on documents such as 10 CFR Part 830, Nuclear Safety Management, 40 CFR Part 194, Criteria for the Certification and Re-Certification of the Waste Isolation Pilot Plant's Compliance with the 40 CFR Part 191 Disposal Regulations; DOE Order 5700.6C, Quality Assurance; and the DOE-EM Quality Assurance Requirements and Description Document (QARD). Applicable QA program source documents have been placed in one of three categories: (1) Regulatory documents, including those incorporated by reference, that define the requirements necessary for the WIPP to be granted a certificate of compliance by the federal government and permit(s) by state governmental agencies to dispose of TRU and mixed-TRU wastes in the WIPP repository, or that define requirements applicable to the management of the WIPP as a DOE non-reactor nuclear facility. (2) Commitment documents that are imposed by DOE management. (3) Guidance documents that provide additional information, useful in the development and implementation of the CAO QA Program. The purpose of the QAPD is to describe the applicability and requirements of the CAO QA Program as applied within the CAO management infrastructure. In this context, the management infrastructure includes all CAO Program participants (e.g. Sandia National Laboratories (SNL), as Science Advisor; Westinghouse Waste Isolation Division (WID), as the Management and Operating (M&O) Contractor of the WIPP; and various DOE organizations and contractors performing work under the cognizance of the CAO). This program is developed and maintained through an ongoing process that selectively applies the varied QA program criteria. This process provides due consideration to; the extent of source requirement applicability; a graded approach; available guidance; and the current foreseeable activities expected to be performed under the cognizance of CAO. The requirements on this QAPD are based on the principles that work shall be planned, documented, performed under controlled conditions, and periodically assessed to establish work item quality and process effectiveness and to promote improvement. Management and line personnel are responsible for planning, achieving, verifying, and assessing quality and promoting continuous improvement. This QAPD further delineates the quality contributions expected of all personnel and encourages their active participation in implementing the CAO QA Program.

Source/Reference Documents

3. DOE 5820.2A, Radioactive Waste Management

Document Date: September 26, 1988

Document Author: U.S. Dept. of Energy (Office of Defense Waste and Transportation Management)

Description: The purpose of this Order is to establish policies, guidelines, and minimum requirements by which the DOE manages its radioactive and mixed waste and contaminated facilities. The provisions of this Order apply to all DOE elements, and, as required by law and/or contract and as implemented by the appropriate contracting officer, all DOE contractors and subcontractors performing work that involves management of waste containing radioactivity and/or radioactivity contaminated facilities for DOE under the Atomic Energy Act of 1954, as amended (public Law 83-703). This Order provides policy for radioactive and mixed wastes which shall be managed in a manner that assures protection of the health and safety of the public, DOE, and contractor employees, and the environment. The generation, treatment, storage, transportation, and/or disposal of radioactive wastes, and the other pollutants or hazardous substances they contain, shall be accomplished in a manner that minimizes the generation of such wastes across program office functions and complies with all applicable Federal, State, and local environmental, safety, and health laws and regulations and DOE requirements.

4. Resource Conservation and Recovery Act (RCRA)

Description: The Resource Conservation and Recovery Act is the federal regulation which mandates the identification, transportation, storage, treatment, and disposal of hazardous wastes. The South Carolina Hazardous Wastes Management Regulations (SCHWMR) implement RCRA in the state of South Carolina. RCRA defines what must be handled as a hazardous waste and identifies the requirements for the management of hazardous wastes from their generation through treatment and disposal. Storage requirements identified in RCRA include the containerization, container labeling, and maximum storage durations for all hazardous wastes. In addition, specific sections of RCRA identify specific treatments and/or maximum concentrations to be achieved in hazardous wastes prior to final disposal. Finally, the RCRA regulations identify the requirements for closing facilities used for the generation, treatment, storage, or disposal of hazardous waste.

5. Savannah River Site Mixed Waste Approved Site Treatment Plan (STP) (U)

Document Number: Revision 4, Volumes I and II (WSRC-TR-94-0608)

Document Date: April 15, 1996

Document Author: WSRC

Description: The U.S.Department of Energy (DOE) ,Savannah Rover Operations Office (DOE-SR), has prepared the Site Treatment Plan (STP) for the Savannah River Site (SRS) mixed waste in accordance with RCRA Section 3021(b), and SCDHEC has approved the STP (except for certain offsite wastes) and issued an order enforcing the STP commitments in Volume I. DOE-SR and SCDHEC agree that this STP fulfills the requirements contained in the FFCAct, RCRA Section 3021, and therefore, pursuant to Section 105(a) of the FFCAct (RCRA Section 3021(b)(5), DOE's requirements are to implement the plan for the development of treatment capacities and technologies pursuant to RCRA Section 3021.

Emerging new technologies not yet considered may be identified to manage waste more safely, effectively, and at lower cost than technologies currently identified in the plan. DOE will continue to evaluate and develop technologies that offer potential advantages in public acceptance, privatization, consolidation, risk abatement, performance, and life-cycle cost. Should technologies that offer such advantages be identified, DOE may request a revision/ modification of the STP in accordance with the provisions of Consent Order 95-22-HW.

The Compliance Plan Volume (Volume I) identifies project activity schedule milestones for achieving compliance with Land Disposal Restrictions (LDR). Information regarding the technical evaluation of treatment options for SRS mixed wastes is contained in the Background Volume (Volume II) and is provided for

Source/Reference Documents

information.

Changes to STP Volume I and II will be done in accordance with the provisions of Consent Order 95-22-HW.

6. U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

Document Number: CAO-94-1010 Revision 0

Document Date: April 30, 1995

Description: The QAPP identifies the quality of data necessary, and techniques designed to maintain and ensure the required quality, to meet the specific Data Quality Objectives (DQOs) associated with the Department of Energy (DOE) Waste Isolation Pilot Plant (WIPP) Transuranic (TRU) Waste characterization Program. Waste characterization data will be collected to support regulatory compliance programs associated with the WIPP facility. These regulatory compliance programs include an assessment and certification of the WIPP repository performance, the preparation of permit applications and a variance petition, and an evaluation of existing TRU waste transportation restrictions. Although this QAPP specifies waste testing, sampling, and analytical methods, it also allows for the introduction, consideration, and development of innovative techniques for TRU waste characterization. Prior to implementation of new waste characterization techniques for use in program activities, the proposed techniques must be submitted to the Carlsbad Area Office (CAO) for review and approval. This QAPP will be reviewed annually, and revised as necessary, to incorporate lessons learned during waste characterization activities.

7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5

Document Number: DOE/WIPP-069 Revision 5

Document Date: April 1, 1996

Description: The Waste Isolation Pilot Plant (WIPP), DOE/WIPP-069, was initially developed by a U.S. Dept. of Energy (DOE) Steering Committee to provide performance requirements to ensure public health and safety handling of transuranic (TRU) waste at the WIPP. This revision updates the criteria and requirements of previous revisions and deletes those which were applicable only to the test phase. The criteria and requirements in this document must be met by participating DOE TRU Waste Generator/Storage Sites (Sites) prior to shipping contact-handled (CH) and remote-handled (RH) TRU waste forms to the WIPP.

The WIPP Project will comply with applicable federal and state regulations and requirements, including those in Titles 10, 40, and 49 of the Code of Federal Regulations (CFR). The WAC, DOE/WIPP-069, serves as the primary directive for assuring the safe handling, transportation, and disposal of TRU wastes in the WIPP and for the certification of these wastes. The WAC identifies strict requirements that must be met by participating Sites before these TRU wastes may be shipped for disposal in the WIPP facility. These criteria and requirements will be reviewed and revised as appropriate, based on new technical or regulatory requirements. The WAC is a controlled document. Revised/changed pages will be supplied to all holders of controlled copies.

Referenced Documents: See Following Source/Reference Documents numbered 7.n.

7.1. "Memorandum of Agreement" between Carlsbad Area Office and Headquarters

Document Author: U.S. Dept. of Energy

Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5

7.2. Atomic Energy Act of 1954

Document Number: Public Law 703, as amended

Source/Reference Documents
Document Author: U.S. Congress *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.3. CAO Generator sites Assessment and Certification (GSAC) Guide *Document Number*: CAO-95-2119 *Document Author*: U.S. Dept. of Energy *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.4. CAO Packaging Procedure and Maintenance Manual *Document Number*: DOE/WIPP-93-1001 *Document Author*: U.S. Dept. of Energy *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.5. Code of Federal Regulations, Energy, Title 10, Part 830, Nuclear safety Management *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.6. Code of Federal Regulations, Title 40, Parts 261, 262, 264, 265, and 268, Protection of Environment *Description*: Ofc. of the Federal Register National Archives and Records Administration *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.7. DOE Order 460.1, Packaging and Transportation Safety *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.8. DOE Order 460.2 Departmental Materials Transportation and Packaging Management *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.9. DOE Order 5700.6C, Quality Assurance *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.10. DOE Radiological Control Manual *Document Number*: DOE-EH-0256T *Description*: U.S. Dept. of Energy *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.11. DOE Test and Evaluation Document for DOT Specification 7A, Type A Packaging *Document Number*: WHC-EP-0558 *Description*: U.S. Dept. of Energy *Referenced In*: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 12. Draft 40 CFR Part 191 Compliance Certification Application *Document Number*: Draft-DOE/CAO-2056

Source/Reference Documents
Document Author: U.S. Dept. of Energy Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 13. Draft No-Mitigation Variance Petition *Document Number*: DOE/CAO-95-2043 *Document Author:* U.S. Dept. of Energy Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 14. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations *Document Number*: EPA QA/R-5 *Document Author:* EPA, Quality Management Staff, Washington, D.C. Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 15. Quality Assurance Program Requirements for Nuclear Facilities *Document Number*: ASME NQA-1 *Document Author*: American Society of Mechanical Engineers Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 16. Rockwell International Drawing, RH-TRU Waste Container Assembly *Document Number*: RI-H-2-91273 *Description*: U.S. Dept. of Energy Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 17. Safety Analysis Report for the RH-TRU 72-B Shipping Package *Document Author*: U.S. Dept. of Energy Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 18. Safety Analysis Report for the TRUPACT II Shipping Package (SARP) *Document Number*: U.S. NRC Docket No. 71-9218 Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 19. Standard Department of Defense Bar Code Symbology *Document Number*: MIL-STD-1198B *Document Author:* U.S. Dept of Defense Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 20. System Design Description, Waste Handling *Document Number*: SDD-WHOO *Document Author:* Westinghouse WID Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5

Source/Reference Documents
7. 21. TRUPACT II Certificate of Compliance *Document Number*: NRC Docket No. 71-9218 *Document Author:* U.S. Dept. of Energy Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 22. TRUPACT II Content Codes (TRUCON) *Document Number*: DOE/WIPP 89-004 *Document Author:* U.S. Dept. of Energy Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7.23. Waste Isolation Pilot Plant Land Withdrawal Act *Document Number*: Public Law 102-579 *Document Author:* U.S. Congress Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 24. Waste Isolation Pilot Plant Resource Conservation and Recovery Permit Application *Document Number*: DOE/WIPP 91-005 *Document Author:* U.S. Dept. of Energy/ Westinghouse Electric Corporation Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5
7. 25. Waste Isolation Pilot Plant Safety Analysis Report *Document Number*: DOE/WIPP-95-2065 *Document Author:* U.S. Dept. of Energy Referenced In: 7. Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5

2.3.2 Originating Requirements

The requirements listed in this section were extracted from the source/reference documents as applicable to the SRS TRU Waste Program.

Originating Requirements
01. Program Management *Description:* (a.) Program organization - responsibility for program quality is shared between DOE Headquarters, CAO, and participating sites. (b.) Program documents - includes a hierarchy of documents that will guide QA activities.(c.) Problem definition and background. (d.) Program description - the program consists of testing, sampling, and analytical techniques that will be used to characterize retrievably stored and newly generated TRU waste at sites that are planning to send their wastes to the WIPP facility. (e.) Data Quality Objectives (DQOs) for Measurement Data - DQOs are qualitative and quantitative statements that clarify Program technical and quality objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions. (f.) Special Training Requirements and Certifications - personnel assigned to perform activities for the program shall have the education, experience, and training applicable to the functions associated

Originating Requirements

with the work.(g.) Documentation and Records - a data/records management system shall be defined (h.) Procurement - participating sites must implement procedures to ensure that procured items and services meet established requirements and perform as specified.(i.) Work Processes - all TRU waste characterization in support of the Program shall be performed using approved instructions and procedures.

Related To:

Function: Perform Program Management

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

02. Assessment and Oversight

Description: Specific assessment actions will be taken during the Program to ensure all parties are adhering to the requirements of this QAPP. (a.) Assessment and Response Actions - audits shall include all management and technical aspects of the Program. (b.) Reports to Management - conditions adverse to quality shall be identified, documented, and reported to management, and all follow-up action shall be tracked to final resolution a time manner (c.) Performance Demonstration Program - each testing and analytical facility performing Program activities shall participate in the PDP and demonstrate conformance to the QA objectives for the Program.

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

03. Data Validation Usability and Reporting

Description: Certain steps are necessary to ensure Program data meet the levels of quality needed for the compliance activities outlined in Program Definition and Background. (a.) Data Review, Validation, and Verification Requirements - include procedures for the review, validation and verification of data at the data generation level; the validation and verification of data at the project level; and the verification of data at the CAO level. (b.) Validation Methods - validation of all data (qualitative as well as quantitative) shall be performed so that data used for WIPP compliance programs will be of known and acceptable quality. (c.) Reconciliation with Data Quality Objectives - reconciling the results of waste testing and analysis with the DQOs provides a way to ensure the data will be of adequate quality to support the regulatory compliance programs. (d.) Data Reporting Requirements - define the type of information and the method of transmittal for data transfer from the data generation level to the project level from the project level to CAO.

Related To:

Function: 1 - Select Waste

Function: 2 - Characterize Waste

Function: 3 - Process Waste

Function: 4 - Validate Waste

Function: 5 - Transport Waste

Function: Perform Program Management

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

04. Measurement and Data Acquisition

Description: Participating sites shall develop QAPjPs and SOPs for implementing the Program as specified in this QAPP. (a.) Quality Assurance Objectives - objectives for data quality are presented for each testing, sampling, and analytical technique in terms of precision, accuracy, MDI, PQRL, completeness, comparability, and representativeness, as applicable. (b.) Methods Requirements - all participating sites must follow acceptable

Originating Requirements

and approved testing, sampling, and analytical techniques so that processes affecting Program quality are controlled. (c.) Quality Control Requirements - QC requirements for each testing, sampling, and analytical technique include the performance of replicate scans, visual examination, the collection and analysis of equipment blanks, field laboratory blanks, field or lab duplicates, field reference stds, and lab control samples. (d.) Equipment Testing, Inspection, and Maintenance Requirements - equipment must be routinely tested and inspected to assure that it is being operated properly and is providing quality data. (e.) Equipment Calibration and Frequency - routine calibration of equipment ensures it is functioning properly and provides documentation of the measurements. Calibration shall be conducted using certified equipment or standards, as appropriate, with known valid relationships to nationally recognized performance standards (NIST) (f.) Data Management - Raw data obtained by testing, sampling and analyzing TRU waste in support of the Program shall be identifiable, legible, and provide documentary evidence of quality.

Related To:

Function: 2 - Characterize Waste

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

05. Sampling /Process Design

Description: The data collection design for the Program is presented for retrievably stored waste and newly generated waste.(a.) Description of Acceptable Matrix Parameter Categories - The DOE Waste Treatability Group Guidance (DOE 1995a) provides a system for grouping wastes with similar physical and chemical properties. This system uses matrix parameter categories to identify wastes and then to group wastes by similar properties. (b.) Parameters, Rationale, and Test Methods - once a waste stream has been identified, characterization information must be developed.

Related To:

Function: 2 - Characterize Waste

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

06. Sample Handling and Custody Requirements

Description: In order to ensure that the Program-generated data meet acceptable standards for legal admissibility and defensibility, field logs, sample labels, and chain-of-custody (COC) forms must be maintained and samples properly handled throughout the waste characterization process. (a.) Field documentation - field personnel must record information pertinent to the collection of samples and document modifications to planned sampling activities. (b.) Labeling - Site QAPjPs must describe the conventions for assigning unique identification numbers to all waste containers and samples included in the Program.(c.) Chain-of-Custody - A waste container or sample will be considered under effective custody control if it is sealed (i.e. unopened) with the custody seal intact. (d.) Handling - Waste container and samples must be handled in accordance with the requirements, minimum sample quantity required, type of sample containers to be used, sample preservation requirements, and maximum allowable holding times as implemented by site SOPs.

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

07. Head Space Gas Sampling

Description: This section describes minimum requirements for the collection of headspace gas samples using the headspace gas sampling methods. This protocol is designed to ensure that representative headspace gas samples, including QC samples, are consistently collected and transferred to the responsible laboratory in a manner that

Originating Requirements

maintains their integrity. (a.) Headspace gas samples must be collected from 3 areas within drums of TRU waste; 1. the drum headspace (directly under the drum lid), 2. The 208-liter (55-gallon) poly bag headspace, and 3.The headspace of the innermost layers of confinement. (b.) Method Requirements - Headspace gas samples for the determination of the analysis must be accomplished within a radiation containment area. (c.) Quality Control - Field QC samples must be collected on a per sampling batch basis. A sampling batch is a suite of samples collected consecutively using the same sampling equipment within a specific time period. (d.) Equipment Testing, Inspection, and Maintenance Requirements - All sampling equipment components that come into contact with headspace sample gases must be constructed of relatively inert materials such as stainless steel or Teflon. (e.) Equipment Calibration and Frequency (f.) Data Management - must record and report information pertinent to the collection of samples in accordance with QAPP, with site QAPjP and SOP requirements.

Related To:

Function: 2 - Characterize Waste

Function: 2.5 - Perform Gas Sampling

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

08. Sampling of Solids and Soils\Gravels

Description: This section describes the minimum requirements for collecting samples of TRU waste classified as homogeneous solids and soil/gravel from 208-liter (55-gallon) drums, waste boxes, and smaller containers contained inside drums and waste boxes. (a.) QA Objectives - samples must be collected randomly in both the horizontal and vertical planes of each container's waste. (b.) Method Requirements - methods to collect samples must be such that the samples are representative of the waste from which they were taken. (c.) Quality Control - coring and sampling of homogeneous solids and soil/gravel must comply with requirements for co-located cores, equipment blanks, and coring tool and sampling equipment cleaning. (d.) Equipment Testing, Inspection, and Maintenance Requirements, (e.) Equipment Calibration and Frequency, (f.) Data Management.

Related To:

Function: 2 - Characterize Waste

Function: 2.4 - Perform Physical Sampling

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

09. Non-Destructive Assay

Description: Non-destructive assay (NDA) techniques allow an item to be assayed without altering its physical or chemical form. (a.) Each site shall demonstrate and technically justify that the RA techniques used are appropriate for the specific wastes to which they are applicable. (b.) Any RA method may be used as long as the documented performance characteristics of the method meet the program QAOs. (c.) Quality Control - outlines the minimum QA/QC operations necessary to satisfy the analytical requirements of the Program. (d.) Instrument Testing, Inspection and Maintenance Requirements - RA measurement systems must be calibrated and maintained in accordance with controls established and implemented in the QAPjPs and SOPs. (e.) Calibration Procedures and Frequencies - each counting system must be subjected to a complete calibration appropriate to its planned usage and based on applicable consensus standards such as those published by ASTM (f.) Data Management - the results of RA for each waste container must be documented and available to the data user.

Related To:

Function: 2 - Characterize Waste

Function: 2.2 - Perform Non-Destructive Assay (NDA)

Originating Requirements

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

10.0 Radiography

Description: Radiography is a non-destructive qualitative and semi-quantitative technique that involves X-ray scanning of waste containers to identify and verify waste container contents. The results of radiography will be verified through visual examination of a statistically selected portion of retrievably stored waste containers in each waste stream. Quality Data Objectives, Methods Requirements, Quality Control, Instrument Testing, Inspection, and Maintenance Requirements, Instrument Calibration and Frequency, and Data Management requirements must be met.

Related To:

Function: 2 - Characterize Waste

Function: 2.3 - Perform Non-Destructive Examination (NDE)

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

11.0 Hydrogen and Methane Analysis

Description: This identifies the required QA elements for the analysis of hydrogen and methane in gas samples. Gas samples are collected in SUMMA passivated canisters from the headspace of waste containers and inner layers of confinement. Quality Data Objectives, Methods Requirements, Quality Control, Instrument Testing, Inspection, and Maintenance Requirements, Instrument Calibration and Frequency, and Data Management requirements must be met.

Related To:

Function: 2 - Characterize Waste

Function: 2.5 - Perform Gas Sampling

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

12.0 Gas Volatile Organic Compound Analysis

Description: This identifies the required QA elements for the analysis of VOCs in gas samples. Gas samples are collected in passivated canisters from the headspace of waste containers and inner layers of confinement. Quality Data Objectives, Methods Requirements, Quality Control, Instrument Testing, Inspection, and Maintenance Requirements, Instrument Calibration and Frequency, and Data Management requirements must be met.

Related To:

Function: 2 - Characterize Waste

Function: 2.5 - Perform Gas Sampling

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

13.0 Total Volatile Organic Compound Analysis

Description: This identifies the required QA elements for the analysis of total VOCs in samples of homogeneous solids and soil/gravels. Quality Data Objectives, Methods Requirements, Quality Control, Instrument Testing, Inspection, and Maintenance Requirements, Instrument Calibration and Frequency, and Data Management requirements must be met.

Originating Requirements

Related To:

Function: 2 - Characterize Waste

Function: 2.5 - Perform Gas Sampling

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

14.0 Total Semi-Volatile Organic Compound Analysis

Description: This identifies the required QA elements for the analysis of total SVOCs in samples of homogeneous solids and soil/gravel. Quality Data Objectives. Methods Requirements. Quality Control. Instrument Testing, Inspection, and Maintenance Requirements, Instrument Calibration and Frequency, and Data Management requirements must be met.

Related To:

Function: 2 - Characterize Waste

Function: 2.5 - Perform Gas Sampling

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

15.0 Total Metal Analysis

Description: This identifies the required QA elements for the analysis of total metals in samples of homogeneous solids and soil/gravel. Quality Data Objectives, Methods Requirements, Quality Control, Instrument Testing, Inspection, and Maintenance Requirements, Instrument Calibration and Frequency, and Data Management requirements must be met.

Related To:

Function: 2 - Characterize Waste

Function: 2.3 - Perform Non-Destructive Examination (NDE)

Function: 2.4 - Perform Physical Sampling

From Document:

U.S. Department of Energy, Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)

16.0 Comply with Transportation Packaging Requirements

Related To:

Function: 2.7 - Compare to WIPP Repository Criteria (Alt Trans Config)

Function: 5.2 - Load TRUPACT II

Function: 5.3 - Load WIPP Alternative Transport Configuration

From Document:

10 CFR 71 Packaging and Transportation of Radioactive Material

17.0 Comply with Transportation Requirements

Related To:

Function: 2.7 - Compare to WIPP Repository Criteria (Alt Trans Config)

Function: 5.2 - Load TRUPACT II

Function: 5.3 - Load WIPP Alternative Transport Configuration

Originating Requirements

From Document:

49 CFR 171,172,173,177,178 Transportation

18.0 Comply with WIPP WAC

Description: WIPP WAC requirements require the participating Sites to comply to all the criteria before TRU wastes may be shipped for disposal in the WIPP facility.

Related To:

Function: 2.6 - Compare to WIPP WAC

Function: 2.7 - Compare to WIPP Repository Criteria (Alt Trans Config)

Function: 3 - Process Waste

System: TRU Waste Disposition Program

From Document:

Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5

19.0 Provides processing capability

Description: Provides processing capability necessary to complete the SRS TRU Waste Program (i.e., size/weight reduction, sorting, segregation, and mitigation of gas generation).

Related To:

Function: I.3 - Green Initiative - Ship Processed Waste (50%)

20.0 QAPP Requirements will be followed

Related To:

System: TRU Waste Disposition Program

21.0 Comply with RCRA (Hazardous Waste)

Description: RCRA defines what must be handled as a hazardous waste and identifies the requirements for the management of hazardous wastes from their generation through treatment and disposal. Storage requirements identified in RCRA include the containerization, container labeling, and maximum storage duration's for all hazardous wastes. In addition, specific sections of RCRA identify specific treatments and/or maximum concentrations to be achieved in hazardous wastes prior to final disposal. Finally, the RCRA regulations identify the requirements for closing facilities used for the generation, treatment, storage, or disposal of hazardous waste. The South Carolina Hazardous Wastes Management regulations (SCHWMR) implement RCRA in the state of South Carolina.

From Document:

Resource Conservation and Recovery Act (RCRA)

22.0 Send waste to WIPP

Related To:

System: TRU Waste Disposition Program

From Document:

DOE 5820.2A, Radioactive Waste Management

Originating Requirements

23.0 To submit Part B Permit Application by 4th qtr FY 2008 (PM)

Description: STP

Related To:

Function: Perform Program Management

System: TRU Waste Disposition Program

From Document:

Savannah River Site Mixed Waste Approved Site Treatment Plan (STP) (U)

24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC

Description: The criteria identified in this table identify strict requirements that must be met before TRU Wastes may be transported to and disposed in the WIPP. These requirements are the conditions or limits that must be met for each criterion. This table is to assist participating Sites in preparing the site specific plans and detailed procedures required for certifying TRU waste for transport to and disposal in the WIPP.

Related To:

FailureParameter: Activity (PECi)

FailureParameter: Container

FailureParameter: Prohibited Items

FailureParameter: TRUCON Code (Decay Heat)

FailureParameter: Fissile Gram (FGE)

FailureParameter: Size and Weight

FailureParameter: RCRA DQO

FailureParameter: TRU (>100 nCi/g)

Function: 2.6 - Compare to WIPP WAC

Function: 2.7 - Compare to WIPP Repository Criteria (Alt Trans Config)

System: TRU Waste Disposition Program

From Document:

Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 5

2.3.3 Failure Parameters

The parameters listed in this section are those parameters from the WIPP Waste Acceptance Criteria that SRS TRU waste may fail to satisfy.

Failure Parameters

Activity (PECi)

Description: A radionuclide limit on the package contents that bounds the release of airborne radioactivity during package failure and fire accident scenario. This limit directly relates to bounding conditions specified for WIPP.

Related To Waste Groups:

Black Boxes

Casks

Failure Parameters

CH Pu 238 in 55-Gallon Drums

Future TRU Waste (Newly Generated Waste)

Odd-Sized Container

Poly Boxes

Traced From Requirement(s):

24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC

Container

Description: DOT Type a or 7A specification 55-gallon drums, standard waste boxes, and drum overpacks will be acceptable. Drums covered with soil or stored in an unprotected environment are suspect or questionable. Concrete casks, poly boxes, culverts, and black boxes do not need DOT 7A requirements. All containers must be vented.

Related To Waste Groups:

Black Boxes

Casks

CH Pu 238 in 55-Gallon Drums

CH Pu 239 in 55-Gallon Drums

Future TRU Waste (Newly Generated Waste)

Odd-Sized Container

Overpacked Drums

Poly Boxes

Traced From Requirement(s):

24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC

Prohibited Items

Description: Materials in the waste that have been defined by the WIPP Waste Acceptance Criteria as prohibited due to their potential to cause a reaction or increase the potential for premature failure of the package, i.e. free liquids, pressurized containers, heavy/unpadded items that could shift during movement and damage the package interior.

Related To Waste Groups:

Black Boxes

Casks

CH Pu 238 in 55-Gallon Drums

CH Pu 239 in 55-Gallon Drums

Future TRU Waste (Newly Generated Waste)

Odd-Sized Container

Poly Boxes

Traced From Requirement(s):

24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC

Failure Parameters

TRUCON Code (Decay Heat)

Description: A limit on radionuclides in TRU waste matrices to ensure that hydrogen gas generated from radiolysis is maintained at safe levels. TRUCON codes are defined for the TRUPACT II transportation system. Decay heat is a specific parameter addressed by the TRUCON codes which affects the total curies. the number of layers or organic materials, and the age of the waste.

Related To Waste Groups:

Black Boxes
Casks
CH Pu 238 in 55-Gallon Drums
CH Pu 239 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Poly Boxes

Traced From Requirement(s):

24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC

Fissile Gram (FGE)

Description: The nuclear criticality control or limit on the number of fissile gram in any single drum (200 grams) or standard waste box (325 grams). Only a small percentage of the existing waste packages may be impacted by this parameter.

Related To Waste Groups:

Black Boxes
Casks
CH Pu 239 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container

Traced From Requirement(s):

24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC

Size and Weight

Description: Fundamental physical limits that define the container acceptability both for the TRUPACT II and the WIPP repository.

Related To Waste Groups:

Black Boxes
Casks
CH Pu 238 in 55-Gallon Drums
CH Pu 239 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Poly Boxes

Traced From Requirement(s):

24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC

Failure Parameters
RCRA DQO *Description:* Limits imposed on the amount of RCRA hazardous constituents that may be present in a waste container. The limits are based on safety and health standards for operations within the WIPP Repository rather than the RCRA limits for hazardous wastes. The primary limits for SRS waste are anticipated to be the limits imposed on organic constituents. However, there are limits imposed by the WIPP RCRA DQOs for metals as well. *Related To Waste Groups:* Black Boxes Casks CH Pu 238 in 55-Gallon Drums CH Pu 239 in 55-Gallon Drums Future TRU Waste (Newly Generated Waste) Odd-Sized Container Poly Boxes *Traced From Requirement(s):* 24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC
TRU (>100 nCi/g) *Description:* TRU Waste is defined as a solid waste matrix containing transuranic radionuclides with an atomic number greater than 92, a half life greater than 20 years and alpha activity exceeding 100 nCi/g. Waste which is <100 nCi/g is considered low level waste and is expected to be disposed of at the DOE sites with LLW burial sites. *Related To Waste Groups:* Black Boxes Casks Future TRU Waste (Newly Generated Waste) Odd-Sized Container Poly Boxes *Traced From Requirement(s):* 24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC

2.3.4 System Functions

The complete set of functions required to be performed to disposition SRS TRU waste are listed in this section. Included is the system level Functional Flow Block Diagram and N^2 Diagram to identify the system level interfaces within the system. Each system level function is further decomposed, i.e. broken down, to the subfunctions necessary to achieve the system level function. Function descriptions and the requirements, interfaces, issues/assumptions, and activities associated with each function are identified.

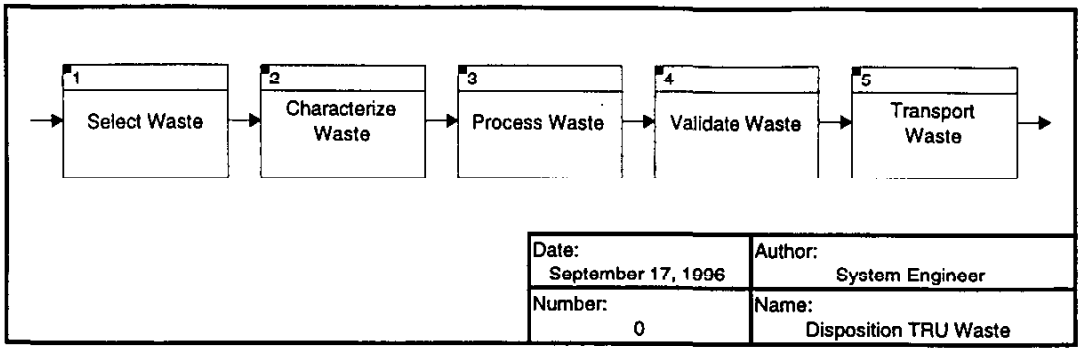


Figure 2.3.4-1 - Disposition TRU Waste

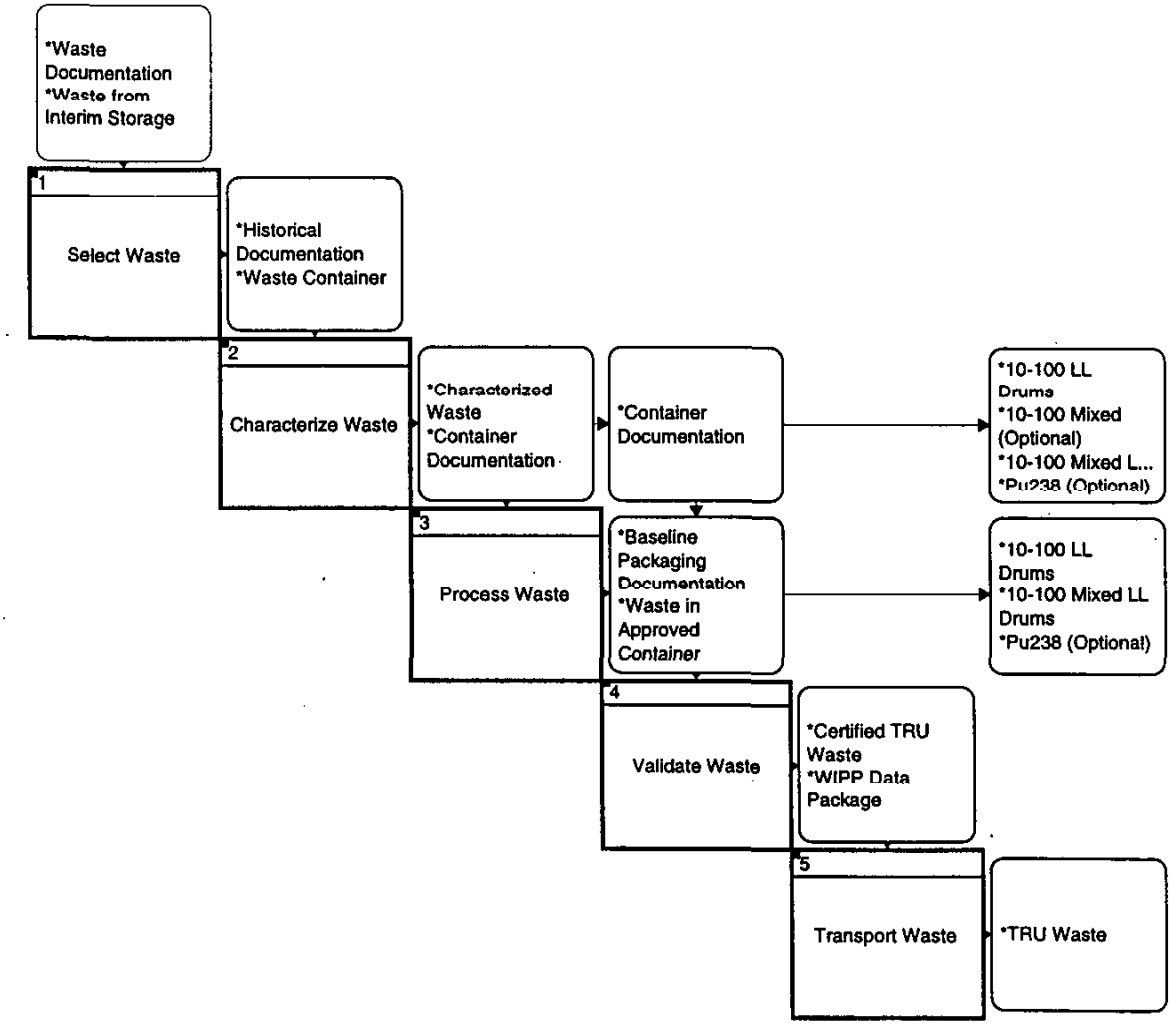


Figure 2.3.4-2 - Disposition TRU Waste Interface Diagram

1 - SELECT WASTE

Select a waste type, by container, to proceed through the functional flow. The functional flow includes any and all necessary characterization, processing, certification, and transportation to final disposal location.

Requirements:
03. Data Validation Usability and Reporting
Input Interfaces:
- Waste Documentation
- Waste from Interim Storage
Output Interfaces:
- Historical Documentation
- Waste Container
Activities:
A.0 - Storage (Select)
A.101 - Baseline Ops - Storage Pads
A.101.1 - Provide TRU Storage Pads
A.104 - Retrieval Project (Drums)
A.1041 - Retrieve Drums
A.1042 - Retrieval Project Phase II
A.1043 - Retrieve Phase II
A.1051 - LLW / MLLW Disposal Plans
A.1052 - Decision: Path Forward - Treatment & Disposition 10-100 Waste
A.1062 - Segregate: 10-100 LLW
A.1063 - Dispose of 10-100 LLW
A.1064 - Segregate: 10-100 MLLW
A.1066 - Dispose of 10-100 MLLW

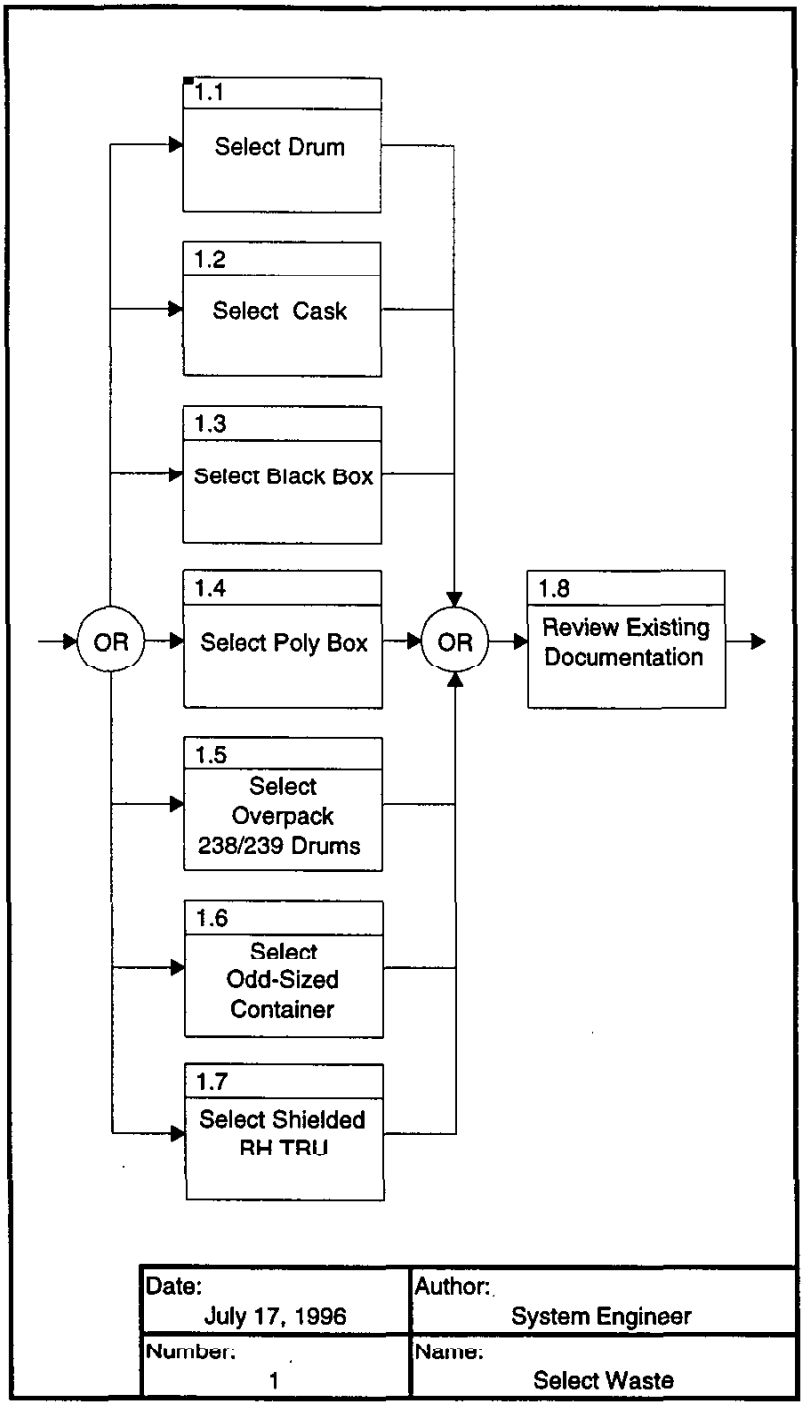


Figure 2.3.4-3 - Select Waste

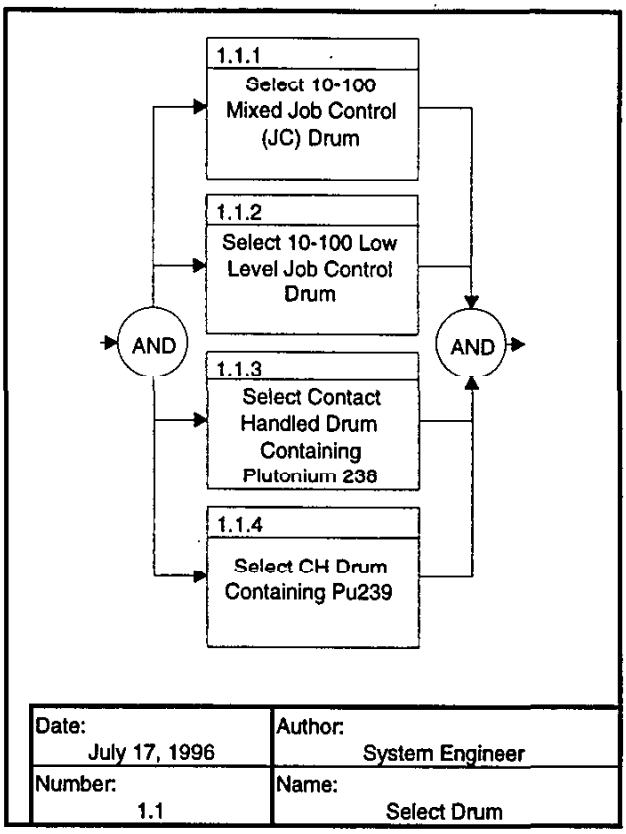


Figure 2.3.4-4 - Select Waste

Sub-Functions of "Select Waste"
1.1 - Select Drum
Description: Select a drum as the waste container to proceed through the functional flow. A Drum is a 55 gallon steel open head container fabricated to SRS procurement / engineering specifications.
1.1.1 - Select 10-100 Mixed Job Control (JC) Drum
Description: Select a10-100 Mixed Low Level (LL) drum as the waste container to proceed through the functional flow. A Drum is a 55 gallon steel open head container fabricated to SRS procurement / engineering specifications.
1.1.2 - Select 10-100 Low Level Job Control Drum
Description: Select a 10 - 100 LL drum as the waste container to proceed through the functional flow. Drum is a 55 gallon steel open head container fabricated to SRS procurement / engineering specifications.

Sub-Functions of "Select Waste"

1.1.3 - Select Contact Handled Drum Containing Plutonium 238

Description:

Select a CH Pu 238 drum as the waste container to proceed through the functional flow. Drum is a 55 gallon steel open head container fabricated to SRS procurement / engineering specifications.

1.1.4 - Select CH Drum Containing Pu239

Description:

Select a CH Pu 239 drum as the waste container to proceed through the functional flow. A Drum is a 55 gallon steel open head container fabricated to SRS procurement / engineering specifications.

1.2 - Select Cask

Description:

Select a cask or a sealed culvert as the waste container to proceed through the functional flow. The dimensions of most casks are 3 feet 4 inches wide by 3 feet 5 inches long and 4 feet by 5 inches high. The cask lid is typically sealed with grout or bolted in place with a gasket. The dimensions of the inner steel box of a cask are typically 27" wide x 27" long x 42" high. Sealed culverts are concrete culverts, sealed with epoxy and grout. Culverts are cylindrical with dimensions of 7 feet 6 inches in height, 7 feet 2 inches in outside diameter.

1.3 - Select Black Box

Description:

Select a black box as the waste container to proceed through the functional flow. Typical black boxes have dimensions of 7 feet high, 12 feet wide and 18 feet long. The lid to these boxes are sometimes sealed with caulking or utilize a neoprene gasket, and are bolted to the box. These boxes are used to store waste that is too large or bulky to be placed into a standard 55-gallon drum, such as cabinets, panels, slab tanks, glove boxes, vessels, pumps and piping. They are fabricated to SRS procurement/engineering specifications.

1.4 - Select Poly Box

Description:

Select a poly box as the waste container to proceed through the functional flow. Poly Boxes typically store HEPA filters and are not considered mixed waste regardless of generation date, based on content. Poly boxes are generally 2.75' x 2.75' x 1.5', and placed inside concrete culverts prior to storage on TRU pads. They are fabricated to SRS procurement/engineering specifications.

1.5 - Select Overpack 238/239 Drums

Description:

Select an overpacked drum as the waste container to proceed through the functional flow. An overpacked drum is typically a DOT container with an 83 - 85 gallon capacity, constructed of carbon steel, open head, fabricated to SRS procurement/engineering specifications. The overpack contains 55-gallon drums which have been placed inside the overpack due to failure of the container.

Sub-Functions of "Select Waste"
1.6 - Select Odd-Sized Container
Description: Select an odd-sized container as the waste container to proceed through the functional flow. Odd-sized containers include containers which are not drums (overpacked or not), black boxes, casks, or poly boxes. They are fabricated to SRS procurement/engineering specifications. Primarily, odd-sized containers are carbon steel boxes that are physically smaller than black boxes.
1.7 - Select Shielded RH TRU
Description: Select a container of Shielded Remote Handled (RH) TRU Waste, regardless of container size or shape, as the waste container to proceed through the functional flow. Remote Handled TRU waste is waste that has a dose between 200 mrem/hr without shielding and 1000 rem/hr @ contact. Neutron contributions are limited to 270 mrem/hr.
1.8 - Review Existing Documentation
Description: Review all existing documentation available for each waste container. For legacy waste, this documentation could include a burial slip, a WIPP Data Package, Hazardous Waste Codes, Generator, the date of generation, and other characterization information. For newly generated waste, this documentation could include a burial slip, and a WIPP Data Package. This review will provide the information needed to determine what additional characterization is necessary and/or possible to attain without additional processing.

2 - CHARACTERIZE WASTE

Collect characterization information on the waste contents and the container. The characterization data collection will consist of requiring any existing storage records and all the activities necessary to collect remaining data such as NDA, NDE and necessary sampling in order to evaluate the waste container data against the WIPP WAC. Emphasis must be stressed that WIPP-DOE-069, Revision 5 and the QAPP provide the existing certification development information including the characterization necessary to meet the waste acceptance criteria for TRU waste being sent to the WIPP repository.

Requirements:

03. Data Validation Usability and Reporting
04. Measurement and Data Acquisition
05. Sampling /Process Design
07. Head Space Gas Sampling
08. Sampling of Solids and Soils\Gravels
09. Non-Destructive Assay
10.0 Radiography
11.0 Hydrogen and Methane Analysis
12.0 Gas Volatile Organic Compound Analysis

13.0 Total Volatile Organic Compound Analysis 14.0 Total Semi-Volatile Organic Compound Analysis 15.0 Total Metal Analysis
Issues/Assumptions: New characterization technology will help identify waste for further processing
Input Interfaces: - Historical Documentation - Waste Container
Output Interfaces: - 10-100 LL Drums - 10-100 Mixed (Optional) - 10-100 Mixed LL Drums - Characterized Waste - Container Documentation - Pu238 (Optional)
Activities: C.1 - Operate ETWAF C.2 - Determine ETWAF Replacement C.3 - ETWAF Replacement Decision C.4 - Provide ETWAF Replacement C.5 - Operate ETWAF Replacement C.6 - Update / Develop Characterization Capability C.7 - Demonstrate Characterization Capability C.8 - Provide Characterization Capability

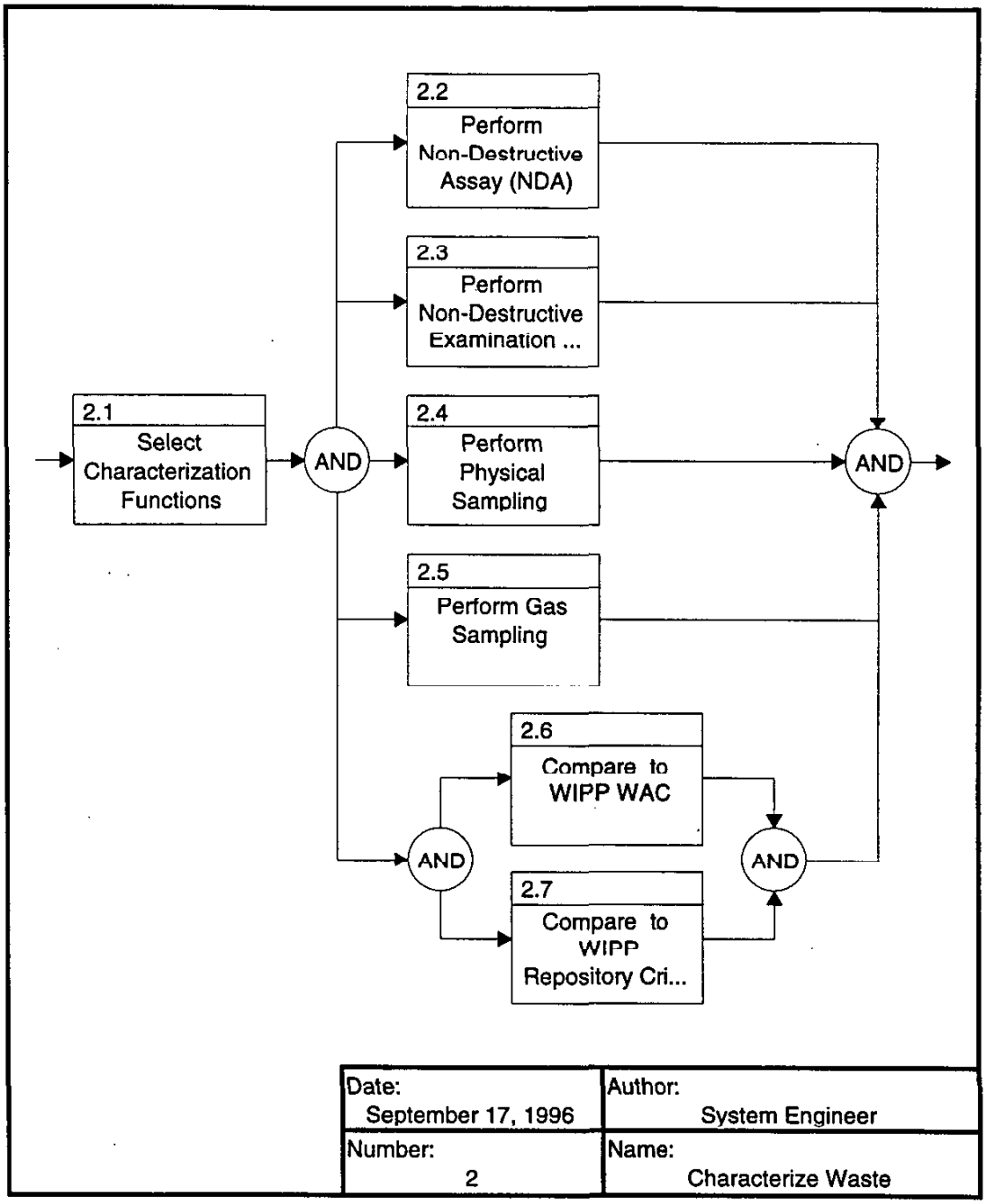


Figure 2.3.4-5 - Characterize Waste

Sub-Functions of "Characterize Waste"
2.1 - Select Characterization Functions
Description: Based on the existence and accuracy of container characterization data, identify which additional characterization activities must be completed to evaluate the waste container against the WIPP WAC.
2.2 - Perform Non-Destructive Assay (NDA)
Description: NDA measures the radioactivity in the container. Non-destructive assay is required for several reasons. At SRS assay capability is required to recategorize 10-100 nCi/g weapons grade and heat source plutonium waste streams as non-TRU (recategorized as either MLLW or LLW). Accurate measurements in the 10-100 nCi/g range are essential in developing a path forward for treatment and disposal of this waste. Non-destructive systems are preferable from both an ALARA standpoint and from a resource standpoint. The cost of designing, constructing and operating a facility to account for contamination and criticality concerns outweigh the costs of developing non-destructive and non-intrusive assay capability. Assay is also required to determine Pu equivalent Curies, fissile gram equivalent, and wattage calculations to ensure both TRUPACT II and WIPP requirements are met. NDA is required for 100% of the containers. Items that interfere with NDA techniques include: - Variation in source radionuclide composition. Many gamma signatures for the radionuclides found in TRU waste interfere which requires the waste generator to determine the radionuclide distribution for each waste stream in order to accurately interpret results from NDA. - Variation in source configuration: material distribution may result in self shielding, or attenuation. Clumping of fissile material can produce neutron multiplication effects. - Chemical composition of source term: interfering radiations can be produced due to interactions with chemicals in a radiation field (for example and alpha, n reaction). - Spatial distribution of source material: different matrices and spatial distributions can effect detection and system response. - Characteristic radiation emission rate: if its too low, may have detection limit concerns. If too high, may saturate detectors. - Waste matrix interferences consist of density, density distribution and elemental composition. - Density: As waste density increases, typically the matrix attenuation of passively emitted characteristic radiations increases complicating interpretation and causing larger correction factors to be applied. - Density distribution: heterogeneous density distribution are not typically well accommodated by waste NDA techniques and generally result in improper signal averaging and larger correction factors. - Elemental composition: there is strong relationship between waste form elemental composition and interaction cross-section. Absorption, scattering, moderation, interfere and interpretation of acquired signals.
Requirements: 09. Non-Destructive Assay
2.3 - Perform Non-Destructive Examination (NDE)
Description: NDE provides a visual image of the waste content inside the container. Non-destructive examination is required to help characterize waste containers, verify compliance with specific waste acceptance criteria, verify absence of prohibited items and combined with other characterization documentation provide assurance to the TSD that waste is in accordance with the applicable transportation, regulatory and safety requirements. X-ray techniques are nondestructive and nonintrusive. The waste containers and waste are unchanged and unopened as a result of

Sub-Functions of "Characterize Waste"
x-ray examination. X-ray provides information about the contents of waste containers. X-ray radiation either passes through an object without any interaction or is attenuated (absorbed or scattered). The x-ray source produces a cone of radiation directed at the object of interest. The radiation that passes through the object is detected by either the large-area detector or the linear detector array depending on the characterization requirements and the time frame allowed for imaging. NDE is required for 100% of the containers. must be maintained as a record. NDE may be used to confirm or determine the location or verify the absence of prohibited items such as free liquids, unpunctured aerosol cans, etc. that affect regulatory compliance and operational safety at WIPP. X-ray imaging techniques include radiology, real time radiography, digital radiology, and computed tomography. Radiography generates a two dimensional picture of the container contents. Features in the object are overlapped in the image and result in shadows in the final image. Real time radiography, is similar to radiography except the images are captured on video. Rotation of the object helps alleviate the problem of overlap and shadows seen in radiography. Digital radiography involves translating and storing the film or video recording to a computer by converting the data to a digital format. This allows computer processing, including enhancements to be performed to on the data to further enhance operator interpretation of the information. Computed tomography combines computer processing and numerous radiologic projections to reconstruct a map of the attenuation properties of the object being analyzed.
Requirements: 10.0 Radiography 15.0 Total Metal Analysis
2.4 - Perform Physical Sampling
Description: Obtain representative samples of the waste inside a container. Requires the container to be opened and a portion of the waste to be extracted for analysis. The analysis could include physical, radiological, and chemical constituents. This information is required to ensure the waste is fully characterized and all constituents present are identified. 10% of all waste to be shipped to WIPP must be physically sampled.
Requirements: 08. Sampling of Solids and Soils\Gravels 15.0 Total Metal Analysis
2.5 - Perform Gas Sampling
Description: Obtain an air sample of the gas inside the waste container. Requires intrusively or non-intrusively extracting a representative gas sample from the head space volume within a waste package and analyzing that sample to ensure compliance with safety, regulatory and transportation requirements, 100% must be sampled. This information is required to ensure that the requirements of the WIPP no-migration petition are met. Additionally, this information is required to further characterize the waste being shipped to WIPP. This analysis also provides information concerning the build-up of explosive mixtures of gas (limited to 500 ppm) during transport (volatile organics and hydrogen gas as examples). This information is a part of the required characterization requirements for shipment of TRU waste to WIPP. Additionally, this information may be useful in characterizing and determining the disposition of 10-100 nCi/g waste that is recategorized as either LLW or MLLW.
Requirements: 07. Head Space Gas Sampling

Sub-Functions of "Characterize Waste"
11.0 Hydrogen and Methane Analysis 12.0 Gas Volatile Organic Compound Analysis 13.0 Total Volatile Organic Compound Analysis 14.0 Total Semi-Volatile Organic Compound Analysis
2.6 - Compare to WIPP WAC
Description: Compare characterization data for an individual container to the WIPP WAC to determine what criteria pass, which do not, and which criteria cannot be evaluated because the information could not be obtained. This information will feed the processing determination.
Requirements: Comply with WIPP WAC Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC
2.7 - Compare to WIPP Repository Criteria (Alt Trans Config)
Description: Compare characterization data for an individual container to the WIPP Repository requirements to determine what criteria pass, which do not, and which criteria cannot be evaluated because the information could not be obtained. This information will feed the processing determination.
Requirements: 16.0 Comply with Transportation Packaging Requirements 17.0 Comply with Transportation Requirements 18.0 Comply with WIPP WAC 24.0 Utilize Table 3.2 Summary Waste Acceptance Criteria Table from WIPP WAC

3 - PROCESS WASTE

The process function includes the activity(ies) required to correct the WIPP WAC failure parameters identified for each waste grouping. Six activities or corrective functions have been identified for the eleven waste groupings. Some waste groupings will require more then one corrective function to be executed to correct failure parameter(s). Some failure parameters will be corrected as a result of correcting others. The corrective function descriptions are based on meeting TRUPACT II requirements. If an alternative transporter was utilized, adjustments to the processing needs would have to be made since most process requirements are directly related to the transporter.

Requirements: 03. Data Validation Usability and Reporting 18.0 Comply with WIPP WAC
Input Interfaces: - Characterized Waste

- Container Documentation
Output Interfaces: - 10-100 LL Drums - 10-100 Mixed LL Drums - Baseline Packaging Documentation - Pu238 (Optional) - Waste in Approved Container
Activities: GRN.40 - Conceptual Design - TWCPB GRN.41 - Determine Facility Requirements GRN.42 - Project Validation - TWCPB GRN.60 - Congressional Appropriation - TWCPB GRN.61 - Design - TWCPB GRN.62 - Construct / Start-Up TWCPB GRN.63 - Operate Facility GRN.91 - Develop / Provide Alternate Transportation System

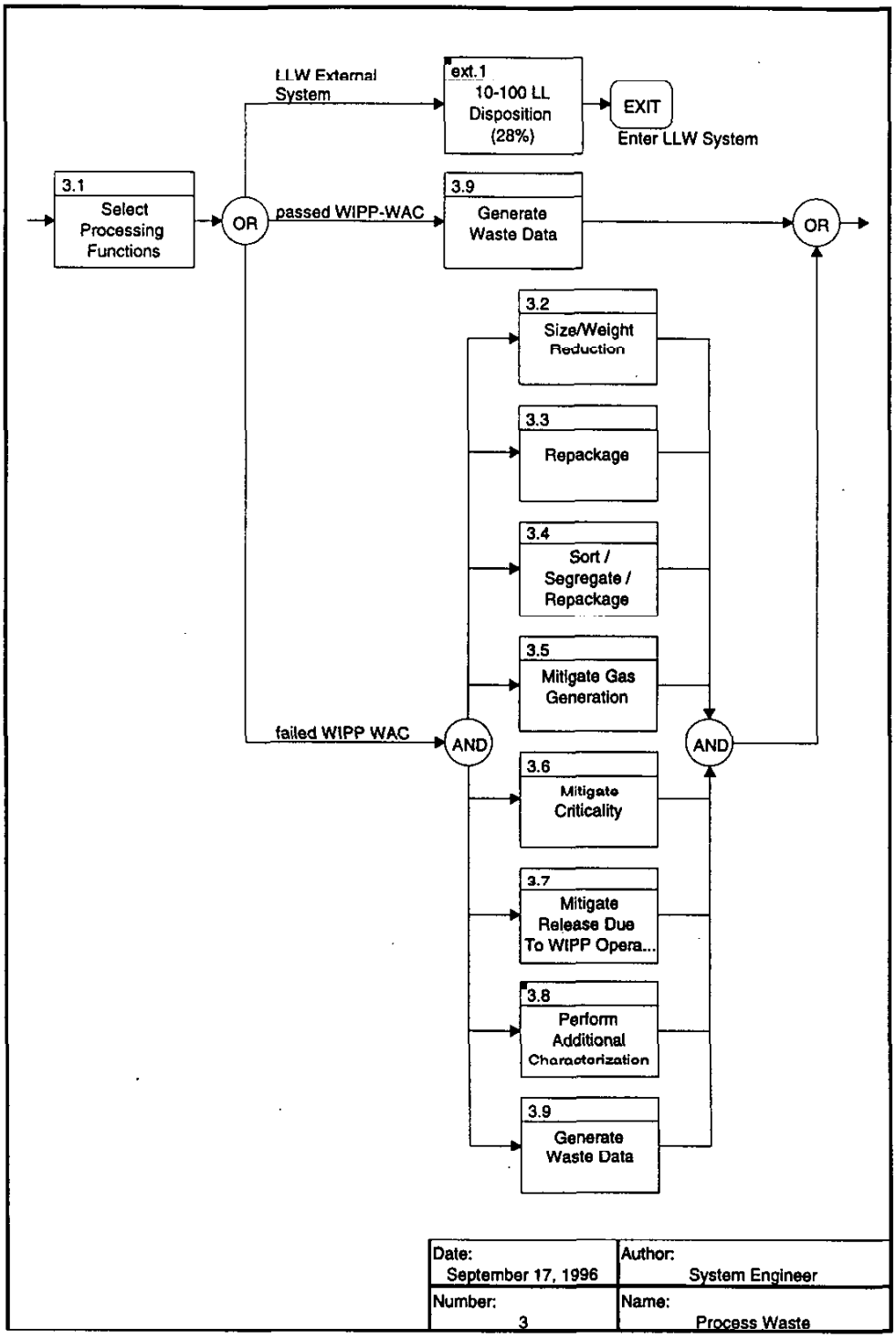


Figure 2.3.4-6 - Process Waste

Sub-Functions of "Process Waste"
3.1 - Select Processing Functions
Description: This function determines the corrective function required to correct the failure parameter(s) identified through characterization.
3.2 - Size/Weight Reduction
Description: This corrective function includes the size and weight reduction of large packages not meeting the WIPP WAC and TRUPACT II requirements. The function includes the capability to size or weight reduce packages and waste components to fit into approved WIPP TRUPACT II containers. This would include the capability to sort and segregate the contents and also volume reduction. The containment requirements for size/weight reduction are extensive. The capability to handle both Pu 238 & 239 would be required. Examples of ways to accomplish size/weight reduction include the use of plasma torches, shredding and compaction. Waste streams for which size/weight reduction is needed to include black boxes, casks, odd-size containers and, possibly, the size reduction of containers associated with future waste streams (resulting from D&D activities). Because the capability for size/weight reduction is so robust, waste streams having other corrective functions such as sorting, segregating, repackaging, mitigation of criticality, and mitigation of a release due to an operational accident could also be processed in a facility with size/weight reduction capability.
Failure Parameters / Waste Groups: **Size and Weight** Black Boxes Casks CH Pu 238 in 55-Gallon Drums CH Pu 239 in 55-Gallon Drums Future TRU Waste (Newly Generated Waste) Odd-Sized Container Poly Boxes
3.3 - Repackage
Description: This corrective function is for the non-intrusive repackaging of containers not meeting WIPP or TRUPACT II requirements. Examples would include the placement of a poly box after venting in a standard waste box, the replacement of a degraded drum with a new drum or the placement of a drum in a standard waste box following vent and purge of the drum. The containment required to perform the Sort/Segregate/Repackage function would not necessarily require a permanent facility. This corrective function could also mitigate a release due to an operational accident by overpacking containers to increase the PECI allowed by WIPP.
Failure Parameters / Waste Groups: **Container** Black Boxes Casks CH Pu 238 in 55-Gallon Drums CH Pu 239 in 55-Gallon Drums

Sub-Functions of "Process Waste"
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Overpacked Drums
Poly Boxes
Activity (PECi)
Black Boxes
Casks
CH Pu 238 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Poly Boxes
3.4 - Sort / Segregate / Repackage
Description:
This corrective function includes the intrusive sorting, segregating and repackaging of TRU waste, to eliminate prohibited items or layers of confinement within a waste package, to meet WIPP or TRUPACT II requirements. Sorting, segregating and repackaging of TRU waste may also decrease the activity level of the TRU waste so that it can meet transportation requirements. Redistribution of activity may be considered a part of this function. The sorting, segregating and repackaging of TRU waste requires the capability for handling both Pu 238 and 239. The containment requirements for sorting, segregating and repackaging are extensive. The facility envisioned would have glove boxes for containing the waste, liquid treatment capability, and venting capability for aerosol cans. This corrective function would also be suitable for waste stream requiring criticality mitigation or releases due to an operational accident.
Failure Parameters / Waste Groups:
Size and Weight
Black Boxes
Casks
CH Pu 238 in 55-Gallon Drums
CH Pu 239 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Poly Boxes
Fissile Gram (FGE)
Black Boxes
Casks
CH Pu 239 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
RCRA DQO
Black Boxes
Casks
CH Pu 238 in 55-Gallon Drums

Sub-Functions of "Process Waste"
CH Pu 239 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Poly Boxes
Activity (PECi)
Black Boxes
Casks
CH Pu 238 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Poly Boxes
TRU (>100 nCi/g)
Black Boxes
Casks
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Poly Boxes
Prohibited Items
Black Boxes
Casks
CH Pu 238 in 55-Gallon Drums
CH Pu 239 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Poly Boxes
TRUCON Code (Decay Heat)
Black Boxes
Casks
CH Pu 238 in 55-Gallon Drums
CH Pu 239 in 55-Gallon Drums
Future TRU Waste (Newly Generated Waste)
Odd-Sized Container
Poly Boxes

3.5 - Mitigate Gas Generation

Description:

This function is for the mitigation of gas generation. Gas generation is the major limiting failure parameter that prevents TRU waste packages from meeting TRUPACT II requirements. The major source of gas generation (Pu 238 produced decay heat) is the radiolytic decay of organic compounds and volatile organics (VOCs) within the waste matrix. The capability to handle Pu 238 & 239 would be required but the major problem is Pu 238. Examples of Process options which could mitigate gas generation are sorting and segregating, thermal treatment(plasma hearth, incineration, etc.), and wet chemical oxidation. The containment requirements to

Sub-Functions of "Process Waste"
support these process functions are extensive and these functions are costly to implement. Support activities and equipment as identified for size/weight reduction, sort/segregate, and repackaging would be included in this function. This is the most robust treatment envisioned and would satisfy all processing options for SRS waste streams.
Failure Parameters / Waste Groups: **RCRA DQO** Black Boxes Casks CH Pu 238 in 55-Gallon Drums CH Pu 239 in 55-Gallon Drums Future TRU Waste (Newly Generated Waste) Odd-Sized Container Poly Boxes **TRUCON Code (Decay Heat)** Black Boxes Casks CH Pu 238 in 55-Gallon Drums CH Pu 239 in 55-Gallon Drums Future TRU Waste (Newly Generated Waste) Odd-Sized Container Poly Boxes **Fissile Gram (FGE)** Black Boxes Casks CH Pu 239 in 55-Gallon Drums Future TRU Waste (Newly Generated Waste) Odd-Sized Container
3.6 - Mitigate Criticality
Description: This function includes the mitigation of criticality concerns for high concentrations of Fissile Transuranic material which exceed the Fissile Gram Equivalent (FGE) limits for WIPP and TRUPACT II. Criticality control requirements would be extensive. The actions required would be sorting/segregation. The size/weight reduction would also have the capability to mitigate criticality since most packages having over 200 gram equivalent Pu 239 are black boxes.
Failure Parameters / Waste Groups: **Fissile Gram (FGE)** Black Boxes Casks CH Pu 239 in 55-Gallon Drums Future TRU Waste (Newly Generated Waste) Odd-Sized Container

Sub-Functions of "Process Waste"
3.7 - Mitigate Release Due To WIPP Operational Accident
Description: This function is to change the waste form to reduce the radioactive materials released if an operational accident destroyed the waste container. The PECi requirement for WIPP is derived from an operational accident at WIPP and the resulting dose to the public. A fire in a container that is staged at WIPP prior to disposal in the repository is the bounding case accident that results in the highest dose to workers and offsite individuals. Eliminating the possibility would increase the 83 PECi limit which currently restricts the amount of Pu 238 waste in a container. This corrective function could be as simple as overpacking the waste container or could include processing as outlined in sort/segregate, size/weight reduction, and mitigation of gas generation which would change the waste form to minimize releases. Examples include overpacking, encasing the container in concrete, thermal destruction, or re-evaluation of the WIPP safety baseline.
Failure Parameters / Waste Groups: **Activity (PECi)** Black Boxes Casks CH Pu 238 in 55-Gallon Drums Future TRU Waste (Newly Generated Waste) Odd-Sized Container Poly Boxes
3.8 - Perform Additional Characterization
Description: This function addresses any re-classification required due to configuration change during processing. It includes the same functions and originating requirements as the Characterize Waste function.
3.9 - Generate Waste Data
Description: This function includes the documentation of container and content pedigree required to demonstrate compliance with WIPP WAC.
ext.1 - 10-100 LL Disposition (28%)
Description: Following the characterization functions, waste is confirmed to be Low-Level or Mixed Low-Level (i.e., less than 100 nCi/gm). These waste streams exit the TRU Waste Program and waste is dispositional in an external system from the TRU Waste Program. A portion, approximately one third, by volume, of the legacy waste currently managed as TRU waste is estimated to have an activity level of less than 100 nanocuries per gram (nCi/g) and could be dispositioned as Low Level Waste or Mixed Low Level Waste (waste contaminated with both RCRA constituents and radioactivity) when characterization, processing, and disposal capabilities become available. Activities to address this portion of the TRU waste are identified as part of the continued storage operation within the TRU Waste Strategic Plan. These activities begin in FY97. A final path forward for both Low Level and Mixed Low Level Waste volumes should be determined by the end of FY 97. The non-mixed Low Level Waste is currently being assayed and segregated for treatment and/or disposal in existing SRS facilities. Non-mixed Low Level Waste disposal facilities include the E-Area disposal vaults. The

Sub-Functions of "Process Waste"
disposal of non-mixed Low Level Waste will reduce the volume of waste currently in storage, thereby reducing the cost associated with continued storage of this waste. The large majority, more than 90%, of the less than 100 nCi/g waste is considered Mixed Low Level Waste and does not currently have an identified treatment and/or disposal plan at SRS. The WIPP facility will not currently accept waste with an activity level less than 100 nCi/g, leaving this waste without a direct disposal option. Once confirmed as Mixed Low Level Waste, this waste would become subject to Land Disposal Restrictions. The decision to identify/segregate the less than 100 nCi/g Mixed Low Level Waste must address all key issues, including its impact to the Site Treatment Plan commitments and the need for additional facilities not currently planned, if this waste is managed as Mixed Low Level Waste.

4 - VALIDATE WASTE

Validation is defined as the process used to assure waste selected for disposal meets all requirements identified in the Waste Acceptance Criteria associated with that disposal and that the pedigree of that waste characterization has been maintained by formal chain of custody. It is a final assurance mechanism assuring validity of the waste package meeting all requirements prior to transportation to final disposal. The review and validation of characterization documentation including necessary updating and assembly of the WIPP Data Package. The waste generator writes a plan describing: the waste management organization, the waste streams, and how the waste will be characterized, handled and packaged to meet the waste acceptance criteria at the disposal site. The disposal site assesses the generator to ensure that the certification plan is being implemented during the handling and packaging of waste. The disposal site approves the generators waste certification process when the generator demonstrates compliance to the Waste Acceptance Criteria.

Each waste container exiting the "Process function" will be accompanied by a WIPP data package which includes characterization information generated from:

- Generator Characterization Data

- Historical Records (COBRA).

- Characterization activities performed within the Characterization Function could include Assay (NDA), X-Ray (NDE), Gas sampling, Physical Sampling.

- Container Traveler package which accompanies the container through the Process function and identifies all process activities conducted on the container to mitigate any characterization failure parameters. This traveler would refer to such items as repackaging into new containers, removal of prohibited items, processing for mitigation of hydrogen gas generation etc.

This information is packaged into the WIPP Data Package which is reviewed against the WIPP Waste Acceptance Criteria for validation that the waste stream and container are in compliance with the requirements for shipment and disposal. This information is also validated against DOT requirements and an assessment is made to assure the proper chain of custody has been maintained thus assuring the characterization data package is accurate. This package provides assurance that the container has meet all criteria for shipment and disposal at WIPP.

Requirements:
03. Data Validation Usability and Reporting
Input Interfaces:
- Baseline Packaging Documentation

- Container Documentation - Waste in Approved Container
Output Interfaces: - Certified TRU Waste - WIPP Data Package
Activities: BLU.11 - Certify FB Line, Newly Generated Waste BLU.12 - Certify FB Line, Legacy BLU.21 - Certify F Canyon, Newly Generated Waste BLU.22 - Certify F Canyon, Legacy BLU.31 - Certify HB Line, Newly Generated Waste BLU.32 - Certify HB LIne, Legacy BLU.41 - Certify H Canyon, Newly Generated Waste BLU.42 - Certify H Canyon, Legacy BLU.51 - Certify SRTC, Newly Generated Waste BLU.52 - Certify SRTC, Legacy GRN.81 - Certify Waste Process YLW.12 - Certify Poly Box Generator YLW.22 - Certify Odd-Sized/Cask/Drums Generator

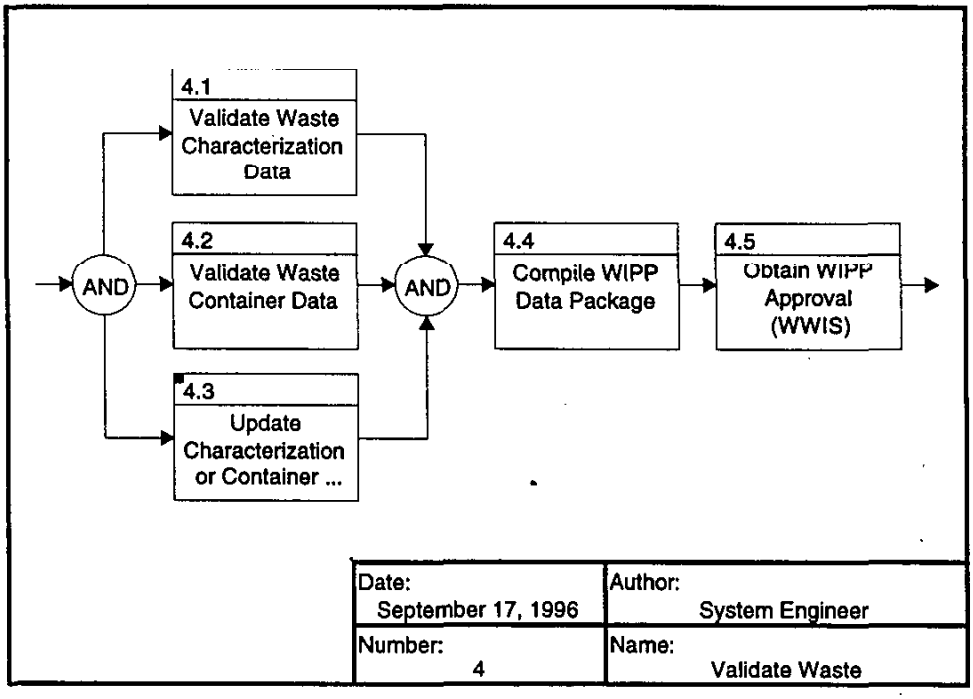


Figure 2.3.4-7 - Validate Waste

Sub-Functions of "Validate Waste"
4.1 - Validate Waste Characterization Data
Description: Ensure all waste characterization data is present and can be traced to the individual container. This data includes: NDA results, NDE results, hazardous constituent data, gas generation results, and other waste content information to be included in the WIPP data package.
4.2 - Validate Waste Container Data
Description: Ensure all waste container data is available and can be traced to the individual container. This data includes; container origin, quality specifications, container integrity, and other waste container information to be included in the WIPP data package.
4.3 - Update Characterization or Container Data
Description: Obtain missing or incorrect data needed to complete the data package. This could include performing NDA, NDE, or gas sampling. This activity may correct a certification failure parameter, or verify a questionable container traveler entry.
4.4 - Compile WIPP Data Package
Description: Complete the WIPP Data Package by collecting all characterization data and assembling the final documentation for transportation.
4.5 - Obtain WIPP Approval (WWIS)
Description: The generator (SRS) must complete a certification statement and enter the required data in the WIPP Waste Information System (WWIS) to ensure that WIPP knows enough about the waste shipment to accept packages upon arrival without having to sample. If the shipment contains mixed waste the generator must submit a Waste Stream Profile Form to WIPP for each waste stream. The Carlsbad Area Office will authorize shipment of SRS waste after reviewing these documents. SRS will have an approved certification plan/program and the ability to enter data input to the WIPP Waste Improvement System (WISS). This function completes the WWIS information sheet to transmit to WIPP for approval. This function will be complete when approval for individual container shipment is received from WIPP.

5 - TRANSPORT WASTE

The Savannah River Site must initiate a TRU Waste Certification Plan and obtain approval from the Carlsbad WIPP-Waste Acceptance Criteria Certification Committee (WACCC) to generate certifiable TRU waste packages. A schedule to certify at least the first TRU waste generator has been identified in the Ship to WIPP in 1999 Plan. The Carlsbad Area Office is responsible to coordinate the public meetings & civilian Emergency Training once the transportation routes or corridor between SRS and WIPP is identified. SRS must identify and train personnel that

would be involved with the receipt, handling, and loading of the transport system. If the initial decision is made by SRS to use the TRU PACT II transport system, pre-shipment authorization will need to commence 12-18 months prior to the initial shipment to WIPP. The development time to design, fabricate, and license a new TRU transport system would take an estimated 36 months after funding is approved. SRS must identify an onsite TRU transport system loading area and ensure that the loading area will be operational to support TRU shipments to WIPP. Lack of a designated loading area would cause shipping schedule delays and limit the availability of transport systems supporting the WIPP pipeline. TRU waste pre-shipment authorization and the preparations necessary to load and ship waste packages are dependent on the volume of certifiable waste at SRS. Once newly generated TRU waste is certified a candidate legacy waste group targeted for certification needs to be selected. The historical documentation on waste generated in the last ten years and the ability to locate records and personnel pertaining to TRU waste management provides a layer degree of process knowledge to characterize this waste. Waste generated and packaged beyond the last 10 years will require a greater degree of characterization because:

· Waste documentation is minimal

· Prohibited items such as free liquids, aerosol cans, leaded gloves, and listed waste were not clearly identified or administratively controlled to prevent their disposal in the waste stream.

· Work force reductions, personnel retirement and transfers have essentially eliminated the operations personnel that actually packaged this waste and that were familiar with the process areas.

· The integrity of the waste package is more questionable due to limited storage controls and conditions that were accepted during that era of waste management.

During the development phase of the preparation to ship waste packages to WIPP the following tasks must be completed to obtain transportation approval. A transportation schedule outlining the tasks requiring completion. before shipment to WIPP to included in the Ship to WIPP in 1998.

Requirements:
03. Data Validation Usability and Reporting
Issues/Assumptions:
Alternative Transportation Configuration affects Strategic Plan Actions
Input Interfaces:
- Certified TRU Waste
- WIPP Data Package
Output Interfaces:
- TRU Waste
Activities:
F.1 - TRUPACT-II Envelope Expansion

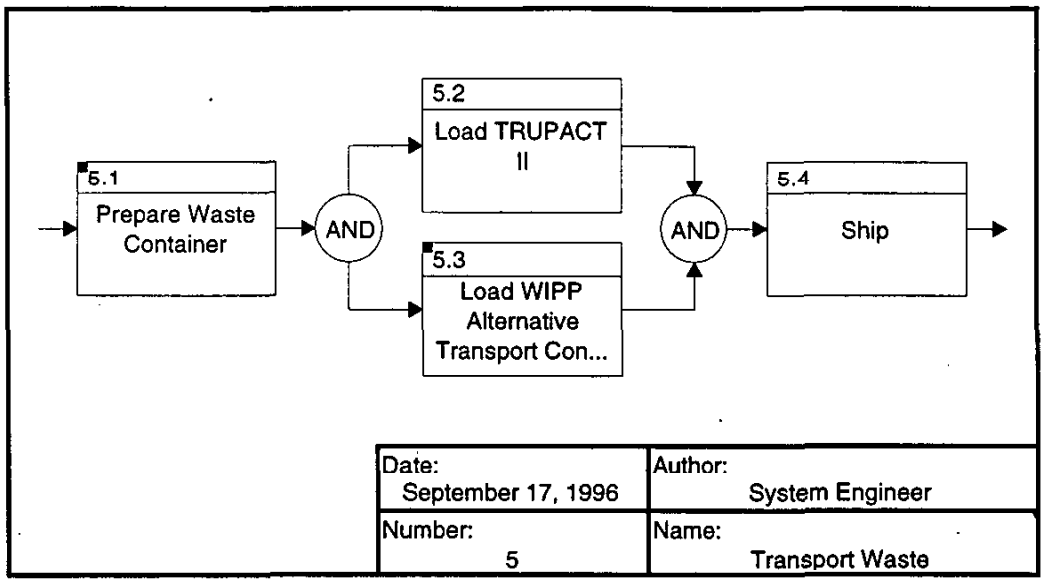


Figure 2.3.4-8 - Transport Waste

Sub-Functions of "Transport Waste"
5.1 - Prepare Waste Container
Description: Complete final preparation for containers prior to loading in the transport vehicle. Retrieve the containers from certified storage location. Aspirate each container 30 days prior to shipment. Ensure all documentation is included and containers are labeled correctly.
5.2 - Load TRUPACT II
Description: Loading the individual containers into the TRUPACT II for final transportation to WIPP. The loading area will have to have necessary support to load drums and standard waste boxes into the TRUPACT II including power, cranes, torquing equipment, and weather protection. The loading facility will receive and store empty transport containers (TRUPACT II) and necessary dunnage prior to shipment.
Requirements: 16.0 Comply with Transportation Packaging Requirements 17.0 Comply with Transportation Requirements
5.3 - Load WIPP Alternative Transport Configuration
Description: This is the same as Load TRUPACT II except it uses an alternative transport configuration to reduce the processing required for WIPP or shipment. This function addresses loading the alternative transport including dunnage. It includes the same functions, issues, components, and originating requirements as function Load

Sub-Functions of "Transport Waste"
TRUPACT Transport. The loading facility will receive and store empty transport containers and necessary dunnage prior to shipment.
Requirements: 16.0 Comply with Transportation Packaging Requirements 17.0 Comply with Transportation Requirements
5.4 - Ship
Description: The actual transportation of TRU waste packages in the approved DOT Type B transport system over the preapproved highway transport route.

2.3.5 Item Dictionary

Items are the inputs to and outputs from the functions. Item descriptions and traceability to the appropriate functions are provided in this section.

Item Dictionary
Waste Container *Output From Function:* 1 - Select Waste *Input To Function:* 2 - Characterize Waste
Black Boxes *Description:* Waste, mixed and non-mixed, currently managed as TRU and stored on TRU Waste Storage Pads which is containerized in Black Boxes. Black Boxes originate from the B-Lines, however, a few boxes are generated by SRTC laboratories. This includes waste from all generators, regardless of activity level (both less than and greater then 100 nCi/gm). Typical boxes have dimensions of 7 feet high, 12 feet wide and 18 feet long. The lid to these boxes are sometimes sealed with caulking and are bolted in place. These boxes are used to store waste that is too large or bulky to be placed into a standard 55-gallon drum, such as cabinets, panels, slab tanks, glove boxes, vessels, pumps, and piping. *Output From Function:* 3.1 - Select Processing Functions *Input To Function:* 3.3 - Repackage 3.7 - Mitigate Release Due To WIPP Operational Accident 3.2 - Size/Weight Reduction 3.5 - Mitigate Gas Generation 3.1 - Select Processing Functions 3.4 - Sort / Segregate / Repackage 3.6 - Mitigate Criticality

Item Dictionary

Failure Parameters:

Activity (PECi)

Container

Prohibited Items

TRUCON Code (Decay Heat)

Fissile Gram (FGE)

Size and Weight

RCRA DQO

TRU (>100 nCi/g)

Casks

Description: Waste, mixed and non-mixed, currently managed as TRU and stored on TRU Waste Storage Pads which is containerized in Casks. This includes waste from all generators, regardless of activity level (both less than and greater than 100 nCi/gm). Casks originate from the SR laboratories. The dimensions of most casks are 3 feet 4 inches wide by 3 feet 5 inches long and 4 feet 5 inches high. The cask lid is typically sealed with grout or bolted in place, if the lid is bolted, a 1/4 inch neoprene gasket is typically installed. The dimensions of the inner steel box are typically 27 inches wide by 27 inches long by 42 inches high with a 1/4 inch neoprene gasket.

Output From Function:

3.1 - Select Processing Functions

Input To Function:

3.3 - Repackage

3.7 - Mitigate Release Due To WIPP Operational Accident

3.2 - Size/Weight Reduction

3.5 - Mitigate Gas Generation

3.1 - Select Processing Functions

3.4 - Sort / Segregate / Repackage

3.6 - Mitigate Criticality

Failure Parameters:

Activity (PECi)

Container

Prohibited Items

TRUCON Code (Decay Heat)

Fissile Gram (FGE)

Size and Weight

RCRA DQO

TRU (>100 nCi/g)

CH Pu 238 in 55-Gallon Drums

Description: TRU Waste, mixed and non-mixed waste, whose primary TRU radionuclide is Pu238 which is containerized in 55-gallon drums. This includes all drummed TRU Waste at SRS except for those drums which originate from FB-Line. TRU Waste drums which contain greater than 1/2 Ci are stored in concrete culverts.

Item Dictionary

Most of the waste in this stream is stored in concrete culverts on the TRU Waste Storage Pads.

Output From Function:

3.1 - Select Processing Functions

Input To Function:

3.2 - Size/Weight Reduction

3.1 - Select Processing Functions

3.5 - Mitigate Gas Generation

Failure Parameters:

Activity (PECi)

Container

Prohibited Items

TRUCON Code (Decay Heat)

Size and Weight

RCRA DQO

CH Pu 239 in 55-Gallon Drums

Description: TRU Waste, mixed and non-mixed waste, primary TRU radionuclide is Pu239 which is containerized in 55-gallon drums. This includes only drummed TRU Waste which originates from FB-Line. TRU Waste drums which contain greater than 1/2 Ci are stored in concrete culverts. A portion of the waste in this stream is stored in concrete culverts on the TRU Waste Storage Pads.

Output From Function:

3.1 - Select Processing Functions

Input To Function:

3.2 - Size/Weight Reduction

3.1 - Select Processing Functions

3.5 - Mitigate Gas Generation

Failure Parameters:

Container

Prohibited Items

TRUCON Code (Decay Heat)

Fissile Gram (FGE)

Size and Weight

RCRA DQO

Future TRU Waste (Newly Generated Waste)

Description: All future waste generated which does not easily fall into one of the previous waste streams (created for legacy wastes currently in storage) due to containerization, waste matrix, or another waste characteristic. This waste stream is intended to anticipate future characteristic changes which could impose new functional or design requirements over those established by the legacy waste streams.

Output From Function:

3.1 - Select Processing Functions

Item Dictionary

Input To Function:

3.3 - Repackage

3.7 - Mitigate Release Due To WIPP Operational Accident

3.2 Size/Weight Reduction

3.5 - Mitigate Gas Generation

3.1 - Select Processing Functions

3.4 - Sort / Segregate / Repackage

3.6 - Mitigate Criticality

Failure Parameters:

Activity (PECi)

Container

Prohibited Items

TRUCON Code (Decay Heat)

Fissile Gram (FGE)

Size and Weight

RCRA DQO

TRU (>100 nCi/g)

Odd-Sized Container

Description: Waste, mixed and non-mixed, currently managed as TRU and stored on TRU Waste Storage Pads which is containerized in any container other than drums, black boxes, casks, or poly boxes. This includes waste from all generators, regardless of activity level (both less than and greater than 100 nCi/gm). This includes waste streams such as manipulator slaves, stored in cylindrical piping and welded on each end as well as any other unusual containers.

Output From Function:

3.1 - Select Processing Functions

Input To Function:

3.3 - Repackage

3.7 - Mitigate Release Due To WIPP Operational Accident

3.2 - Size/Weight Reduction

3.5 - Mitigate Gas Generation

3.1 - Select Processing Functions

3.4 - Sort / Segregate / Repackage

3.6 - Mitigate Criticality

Failure Parameters:

Activity (PECi)

Container

Prohibited Items

TRUCON Code (Decay Heat)

Fissile Gram (FGE)

Size and Weight

Item Dictionary

RCRA DQO
TRU (>100 nCi/g)

Overpacked Drums

Description: Drums placed in a Standard Waste Box, 10-drum overpack or 83-gallon overpack to ensure that container integrity is maintained.

Output From Function:

3.1 - Select Processing Functions

Input To Function:

3.3 - Repackage

Failure Parameters:

Container

Poly Boxes

Description: Waste currently managed as TRU and stored on TRU Waste Storage Pads which is containerized in Poly Boxes. This includes waste from all generators, regardless of activity level (both less than and greater than 100 nCi/gm). Poly Boxes typically store HEPA filters and are not considered mixed waste regardless of generation date based on content. Poly Boxes are generally 2.75' x 2.75' x 1.5' and placed inside concrete culverts prior to storage on TRU pads. A maximum of 8 poly boxes can be placed within a concrete culvert, two layers of four. ** (Concrete culverts are cylindrical with dimensions of 7 feet 6 inches in height, 7 feet 2 inches in outside diameter. The bottom wall of the storage culverts are cast together. In 1985 the practice of sealing the tops in place with epoxy and grout was discontinued. The lid to the culverts is currently seated on top of the culvert without additional sealing. The culvert and lid have a stair step arrangement that facilitates placement, seating and security lid on the culvert).

Output From Function:

3.1 - Select Processing Functions

Input To Function:

3.3 - Repackage
3.2 - Size/Weight Reduction
3.1 - Select Processing Functions
3.5 - Mitigate Gas Generation

Failure Parameters:

Activity (PECi)
Container
Prohibited Items
TRUCON Code (Decay Heat)
Size and Weight
RCRA DQO
TRU (>100 nCi/g)

Item Dictionary

10-100 LL Drums

Output From Function:

2 - Characterize Waste

2.6 Compare to WIPP WAC

3 - Process Waste

Input To Function:

ext.1.1 - Compare to E-Area Vault Criteria

10-100 Mixed (Optional)

Description: Optional path for this waste stream can be processed and disposed of at SRS.

SubItems:

- 10-100 Mixed Option

Output From Function:

2 - Characterize Waste

Input To Function:

ext.1 - 10-100 LL Disposition (28%)

10-100 Mixed LL Drums

Description: The non-destructive assay equipment necessary to measure plutonium 238 is not yet available.

Output From Function:

2 - Characterize Waste

2.6 - Compare to WIPP WAC

3 - Process Waste

Input To Function:

ext.1.4 - Process to meet LDR and Disposal Facility Criteria

ext.1 - 10-100 LL Disposition (28%)

10-100 Mixed Option

Description: Currently does not meet WIPP WAC's nanocurie per gram level which is greater than 100.

Output From Function:

2.6 - Compare to WIPP WAC

Baseline Packaging Documentation

Output From Function:

3 - Process Waste

Input To Function:

4 - Validate Waste

Item Dictionary

Certified TRU Waste

Description: The WIPP WAC Certification Committee approves TRU waste certification plans submitted by the waste generator once that generator demonstrates that their characterization, handling, packaging, of TRU waste meets the WIPP Waste Acceptance Criteria.

Output From Function:

4 - Validate Waste

Input To Function:

5 - Transport Waste

CH Pu 238

Description: A plutonium isotope produced as a heat or power supply source for military and space programs.

Output From Function:

2.6 - Compare to WIPP WAC

CH Pu 239

Description: A plutonium isotope produced for use in the defense weapons programs.

Output From Function:

2.6 - Compare to WIPP WAC

Characterized Waste

Description: The physical, chemical, and radiological information identifying the specific contents of waste in each waste stream to ensure that packaged waste can meet the limits and requirements for transportation and disposal.

Output From Function:

2 - Characterize Waste

Input To Function:

3 - Process Waste

Chem / Phys / Rad Info

Description: The ability to measure or identify through process knowledge the contents of each waste package.

Output From Function:

2.4 - Perform Physical Sampling

Input To Function:

2.6 - Compare to WIPP WAC

Container Documentation

Description: WIPP currently requires Type A or 7A specification containers that are certified by the generator to withstand routine handling and transportation conditions and not release their contents.

Output From Function:

2 - Characterize Waste

Item Dictionary

Input To Function:

4 - Validate Waste

3 - Process Waste

Historical Documentation

Description: Each waste container has a storage record which identifies the generator, packaging data, generator location and waste contents description of that package.

Output From Function:

1 - Select Waste

Input To Function:

2 - Characterize Waste

Image

Description: The visual examination and recording of the contents within a drum using non-intrusive or non-destructive examination equipment.

Output From Function:

2.3 - Perform Non-Destructive Examination (NDE)

Input To Function:

2.6 - Compare to WIPP WAC

Pu238 (Optional)

Output From Function:

2 - Characterize Waste

2.6 - Compare to WIPP WAC

3 - Process Waste

Input To Function:

ext.1.4 - Process to meet LDR and Disposal Facility Criteria

ext.1 - 10-100 LL Disposition (28%)

Radionuclide Conc/Quan

Output From Function:

2.2 - Perform Non-Destructive Assay (NDA)

Input To Function:

2.6 - Compare to WIPP WAC

TRU Waste

Description: Transuranic (TRU) waste is radioactive waste containing alpha-emitting radionuclides that have an atomic number greater than 92 (e.g., plutonium-239) and that have half lives greater than 20 years in concentrations greater than 100 nanocuries per gram.

Item Dictionary
Output From Function: 0 - Disposition TRU Waste 5 - Transport Waste
Volatile Chem Info *Output From Function:* 2.5 - Perform Gas Sampling *Input To Function:* 2.6 - Compare to WIPP WAC
Waste Documentation *Input To Function:* 0 - Disposition TRU Waste 1 - Select Waste
Waste from Interim Storage *SubItems:* - Black Boxes - Casks - CH Pu 238 in 55-Gallon Drums - CH Pu 239 in 55-Gallon Drums - Future TRU Waste (Newly Generated Waste) - Odd-Sized Container - Overpacked Drums - Poly Boxes - 10-100 LL Drums - 10-100 Mixed (Optional) - Pu238 (Optional) - Shielded RH TRU *Input To Function:* 0 - Disposition TRU Waste 1 - Select Waste
Waste in Approved Container *Output From Function:* 3 - Process Waste *Input To Function:* 4 - Validate Waste

Item Dictionary

WIPP Data Package

Output From Function:

4 - Validate Waste

Input To Function:

5 - Transport Waste

3.0 TRU WASTE DISPOSITION INITIATIVES

An engineering evaluation of the waste groups traced through the developed system model resulted in the formulation of the TRU waste disposition inititatives.

3.1 Failure Matrix and Parameters

For use in conjunction with the system model functional flow, the failure matrix, Table 3.1-1, was developed to identify and quantify the volume of TRU waste in storage that is anticipated to fail key acceptance parameters at the Waste Isolation Pilot Plant (WIPP). The table also identifies the key corrective functions that have to be performed in order to prepare/modify the TRU waste in storage in order to meet the failed WIPP parameter. Each waste stream was handled separately in the failure table due to the 100% failure rate for some waste streams for criteria such as container type or size/weight.

The table identifies the failure parameters which are specific to the WIPP repository versus those parameters which are specific to the transport method (TRUPACT II). With two exceptions, the criteria and failure parameters are identical for the transport and the repository. These exceptions include the decay heat and the activity. The decay heat criteria is the limiting criteria for a large portion of all waste streams. The percentage, and equivalent volume, which fails each criteria is listed along with the proposed corrective function. The possible corrective function(s) for each criteria failed is marked by an X. Only those most likely corrective functions are checked. Comments relevant to the failure criteria for a waste stream are identified in the far right column.

Estimates for the amount of each waste stream that would fail the activity, decay heat, and fissile gram quantity criteria was based on data available from the Computerized Burial Record Analysis System (COBRA) database which stores all the data received from the waste generator when waste is sent to E-Area for storage. Estimates for the volume of each waste stream that would fail the remaining parameters were extrapolated from past and current container x-raying operations, historical practices, and changes in routine practices based on implementation dates of significant regulatory and DOE requirements. The failure percentage identified for each failure parameter is based on the percentage of the total volume of that waste stream that fails each individual criteria and is exclusive of the volume that fails any other criteria. The volumes represented in the table can not be used directly to determine the amount of each waste type that passes all criteria. Data to determine the number of containers that pass all criteria, or fail multiple criteria, cannot be readily obtained from the COBRA database

The table only addressed that volume of waste in storage that does not fall into either of the two drummed 10-100 nCi/g waste streams (10-100 mixed low-level waste in drums or 10-100 low-level waste in drums).

Waste Group	Failure Parameters	WIPP Repository Requirement	% Pass	% Fail	WIPP Transport Requirement (TRUPACT II)	% Pass	% Fail		Cubic Meters that Fail Criteria	Number of Containers that Fail Criteria	55-Gallon Drum Equivalents that Fail Criteria		Corrective Function: Size/Weight Reduction	Repackage	Sort / Segregate / Repackage	Mitigate Gas Generation	Mitigate Criticality	Mitigate Release Due to WIPP Operation Accident	Comments
CH Pu238 in 55-gallon Drums		**1584 cubic meters (7990 drums)**																	
	Container	x	65	35	x	65	35		554	2797	2797			x					Container will also fail this criteria if venting is required.
	Activity (PECi)	x	88	13	N/A	-	-		206	1039	1039			x	x			x	Based on current limit of 80 PECi. May be changed in a
	Prohibited Items	x	85	15	x	85	15		238	1199	1199				x				Includes aerosol cans, free liquids.
	Decay Heat (TRUCON Code)	N/A	-	-	x	27	73		1156	5833	5833				x	x			
	Fissile Gram (FGE)	x	100	0	x	100	0		0	0	0								
	Size/Weight	x	99	1	x	99	1		16	80	80		x		x				
	RCRA Data Quality Objectives	x	98	2	x	98	2		32	160	160				x	x			
	TRU (> 100 nCi/g)	x	99	1	x	99	1		16	80	80								Containers will be fed into one of the 10-100 waste
CH Pu239 in 55-gallon Drums		**675 cubic meters (3405 drums)**																	
	Container	x	65	35	x	65	35		236	1192	1192			x					Container will also fail this criteria if venting is required.
	Activity (PECi)	x	100	0	N/A	-	-		0	0	0								
	Prohibited Items	x	85	15	x	85	15		101	511	511				x				Includes aerosol cans, free liquids.
	Decay Heat (TRUCON Code)	N/A	-	-	x	60	40		270	1362	1362				x	x			
	Fissile Gram (FGE)	x	99	1	x	99	1		7	34	34				x	x	x		
	Size/Weight	x	99	1	x	99	1		7	34	34		x		x				
	RCRA Data Quality Objectives	x	93	2	x	98	2		14	68	68				x	x			
	TRU (> 100 nCi/g)	x	99	1	x	99	1		7	34	34								Containers will be fed into one of the 10-100 waste

Table 3.1-1, TRU Waste Failure Table

Waste Group / Failure Parameters	WIPP Repository Requirement	% Pass	% Fail	WIPP Transport Requirement (TRUPACT II)	% Pass	% Fail		Cubic Meters that Fail Criteria	Number of Containers that Fail Criteria	55-Gallon Drum Equivalents that Fail Criteria		Corrective Function: Size/Weight Reduction	Repackage	Sort / Segregate / Repackage	Mitigate Gas Generation	Mitigate Criticality	Mitigate Release Due to WIPP Operation Accident	Comments
Overpacked Drums																		8800 drums - Volume is in other drum streams.
Container	x	0	100	x	0	100		= 100	= 100 %				x					Anticipate that WIPP will accept overpacked drums
Poly Boxes	**178 cubic meters (788 poly boxes) (890 drum eqv.)**																	
Container	x	0	100	x	0	100		178	788	890			x					Container will also fail this criteria if venting is required.
Activity (PECi)	x	99	1	N/A	-	-		2	8	9			x	x			x	Based on current limit of 80 PECi. May be changed in a
Prohibited Items	x	99	1	x	99	1		2	8	9				x				Includes aerosol cans, free liquids.
Decay Heat (TRUCON Code)	N/A	-	-	x	87	13		23	102	116				x	x			
Fissile Gram (FGE)	x	99	1	x	99	1		2	8	9								
Size/Weight	x	100	0	x	100	0		0	0	0								
RCRA Data Quality Objectives	x	98	2	x	98	2		4	16	18				x	x			
TRU (>100 nCi/g)	x	76	26	x	76	26		46	205	231		x		x				Waste will processed and fed into one of the 10-100
Black Boxes	**3631 cubic meters (85 Black boxes) (18155 drum eqv.)**																	
Container	x	0	100	x	0	100		3631	85	18155			x					
Activity (PECi)	x	96	4	N/A	-	-		145	3	726				x			x	Based on current limit of 80 PECi. May be changed in a
Prohibited Items	x	99	1	x	99	1		36	1	182				x				Includes aerosol cans, free liquids.
Decay Heat (TRUCON Code)	N/A	-	-	x	36	64		2324	54	11619				x	x			
Fissile Gram (FGE)	x	95	5	x	95	5		182	4	908				x	x	x		
Size/Weight	x	0	100	x	0	100		3631	85	18155		x		x				Waste matrix prohibits simply repacking - large
RCRA Data Quality Objectives	x	98	2	x	98	2		73	2	363				x	x			
TRU (>100 nCi/g)	x	75	25	x	75	25		908	21	4539		x		x				Waste will processed and fed into one of the 10-100

Table 3.1-1, TRU Waste Failure Table

Waste Group / Failure Parameters	WIPP Repository Requirement	% Pass	% Fail	WIPP Transport Requirement (TRUPACT II)	% Pass	% Fail	Cubic Meters that Fail Criteria	Number of Containers that Fail Criteria	55-Gallon Drum Equivalents that Fail Criteria	Corrective Function: Size/Weight Reduction	Repackage	Sort / Segregate / Repackage	Mitigate Gas Generation	Mitigate Criticality	Mitigate Release Due to WIPP Operation Accident	Comments
Casks	**298 cubic meters (1490 drum eqv.)**															
Container	x	0	100	x	0	100	298		1490		x					
Activty (PECI)	x	73	27	N/A	-	-	80		402			x			x	Based on current limit of 80 PECI. May be changed in a
Prohibited Items	x	85	15	x	85	15	45		224			x				Includes aerosol cans, free liquids.
Decay Heat (TRUCON Code)	N/A	-	-	x	95	5	15		75			x	x			
Fissile Gram (FGE)	x	99	1	x	99	1	3		15			x	x	x		
Size/Weight	x	50	50	x	50	50	149		745	x		x				Waste matrix prohibits simply repacking - large
RCRA Data Quality Objectives	x	98	2	x	98	2	6		30			x	x			
TRU (> 100 nCi/g)	x	91	9	x	91	9	27		134	x		x				Waste will processed and fed into one of the 10-100
Odd Size Containers	**645 cubic meters (3225 drum eqv.)**															
Container	x	0	100	x	0	100	645		3225		x					
Activty (PECI)	x	76	24	N/A	-	-	155		774			x			x	Based on current limit of 80 PECI. May be changed in a
Prohibited Items	x	85	15	x	85	15	97		484			x				Includes aerosol cans, free liquids.
Decay Heat (TRUCON Code)	N/A	-	-	x	45	55	290		1451			x	x			
Fissile Gram (FGE)	x	99	1	x	99	1	6		32			x	x	x		
Size/Weight	x	50	50	x	50	50	323		1613	x		x				Waste matrix prohibits simply repacking - arge
RCRA Data Quality Objectives	x	98	2	x	98	2	13		65			x	x			
TRU (> 100 nCi/g)	x	72	28	x	72	28	181		903	x		x				Waste will processed and fed into one of the 10-100

Table 3.1-1, TRU Waste Failure Table

Waste Group / Failure Parameters	WIPP Repository Requirement	% Pass	% Fail	WIPP Transport Requirement (TRUPACT II)	% Pass	% Fail	Cubic Meters that Fail Criteria	Number of Containers that Fail Criteria	55-Gallon Drum Equivalents that Fail Criteria	Corrective Function: Size/Weight Reduction	Repackage	Sort / Segregate / Repackage	Mitigate Gas Generation	Mitigate Criticality	Mitigate Release Due to WIPP Operation Accident	Comments
Future TRU Waste	**Newly Generated Waste (1997-2005 = 1123 cubic meters)**															
	Drums = 544 cubic meters total (2720 drums)															
	Poly Boxes = 192 cubic meters total (847 poly boxes)															
	Black Boxes = 387 cubic meters total (9 black boxes)															
Container	x	65	35	x	65	35	All black boxes				x					
Activity (PECi)	x	90	10	N/A	-	-						x			x	Based on current limit of 80 PECi. May be changed in a
Prohibited Items	x	100	0	x	100	0										Includes aerosol cans, free liquids.
Decay Heat (TRUCON Code)	N/A	-	-	x	65	35						x	x			
Fissile Gram (FGE)	x	99	1	x	99	1						x	x	x		
Size/Weight	x	65	35	x	65	35	All black boxes			x		x				
RCRA Data Quality Objectives	x	98	2	x	98	2						x	x			
TRU (> 100 nCi/g)	x	100	0	x	100	0										Waste will processed and fed into one of the 10-100

Table 3.1-1, TRU Waste Failure Table

3.2 Disposition Initiatives

Application of the TRU waste groupings to the functional flows with consideration of the volumes, failure parameters, and possible corrective functions provided in the failure matrix table reveals that TRU waste can be divided into three categories. Both newly generated and legacy wastes can be divided into these same categories. The categories are defined as follows:

Certifiable - Waste packages that can be characterized, certified, and shipped to WIPP as is. Waste packages in this category meets WIPP repository and TRUPACT II transport requirements. No additional or alternate repackaging, processing or transport capability is needed to ship this waste to WIPP. A 55 gallon drum containing heterogeneous debris waste contaminated with plutonium 239 is an example of a WIPP certifiable waste container.

Requires Repackaging - Waste packages that meet all repository and transport requirements except for container requirements. Waste in this category can be non-intrusively repackaged into a WIPP approved container then shipped to WIPP. Examples of repackaged waste are poly boxes containing High Efficiency Particulate Air filters or 83 gallon drums that can be overpacked into WIPP approved standard waste boxes.

Requires Processing - Waste packages that require processing before they can meet WIPP repository and/or TRUPACT II transport requirements. This waste package fails requirements because a waste characteristic or parameter (i. e., size, activity, weight, etc.) prevents compliance with the WIPP Waste Acceptance Criteria. Processing capability and/or an alternate transport configuration is required to facilitate shipment of the waste to WIPP. The degree of processing required will depend on the transport configuration used. Examples of waste that requires processing are black box waste packages containing large process equipment (fails weight limit) or 55 gallon drums containing gram quantities of heat source plutonium 238.

Three Initiatives for TRU waste disposition were developed based on the three TRU waste categories listed above:

- BLUE INITIATIVE - BEGIN SHIPMENT OF CERTIFIABLE WASTE
- YELLOW INITIATIVE - SHIP REPACKAGED WASTE
- GREEN INITIATIVE - SHIP PROCESSED WASTE

The implementation of the Blue Initiative and/or Yellow Initiative provides for early shipments of TRU waste packages to WIPP, resulting in some risk reduction in continued storage at SRS. In addition, the need for additional new storage areas at SRS is reduced, and characterization and transportation infrastructure necessary for the success of the entire program is established; however, these initiatives will only disposition a portion of the total TRU waste inventory which does not require processing.

The implementation of the Green Initiative requires the acquisition of the additional capability and/or facilities needed to disposition all of the SRS TRU waste inventory; therefore, the implementation of the Green Initiative adds the processing capability needed to disposition the remainder of the TRU waste inventory by 2033. A strategic plan that used only the Green Initiative, however, would allow the SRS TRU waste inventory to increase (resulting in an increase in risk) while additional capability and or facilities were being acquired (this could take until October, 2008); therefore, a strategic plan that uses only the Green Initiative would not provide the most timely disposition of the TRU waste.

The implementation of the three Initiatives together in an overall strategic plan provides for an effective method of disposing all of the SRS TRU waste inventory. Shipping the most easily certifiable TRU waste first (certifiable waste and waste that requires repackaging), while obtaining the capability and facilities needed to certify and ship waste that requires processing, will allow the entire TRU waste inventory to be dispositioned in a more timely manner.

The following three subsections explain the objectives and implementation of each of these Initiatives. In addition, a portion of the waste at SRS being managed as TRU waste may actually be defined as Low Level or Mixed Low

Level Waste. The disposition of this waste is discussed in a separate subsection, section 3.3, since this waste does not fit into any of the three TRU waste categories and cannot be dispositioned using any of the three TRU waste Initiatives.

3.2.1 Blue Initiative - Begin Shipment Of Certifiable Waste (10%)

The Blue Initiative satisfies the following five objectives and dispositions approximately 10% of the SRS TRU waste inventory by volume:

- Positions SRS to commence TRU waste shipments when WIPP opens in 1998.
- Provides a robust SRS TRU waste management program that produces newly generated, WIPP certified waste for shipment.
- Provides equipment, facilities, and infrastructure necessary to begin the process of characterization and transportation of TRU waste for shipment to WIPP.
- Provides for the certification and shipment of the interim stored (legacy) waste that meets WIPP repository and TRUPACT II transport requirements.
- Starts the mortgage reduction by reducing the TRU storage inventory and risk associated with continued storage.

The generator's waste programs will be upgraded and certified by WIPP so that the newly generated waste that meets. WIPP repository and transport requirements can be certified and shipped. In addition, processes, that produce non-certifiable TRU waste, will be evaluated to determine if they can be modified to maximize the generation of certifiable waste. This effort includes providing equipment necessary to support the certification process.

The process characterization information obtained from the above certification effort will be applied to the generators legacy waste to determine if these waste packages are certifiable. This will provide a more timely reduction of TRU waste inventories. A potential cost savings of up to $8,000 per container may be realized by revising the existing conservative limits imposed by WIPP in the certification arena. SRS should support the Carlsbad Area Office's effort to reduce excessive characterization requirements.

SRS TRU waste packages that cannot be dispositioned using the Blue Initiative shall be dispositioned using the Yellow Initiative or Green Initiative.

The operating and shipping experience gained by starting SRS TRU waste shipments to WIPP under the Blue Initiative, as early as FY99 would "open the pipe line" for SRS TRU waste packages, provide facilities and infrastructure to support all three initiatives and limit the amount of additional/new storage facilities needed at SRS and would help SRS avoid flooding the pipeline during the outyears of WIPP operation.

The functions necessary for the Blue Initiative are listed below and the functional flow is shown in Figure 3.2-1.

1.1 - Select Drum
1.8 - Review Existing Documentation
2.1 - Select Characterization Functions
2.2 - Perform Non-Destructive Assay (NDA)
2.3 - Perform Non-Destructive Examination (NDE)
2.4 - Perform Physical Sampling
2.5 - Perform Gas Sampling
2.6 - Compare to WIPP WAC

4.1 - Validate Waste Characterization Data
4.2 - Validate Waste Container Data
4.4 - Compile WIPP Data Package
4.5 - Obtain WIPP Approval (WWIS)
5.1 - Prepare Waste Container
5.2 - Load TRUPACT II
5.4 - Ship

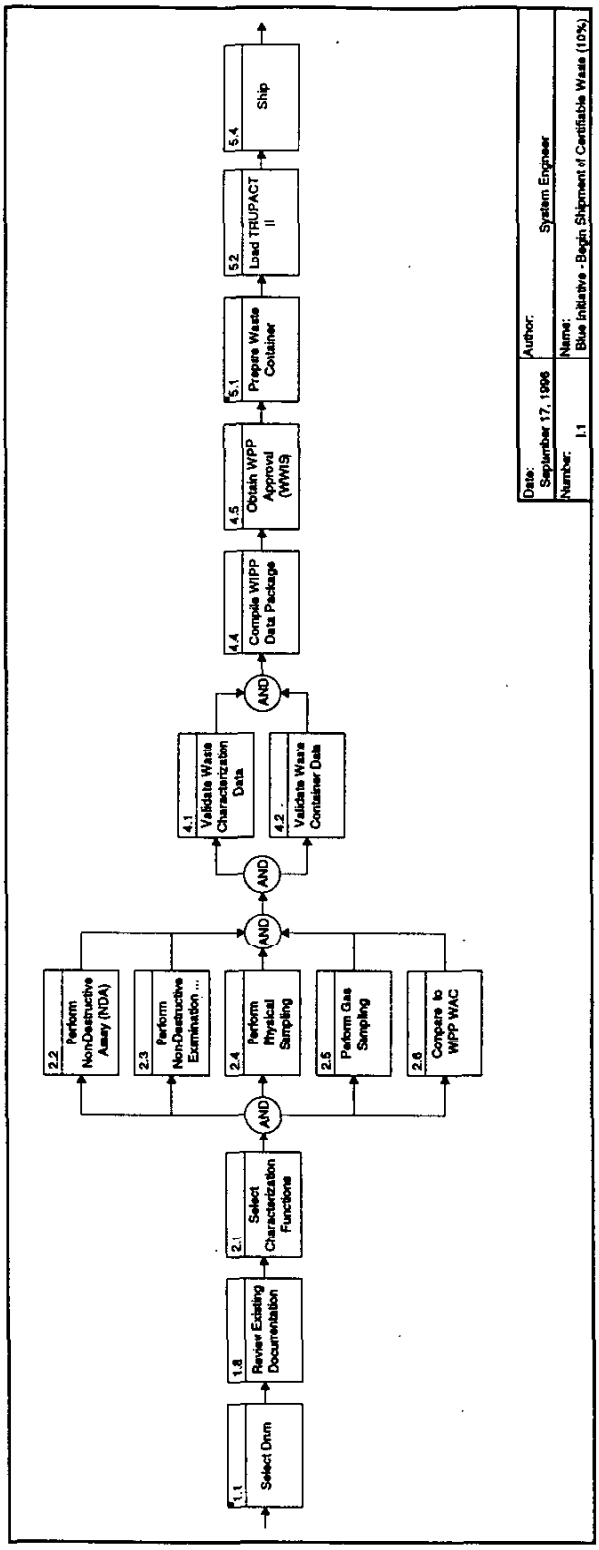


Figure 3.2-1, Blue Initiative - Begin Shipment of Certifiable Waste (10%)

3.2.2 Yellow Initiative - Ship Repackaged Waste (12%)

The Yellow Initiative satisfies the following two objectives and dispositions 12% of the SRS TRU waste inventory by volume:

- Increases the volume of certified waste shipments to WIPP.
- Reduces the amount of waste maintained in interim storage (legacy waste) thus reducing risk.

A portion of the legacy waste meets all repository and transport requirements except for container requirements is categorized as waste that 'requires non-intrusive repackaging'. Repackaging/Overpacking satisfies this failure parameter and allows this waste to meet certification requirements and shipment to WIPP. Acquiring repackaging facilities (possibly mobile facilities) is not expected to require a significant investment of time or resources; however, the cost effectiveness of this Initiative should be investigated prior to implementation.

SRS TRU waste packages that cannot be dispositioned using the Yellow Initiative shall be dispositioned using the Green Initiative.

The repackaging of TRU waste would provide additional waste packages for shipment to WIPP. This would ensure that personnel involved with TRU waste characterization, storage and shipment would maintain their training and experience through the first decade of WIPP operation or until TRU processing capability (Green Initiative) becomes available. The combination of the Blue Initiative and the Yellow Initiative will help 'fill the pipeline' to WIPP while reducing the need for additional/new storage areas at SRS.

The functions necessary for the Yellow Initiative are listed below and the functional flow is shown in Figure 3.2-2.

1.1 - Select Drum
1.2 - Select Cask
1.4 - Select Poly Box
1.5 - Select Overpack 238/239 Drums
1.6 - Select Odd-Sized Container
1.8 - Review Existing Documentation
2.1 - Select Characterization Functions
2.2 - Perform Non-Destructive Assay (NDA)
2.3 - Perform Non-Destructive Examination (NDE)
2.4 - Perform Physical Sampling
2.5 - Perform Gas Sampling
2.6 - Compare to WIPP WAC
3.3 - Repackage
4.1 - Validate Waste Characterization Data
4.2 - Validate Waste Container Data
4.4 - Compile WIPP Data Package
4.5 - Obtain WIPP Approval (WWIS)
5.1 - Prepare Waste Container
5.2 - Load TRUPACT II
5.4 - Ship

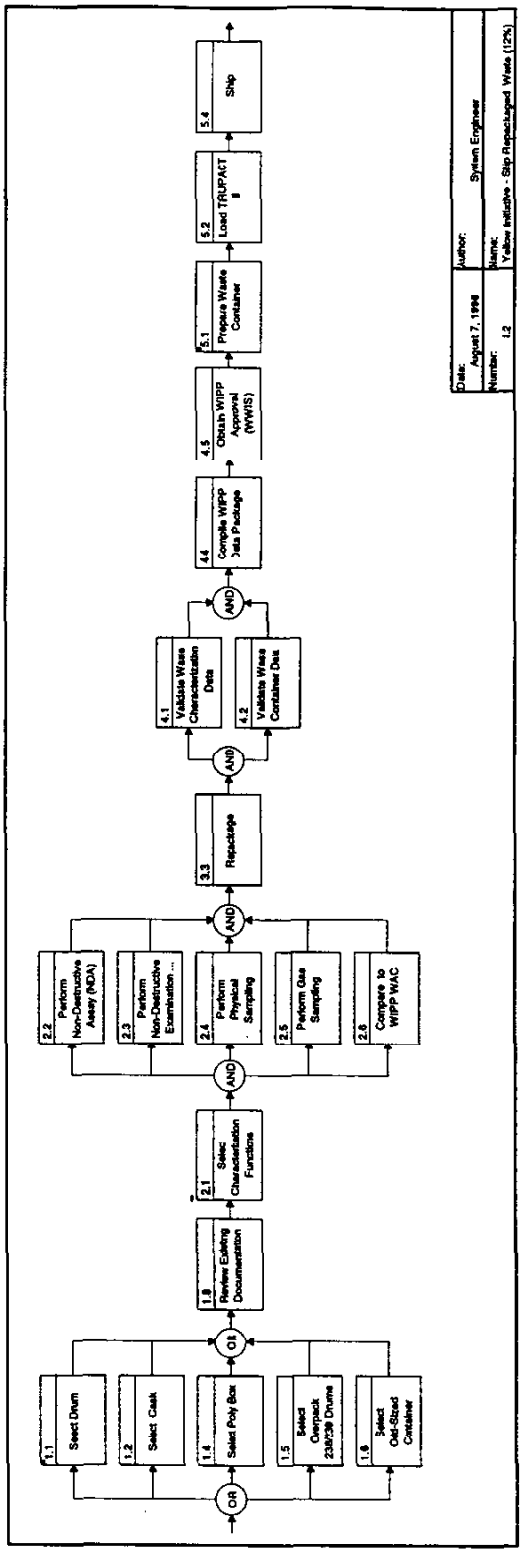


Figure 3.2-2, Yellow Initiative - Ship Repackaged Waste (12%)

3.2.3 Green Initiative - Ship Processed Waste (50%)

The Green Initiative satisfies the following three objectives and dispositions up to 50% of the SRS TRU waste inventory by volume:

- Provides processing capability necessary to complete the SRS TRU Waste Program (i.e., size/weight reduction, sorting, segregation, and mitigation of gas generation).
- Places the SRS TRU waste program in 'End State' by 2033. End State is reached when all legacy waste has been removed from SRS storage and TRU program capability exists to facilitate shipment of all newly generated waste to WIPP. Risk is eliminated.
- Submits a Resource Conservation Recovery Act (RCRA) Part B Permit Application, for the processing of TRU waste, to the South Carolina Department of Health and Environmental Control by fourth quarter FY 2008.

The majority of the SRS TRU waste fails WIPP and TRUPACT II requirements because a waste characteristic or parameter (i. e., size, activity, weight, etc.) prevents compliance with WIPP Waste Acceptance Criteria. This strategy evaluates the characteristics and volume of waste that fails along with the associated failure parameters then provides an integrated solution. The solution provides processes and facilities that modify the waste form to correct the failed parameters and produce waste that is WIPP compliant. The implementation of the Green Initiative will require a significant investment of time and resources (the acquiring of process facilities/capability could take as long as ten years).

The two major failure parameters identified above (decay heat, size/weight), are primarily associated with the transport container TRUPACT II. The use of an alternate transport configuration with less restrictive size/weight and decay heat limits, would significantly reduce the amount of processing required and would facilitate using existing DOE complex capability rather than constructing major processing facilities at each site. The greatest area of risk in the strategic plan involves the risks incurred when processing TRU waste. A decrease in the level of processing facilitated by higher transport limits would reduce risk. In addition, the life cycle cost savings (SRS only) for this lower level of processing is estimated at $572M. Due to this significant cost savings and an accelerated inventory reduction, a re-configured transporter should be investigated prior to quantifying SRS processing needs.

The functions necessary for the Green Initiative are listed below and the functional flow is shown in Figure 3.2-3.

1.1 - Select Drum
1.2 - Select Cask
1.3 - Select Black Box
1.4 - Select Poly Box
1.5 - Select Overpack 238/239 Drums
1.6 - Select Odd-Sized Container
1.7 - Select Shielded RH TRU
1.8 - Review Existing Documentation
2.1 - Select Characterization Functions
2.2 - Perform Non-Destructive Assay (NDA)
2.3 - Perform Non-Destructive Examination (NDE)
2.4 - Perform Physical Sampling
2.5 - Perform Gas Sampling
2.6 - Compare to WIPP WAC
2.7 - Compare to WIPP Repository Criteria (Alt Trans Config)
3.1 - Select Processing Functions

3.2 - Size/Weight Reduction
3.3 - Repackage
3.4 - Sort / Segregate / Repackage
3.5 - Mitigate Gas Generation
3.6 - Mitigate Criticality
3.7 - Mitigate Release Due To WIPP Operational Accident
3.8 - Perform Additional Characterization
3.9 - Generate Waste Data
4.1 - Validate Waste Characterization Data
4.2 - Validate Waste Container Data
4.3 - Update Characterization or Container Data
4.4 - Compile WIPP Data Package
4.5 - Obtain WIPP Approval (WWIS)
5.1 - Prepare Waste Container
5.2 - Load TRUPACT II
5.3 - Load WIPP Alternative Transport Configuration
5.4 - Ship

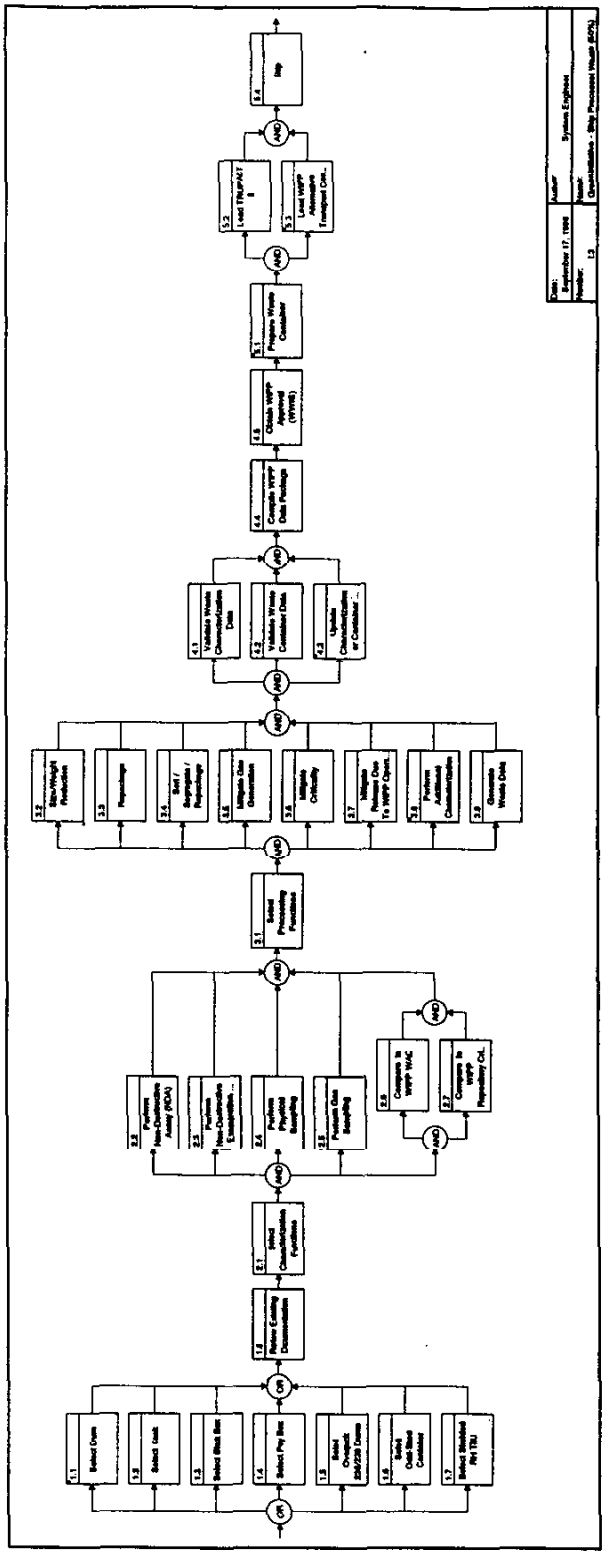


Figure 3.2-3 - Green Initiative - Ship Processed Waste (50%)

3.3 Disposition Of Low Level And Mixed Low Level Waste (28%)

A portion, approximately one third, by volume, of the legacy waste currently managed as TRU waste is estimated to have an activity level of less than 100 nanocuries per gram (nCi/g) and could be dispositioned as Low Level Waste or Mixed Low Level Waste (waste contaminated with both RCRA constituents and radioactivity) when characterization, processing, and disposal capabilities become available. Activities to address this portion of the TRU waste are identified as part of the continued storage operation within the TRU Waste Strategic Plan. These activities begin in FY97. A final path forward for both Low Level and Mixed Low Level Waste volumes should be determined by the end of FY 97.

The non-mixed Low Level Waste is currently being assayed and segregated for treatment and/or disposal in existing SRS facilities. Non-mixed Low Level Waste disposal facilities include the E-Area disposal vaults. The disposal of non-mixed Low Level Waste will reduce the volume of waste currently in storage, thereby reducing the cost associated with continued storage of this waste.

The large majority, more than 90%, of the less than 100 nCi/g waste is considered Mixed Low Level Waste and does not currently have an identified treatment and/or disposal plan at SRS. The WIPP facility will not currently accept waste with an activity level less than 100 nCi/g, leaving this waste without a direct disposal option. Once confirmed as Mixed Low Level Waste, this waste would become subject to Land Disposal Restrictions. The decision to identify/segregate the less than 100 nCi/g Mixed Low Level Waste must address all key issues, including its impact to the Site Treatment Plan commitments and the need for additional facilities not currently planned, if this waste is managed as Mixed Low Level Waste.

The functions necessary for the disposition of Low Level waste are listed below and the functional flow is shown in Figure 3.3-1.

1.1 - Compare to E-Area Vault Criteria
1.2 - Process to Pass E-Vault Parameters
1.3 - Dispose in E-Area Vaults
1.4 - Process to meet LDR and Disposal Facility Criteria
1.5 - Transport to Appropriate Disposal Facility
1.6 - Dispose in RCRA Facility

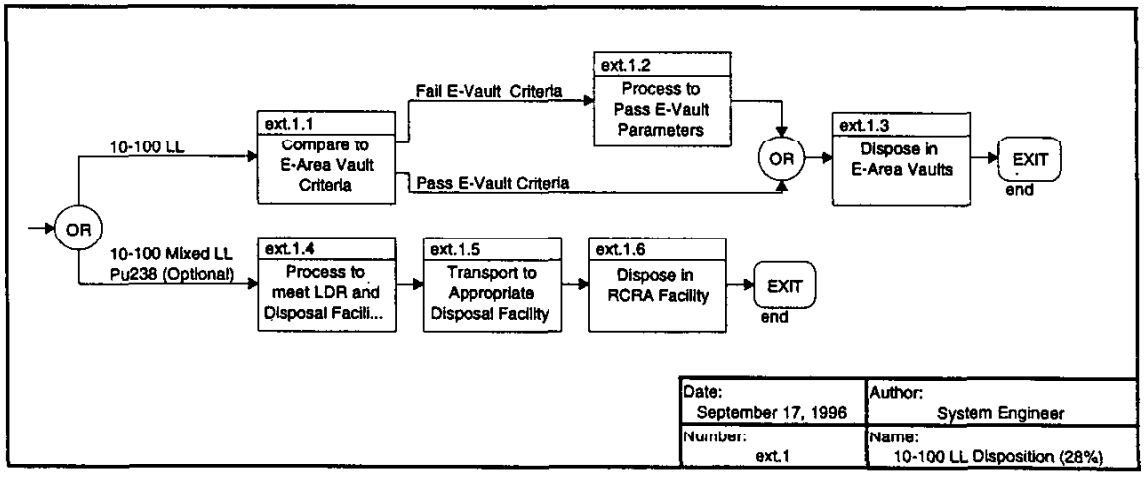


Figure 3.3-1 - 10-100 LL Disposition (28%)

Sub-Functions of "10-100 LL Disposition (28%)"
ext 1.1 - Compare to E-Area Vault Criteria
Description: Waste characteristics are compared to acceptance criteria for disposal in the E-Area vaults. The criteria to be evaluated include radionuclide distribution and quantities, free liquids physical characteristics, and container data.
ext 1.2 - Process to Pass E-Vault Parameters
Description: Process waste container contents to modify failure parameters to allow the waste container to meet E-Area Vault criteria. The process may include repackaging, reducing prohibitive items, or incineration.
ext 1.3 - Dispose in E-Area Vaults
Description: Complete waste container documentation, transport, and dispose of the container in an E-Area Disposal Vault. This activity includes certification, transportation, and disposal of each container destined for disposal in the E-Area Vault.
ext 1.4 - Process to meet LDR and Disposal Facility Criteria
Description: Process to meet Land Disposal Restriction Requirements for disposal in an appropriate disposal facility. Processing could include thermal treatments to destroy organic constituents, stabilization, neutralization, macroencapsulation techniques for debris wastes, or other specified technologies such as amalgamation depending on what constituents in the waste is considered hazardous. The facility to complete this processing would have to be RCRA permitted and would be expected to provide all necessary treatment technologies.
Issues/Assumptions: Buried TRU Waste in MWMF will not be retrieved and sent to WIPP Defense/ Non-Defense TRU waste may not be allowed in WIPP There is no identified disposal for LL Mixed Waste
ext 1.5 - Transport to Appropriate Disposal Facility
Description: Determine where processed waste container will be disposed (on site or at a commercial facility such as Envirocare). Develop waste characterization and container documentation and transport the container to the disposal location.
ext 1.6 - Dispose in RCRA Facility
Description: Dispose of processed waste in the disposal facility and complete all LDR disposition documentation.

3.4 Waste Inventory Volumes

The following information provides the basis for determining the TRU waste inventory associated with three initiatives identified in Section 3.2.

The global inventories for each waste type are extracted from the TRU Waste Failure Matrix, Table 3.1-1, and have their roots from the 1996 Baseline Inventory Report submittal . Waste volumes exclude the low-level waste (LLW) volumes managed as suspect TRU waste. Where the TRU Waste Failure Table identifies additional LLW, it is included in the calculations except for failures of less than 1% which are ignored.

3.4.1 Failure Parameter Algorithm

The Algorithm used to determine the volume inventories in the Blue, Yellow, and Green Initiatives for each waste group is as follows:

[Total Volume in waste group]		
– [Volume ≤ 100 nCi (non-TRU)]	⇒	to LL/.MLL
– [Largest volume failure of parameter requiring processing other than REPACKAGE]	⇒	to GREEN INITIATIVE
= [Balance of waste subject to further allocation to INITIATIVES]		
× [(% fail) of next highest failure parameter requiring processing]	⇒	to GREEN INITIATIVE
[iterate until (% fail) ≤ 5%)]	⇒	to GREEN INITIATIVE
➨ Volume allocated to GREEN INITIATIVE	=	Σ GREEN INITIATIVE
[Balance of waste subject to further allocation to INITIATIVES]		
– [Volume allocated to GREEN INITIATIVE]		
= [Balance of waste subject to YELLOW INITIATIVE]		
× [(% fail) of CONTAINER failure parameter		
➨ = Volume allocated to YELLOW INITIATIVE		
[Balance of waste subject to YELLOW INITIATIVE]		
– [Volume allocated to YELLOW INITIATIVE]		
➨ = Volume of waste allocated to BLUE INITIATIVE		

3.4.2 Container Volumes, Conversion Factors and Notes

1 55-gallon drum = 1 drum equivalent (DE) = .1982 cubic meter (m^3)
1 poly box = 1.13 drum equivalent (DE) = .226 cubic meter (m^3)
1 black box = 215.5 drum equivalent (DE) = 42.5 cubic meter (m^3) .

Casks and odd size containers are calculated on total volume because the containers vary in size. The following total volumes are used:

casks - 298 cubic meters (m^3)
odd size containers - 645 cubic meters (m^3)

3.4.3 Initiative Waste Inventory Volumes

3.4.3.1 CH Pu-239 in 55-gallon drums:

Total Volume - 3405 drums X .1982 = 675 m^3 = 3405 DE

3045 DE X 0.4 (40%) = 1362 DE decay heat failures (from TRU waste failure table)

3405 DE
- 1362 DE decay heat failures
2043 DE

2043 DE X 0.15 (15%) = 102 DE prohibited items failures (from TRU waste failure table)

3405 DE
- 102 DE prohibited items failures
1941 DE

1941 DE X 0.05 (5%) = 97 DE other failures

1941 DE
- 97 DE other failures
1844 DE

1844 DE X 0.35 (35%) = 645 DE container failures (from TRU waste failure table)

1844 DE
- 645 DE container failures
1199 DE

Summary:

Blue Initiative	Yellow Initiative	Green Initiative	LLW	Total
1199 DE	645 DE	1561 DE	-0-	3405 DE
(238 m^3)	(128 m^3)	(309 m^3)		(675 m^3)

3.4.3.2 CH Pu-238 in 55-gallon drums:

Total Volume - 7990 drums X .1982 = 1584 m^3 = 7990 DE

7990 DE X 0.73 (73%) = 5832 DE decay heat failures (from TRU waste failure table)

7990 DE
- 5832 DE decay heat failures
2158 DE

2158 DE X 0.15 (15%) = 323 DE prohibited items failures (from TRU waste failure table)

2158 DE
- 323 DE prohibited items failures
1835 DE

1835 DE X 0.13 (13%) = 237 DE PE curie failures (from TRU waste failure table)

1835 DE
- 237 DE PE curie failures
1598 DE

1598 DE X 0.04 (4%) = 65 DE other failures (from TRU waste failure table)

1598 DE
- 65 DE other failures
1533 DE

1533 DE X 0.35 (35%) = 536 DE container failures (from TRU waste failure table)

1533 DE
- 536 DE container failures
997 DE

Summary:

Blue Initiative	Yellow Initiative	Green Initiative	LLW	Total
996 DE	536 DE	6458 DE	-0-	7990 DE
(198 m^3)	(106 m^3)	(1280 m^3)		(1584 m^3)

3.4.3.3 Poly Boxes:

Total Volume - 178 m^3 = 898 DE = 788 boxes

898 DE X 0.26 (26%) = 233 DE fail to LLW (from TRU waste failure table)

898 DE
- 233 DE fail to LLW
665 DE

665 DE X 0.13 (13%) = 86 DE decay heat failures (from TRU waste failure table)

665 DE
- 86 DE decay heat failures
579 DE

579 DE X 0.05 (5%) = 28 DE other failures (from TRU waste failure table)

579 DE
- 28 DE other failures
551 DE

1533 DE X 1.0 (100%) = 551 DE container failures (from TRU waste failure table)

Summary:

Blue Initiative	Yellow Initiative	Green Initiative	LLW	Total
-0-	551 DE	114 DE	233 DE	898 DE
	(109 m^3)	(23 m^3)	(46 m^3)	(178 m^3)

3.4.3.4 Black Boxes:

Total Volume - 85 boxes x 42.5 m^3/box = 3611 m^3 = 18,226 DE

18226 DE X 0.25 (25%) = 4556 DE = 21 fail to LLW (from TRU waste failure table)

18226 DE
- 4556 DE LLW failures
13670 DE

13670 DE X 1.0 (100%) = 13670 DE = 64 boxes size/weight failures (from table)

Summary:

Blue Initiative	Yellow Initiative	Green Initiative	LLW	Total
-0-	-0-	13670 DE	4556 DE	18226 DE
		(2709 m^3)	(902 m^3)	(3611 m^3)

3.4.3.5 Casks:

Total Volume - 298 m^3 = 1503 DE

1503 DE x 0.9 (9%) = 135 DE fail to LLW (from TRU waste failure table)

1503 DE
- 135 DE LLW
1368 DE

1368 DE X 0.5 (50%) = 684 DE = fail to size/weight (from TRU waste failure table)

1368 DE
- 684 DE size/weight failures
684 DE

684 DE X 0.27 (27%) = 184 DE fail PE curie criteria (from TRU waste failure table)

684 DE
- 184 DE PE curie failures
500 DE

500 DE X 0.15 (15%) = 75 DE fail prohibited items (from TRU waste failure table)

500 DE
- 75 DE size/weight failures
425 DE

Summary:

Blue Initiative	Yellow Initiative	Green Initiative	LLW	Total
-0-	425 DE	943 DE	135 DE	1503 DE
	(84 m^3)	(186 m^3)	(28 m^3)	(298 m^3)

3.4.3.6 Odd Size Containers:

Total Volume - 645 m3 = 3254 DE

3254 DE X 0.28 (28%) = 911 DE fail to LLW (from TRU waste failure table)

3254 DE
- 911 DE fail to LLW
2343 DE

1368 DE X 0.55 (55%) = 752 DE decay heat failures (from TRU waste failure table)

1368 DE
- 752 DE decay heat failures
616 DE

616 DE X 0.5 (50%) = 308 DE size/weight failures (from TRU waste failure table)

616 DE
- 308 DE size/weight failures
308 DE

308 DE X 0.24 (24%) = 73 DE PE curies failures (from TRU waste failure table)

500 DE
- 75 DE PE curie failures
425 DE

308 DE X 0.15 (15%) = 73 DE prohibited item failures (from TRU waste failure table)

308 DE
- 73 DE prohibited item failures
235 DE

235 DE X 0.03 (3%) = 7 DE other failures (from TRU waste failure table)

235 DE
- 7 DE other failures
228 DE

Summary:

Blue Initiative	Yellow Initiative	Green Initiative	LLW	Total
-0-	228 DE (46 m^3)	2115 DE (419 m^3)	911 DE (180 m^3)	3254 DE (645 m^3)

3.4.3.7 SRS TRU Waste Inventory Summary

Containers	Blue Initiative	Yellow Initiative	Green Initiative	LLW	Total
CH Pu-239 Drums	1199 DE (238 m^3)	645 DE (128 m^3)	1561 DE (309 m^3)	-0-	3405 DE (675 m^3)
CH Pu-238 Drums	996 DE (198 m^3)	536 DE (106 m^3)	6458 DE (1280 m^3)	-0-	7990 DE (1584 m^3)
Poly Boxes (788 boxes)	-0-	551 DE (109 m^3)	114 DE (23 m^3)	233 DE (46 m^3)	898 DE (178 m^3)
Black Boxes (85 boxes)	-0-	-0-	13670 DE (2709 m^3)	4556 DE (902 m^3)	18226 DE (3611 m^3)
Casks	-0-	425 DE (84 m^3)	943 DE (186 m^3)	135 DE (28 m^3)	1503 DE (298 m^3)
Odd Size Containers	-0-	228 DE (46 m^3)	2115 DE (419 m^3)	911 DE (180 m^3)	3254 DE (645 m^3)
Total	2195 DE (436 m^3)	2385 DE (473 m^3)	24861 DE (4926 m^3)	5835 DE (1156 m^3)	35276 DE (6991 m^3)

4.0 CONTINGENCY PLAN FOR DISPOSITION OF SRS TRU WASTES

The Savannah River Site's Strategic Plan recommendations are based on the assumption that WIPP opens on schedule in November, 1997 and that the New Mexico Environmental Department approves the No Migration Petition Variance which allows disposal of Mixed TRU waste without processing to Land Disposal Restrictions for hazardous waste. Changes in either of these assumptions would significantly impact the SRS Strategic Plan. Contingencies if these assumptions don't hold true are discussed in Sections 4.1 and 4.2.

4.1 WIPP Does Not Receive A No Migration Petition

Under the SRS Site Treatment Plan Consent Order, SRS would be required to treat Mixed TRU waste to meet Land Disposal Restriction requirements. This Strategic Plan's recommendation to consider alternative transporter configurations for shipment of TRU wastes to WIPP without Land Disposal Restriction treatment would defer to the more costly and longer duration option of providing Land Disposal Restriction treatment. Any savings that would be obtained by shipping untreated Mixed TRU waste to WIPP would not be realized. It would however, simplify the decision making process outlined in this Plan by eliminating all other options. Land Disposal Restriction treatment (vitrification, plasma hearth, macroencapsulation) would result in significant cost and extended time duration, moving funding for facilities and shipments of waste to WIPP out into the future.

Additional permitted storage capacity will be required to store Mixed TRU waste while the extensive treatment facilities are funded and constructed. This could result in the construction of an additional storage pad every two years.

4.2 WIPP Does Not Open

As is the case in Section 4.1 above, mixed TRU wastes would need to be treated to meet Land Disposal Restriction standards. Thermal destruction of the waste (vitrification or plasma hearth systems) to produce a glass matrix would most likely be the technology of choice since it provides a stablized waste form that is more acceptable for long term interim storage. Additional storage facilities would need to be constructed to provide this long term interim storage until a new repository is identifed and constructed. This scenario would also result in significant cost as well as facility delays to treat TRU wastes for safe long term storage.

5.0 IMPLEMENTATION RECOMMENDATIONS

The three TRU waste Initiatives, discussed in Section 3, should be undertaken concurrently, as funding allows, to ensure that all waste is dispostioned in a timely manner. Safe storage and TRU waste retrieval must continue to be the baseline operations while the amount of waste in storage is reduced through implementing the Initiatives.

The reduction of the SRS TRU waste in storage will be accomplished by providing the characterization and processing necessary to ship the waste to the WIPP facility or other DOE site for processing and eventual shipment to WIPP. The schedule shown in Appendix A identifies the major activities needed for implementation of the TRU waste Initiatives and the proposed start/completion dates for each of these activities based on the major commitment dates for the program. The key decisions and recommended implementation priority for activities contained within this schedule are discussed below for each Initiative.

The certification of the FB-line waste generation process has been scheduled based on the "Ship to WIPP in 1999" effort. The Blue Initiative builds on this schedule for the remaining four TRU Waste generators, in sequence, after the certification process has been established for FB-line. The certification of newly generated waste is the foundation for the entire TRU Program. The radiological and chemical characterization and process information developed during certification of generators is the key to simplifying the certification of legacy waste resulting from those same generators. Without this information, extensive and expensive analytical analysis and intrusive inspection would be required to certify legacy waste. The certification effort will decrease the amount of waste in storage by reducing the addition of newly generated waste and will ease the certification of legacy waste resulting in more timely disposition. The money saved from storage can partially offset the certification costs.

There is an opportunity for reducing the characterization costs by pushing back on excessive WIPP requirements in the certification arena. Current characterization cost estimates for WIPP are $11,000 per container. Normal hazardous waste samples cost $3-$5,000. The reduction of unnecessary requirements in this area has been recognized and is a focus area for the National Integration team which looks at TRU and mixed wastes. SRS should continue to support this re-evaluation as a priority since it has the potential to significantly reduce implementation costs for the Blue Initiative.

The development of equipment to Non-destructively Assay, Non-destructively Examine, and provide gas sampling capability and analysis is essential to the certification process and must be a priority. Non-destructively Assay capability must be developed for both plutonium 239 & 238 with accuracy at very low concentrations 100 nCi/g as well as high gram quantities (> 5 grams). The location of this capability also needs to be determined since the Experimental TRU Waste Assay Facility and Waste Certification Facility will be eliminated in an upcoming environmental restoration closure activity. Studies to determine the best option (i.e. mobile or stationary) need to be undertaken. Additionally, a key decision needs to be made on the container or containers which will be handled by the above equipment. Once container capability is determined, the selected containers must be incorporated into the waste acceptance criteria.

The last area of priority in the Blue Initiative is the capability to load the selected transporter. The Experimental TRU Waste Assay Facility and Waste Certification Facility shutdown eliminates the current capability to load the transporter. A study to determine the best replacement option must be undertaken to support shipments to WIPP.

The Blue Initiative recommendations above are essential infrastructure for the entire TRU Program. Any missing element will prevent the success of all three Initiatives.

The Yellow Initiative is optional and aimed at further reducing the storage and risk mortgage by certifying and shipping that portion of waste which can be easily repackaged. The Yellow Initiative should be used if additional shipments to WIPP are needed prior to installing the processing capability resulting from the Green Initiative. The repackaging capability envisioned is non-intrusive and easily accomplished by a vendor with portable equipment or with minimal containment. This capability would have to be installed in an existing hazardous waste permitted facility. Further study to quantify the cost effectiveness of this Initiative will have to be conducted.

The Green Initiative includes the design, construction, and operation of a TRU Waste Characterization and Processing Facility which would correct the failure parameters which prevent direct shipment to WIPP for the remaining wastes. The first priority in this initiative is the evaluation of an alternate transport configuration. The Green Initiative waste fails the WIPP Waste Acceptance Criteria due to two primary reasons, size/weight and decay heat. These two major failure parameters are primarily associated with the transport container TRUPACT II. The use of an alternate transport configuration with less restrictive size/weight and decay heat limits, would significantly reduce the amount of processing required and would facilitate using existing and proposed DOE complex capability rather than constructing major processing facilities at each site. This alternative could include TRUPACT II with new decay heat limits or a new transport container capable of handling the currently non-complying containers ar SRS in terms of size and weight restrictions. Either configuration would reduce processing costs. The National Environmental Management Integration Team has an alternate transport configuration as a focus area and SRS should support this effort.

Only after the constraints of the alternative transport configuration are known can design of a processing facility be finalized; however, the minimum requirements of the processing facility will have to include size/weight reduction and sorting/segregation capability for plutonium 238, since no other site has or plans to have plutonium 238 capability. Based on the uniqueness and quantity of SRS plutonium 238 waste, it is recommended that the 1999 line item be scoped for plutonium 238 size/weight reduction and sorting/segregation.

5.1 Issues

The following is a listing of the issues identified that affect the the implementation of the TRU waste program:

Issues
Alternative Transportation Configuration affects Strategic Plan Actions *Description:* The functional flow diagram is based on compliance with the WIPP WAC by processing the waste at SRS as necessary and use of the TRUPACT II to transport TRU waste to WIPP. Development and use of an alternative transport configuration (s) in conjunction with or in place of TRUPACT II significantly impacts the direction of the TRU Waste Strategic Plan by allowing multiple options for disposition of the waste streams. Alternate transport configurations sized to accommodate waste containers satisfying the WIPP repository and/or the largest container (i.e. black boxes or limited to maximum DOT requirements) should be evaluated. Use of these alternatives would allow the option of centralized processing of all or part of the waste at one or more sites (as well as processing at SRS). Processing to correct WIPP WAC failure parameters, primarily decay heat and size/weight limits, will be extensive and is directly related to the configuration of the transporter. A reconfigured transporter with a greater decay heat and size/weight limit could significantly reduce the processing required and/or would facilitate using existing DOE complex capability rather than constructing major processing facilities at each Site. The extent of processing required to be done at SRS is dependent on the criteria attributed to the transport configuration. The in-depth option analysis performed on the processing function must take into account the transport configuration and its associated criteria. Less restrictive criteria than TRUPACT II results in less extensive processing and facility requirements. The results of the in-depth option analysis, selection of transport configuration(s), selection of processing site locations, and use of the TRUPACT II and/or the alternatives will allow generation of the final actions necessary to complete disposition of all of the SRS TRU Waste. *Related To:* Function: 5 - Transport Waste
Defense/ Non-Defense TRU waste may not be allowed in WIPP *Description:* A legal opinion received by DOE-HQ stated that non-defense waste may not be acceptable for disposal at WIPP. If this opinion is factual, it could prevent a significant percentage of TRU waste currently being stored at SRS and other DOE subcontractor facilities. A prohibition on non-defense waste might be interpreted to include wastes generated by universities, national laboratories, and facilities producing heat source,

Issues
medical, and specialty isotopes which, to a large extent, are non-defense waste. *Related To:* Function: ext.1.4 - Process to meet LDR and Disposal Facility Criteria
New characterization technology will help identify waste for further processing *Description:* - Upgraded non-destructive assay instrumentation capable of measuring plutonium 238 in the 10-100 nanocurie per gram range. - NDA and NDE equipment that will permit assaying and examining containers other than drums. -Equipment and laboratory services to provide gas sampling and analysis. - A work area and equipment that will support intrusive inspection of a limited number of containers. *Related To:* Function: 2 - Characterize Waste
There is no identified disposal for LL Mixed Waste *Description:* A portion, approximately one third, by volume, of the legacy waste currently managed as TRU waste is estimated to have an activity level of less than 100 nanocuries per gram (nCi/g) and could be dispositioned as Low Level Waste or Mixed Low Level Waste (waste contaminated with both RCRA constituents and radioactivity) when characterization, processing, and disposal capabilities become available. Activities to address this portion of the TRU waste are identified as part of the continued storage operation within the TRU Waste Strategic Plan. These activities begin in FY97. A final path forward for both Low Level and Mixed Low Level Waste volumes should be determined by the end of FY 97. The non-mixed Low Level Waste is currently being assayed and segregated for treatment and/or disposal in existing SRS facilities. Non-mixed Low Level Waste disposal facilities include the E Area disposal vaults. The disposal of non-mixed Low Level Waste will reduce the volume of waste currently in storage, thereby reducing the cost associated with continued storage of this waste. The large majority, more than 90%, of the less than 100 nCi/g waste is considered Mixed Low Level Waste and does not currently have an identified treatment and/or disposal plan at SRS. The WIPP facility will not currently accept waste with an activity level less than 100 nCi/g. leaving this waste without a direct disposal option. Once confirmed as Mixed Low Level Waste, this waste would become subject to Land Disposal Restrictions. The decision to identify/segregate the less than 100 nCi/g Mixed Low Level Waste must address all key issues, including its impact to the Site Treatment Plan commitments and the need for additional facilities not currently planned, if this waste is managed as Mixed Low Level Waste. *Related To:* Function: ext.1.4 - Process to meet LDR and Disposal Facility Criteria

5.2 Implementation Activities

The following is a listing of the activities necessary for the implementation of the TRU waste initiatives as scheduled in Appendix A:

TRU Waste Movement Activities

Activity No.	Activity Title / Description	Start Date	End Date
MOV.1	**Ship TRU Waste to WIPP** *Description:* The Ship To-WIPP in 1999 Plan outlines the details, tasks, and schedule to ship waste to WIPP.	November 24, 1998	September 30, 2015
MOV.2	**Store TRU Waste** *Description:* TRU Waste packages that are certifiable and being selected for shipment to WIPP will be physically separated from other stored waste containers.	October 1, 1996	September 30, 2015
MOV.3	**Produce Certified TRU Waste** *Description:* Waste generators must write and implement a certification plan for approval by the WIPP WACCC to produce certifiable waste packages.	November 24, 1998	June 30, 2015

Blue Initiative - Begin Shipment of Certifiable Waste (10%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
BLU.0	**Blue Initiative : Ship Certified Waste** *Description:* The details, tasks and schedule necessary to have certified waste available for shipment to WIPP is contained in the Ship-To-WIPP in 1999 Plan.		
BLU.2	**Produce Certified Waste** *Description:* The SWMD must update the Waste Acceptance Criteria manual, the QAPjP, and support the TRU Waste generators during the development of SRS Certification Plan(s). The waste characterization, handling, packaging, and records management information must be implemented to support the TRU Certification Plan and produce a certifiable waste program. The Certification Plan must be approved by the WIPP WAC.		
BLU.11	**Certify FB Line, Newly Generated Waste** *Description:* The generator must submit a Waste Certification Plan and obtain certification approval	November 1, 1996	November 23, 1998

Blue Initiative - Begin Shipment of Certifiable Waste (10%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
	from the WIPP WACCC. (see BLU.2) The first waste generator at SRS has been identified as the F Area facility. *Implements Function(s):* 4 - Validate Waste		
BLU.12	**Certify FB Line, Legacy** *Description:* After the generator receives WIPP WACCC approval of their certification plan, the SWMD shall submit or amend the certification plan to include legacy waste from the original generator using historical waste data, process knowledge, and characterization measurements to validate waste content and packaging information. There appears to be enough information available to develop a certification plan that would include waste generated during the previous 5 to 10 years. *Implements Function(s):* 4 - Validate Waste	November 24, 1997	November 23, 1998
BLU.21	**Certify F Canyon, Newly Generated Waste** *Description:* The second generator will be one of the four remaining SRS TRU waste generators. (See BLU.11 for more detail) *Implements Function(s):* 4 - Validate Waste	November 24, 1998	November 22, 2000
BLU.22	**Certify F Canyon, Legacy** *Description:* See BLU.21 and BLU.12 for more information. *Implements Function(s):* 4 - Validate Waste	November 23, 1999	November 22, 2000
BLU.31	**Certify HB Line, Newly Generated Waste** *Description:* See BLU.21 for information on 3rd generator and BLU.11 for detail. *Implements Function(s):* 4 - Validate Waste	October 1, 1999	October 1, 2001
BLU.32	**Certify HB LIne, Legacy** *Description:* See BLU.21 and BLU.12 for more detail.	October 3, 2000	October 1, 2001

Blue Initiative - Begin Shipment of Certifiable Waste (10%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
	Implements Function(s): 4 - Validate Waste		
BLU.41	**Certify H Canyon, Newly Generated Waste** *Description:* See BLU.21 and BLU.12 for more detail. *Implements Function(s):* 4 - Validate Waste	October 2, 2000	September 27, 2002
BLU.42	**Certify H Canyon. Legacy** *Description:* See BLU.21 and BLU.12 for more detail. *Implements Function(s):* 4 - Validate Waste	October 1, 2001	September 27, 2002
BLU.51	**Certify SRTC, Newly Generated Waste** *Description:* See BLUN.21 and BLU.12 for more detail. *Implements Function(s):* 4 - Validate Waste	October 1, 2001	September 30, 2003
BLU.52	**Certify SRTC, Legacy** *Description:* See BLU.21 and BLU.12 for more detail. *Implements Function(s):* 4 - Validate Waste	October 1, 2002	September 29, 2003

Yellow Initiative - Ship Repackaged Waste (12%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
YLW.0	**Yellow Initiative: Ship Cert. by Repackage Waste** *Description:* The certification of waste by repackaging to correct that failure parameter would supply additional certified waste packages to "fill the transportation pipeline" to WIPP until a processing facility becomes available to correct all existing failure parameters.		

Yellow Initiative - Ship Repackaged Waste (12%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
YLW.1	**Repackage Feasibility Study** *Description:* A study to determine the number of waste containers that might be certifiable and acceptable for transportation to WIPP after repackaging, the potential cost to repackage, and the timeframe for repackaging versus the availability of a processing facility that would correct all failure parameters.	October 1, 1996	September 30, 1997
YLW.2	**Decision: Continue or Fail to Green Initiative** *Description:* WSRC will need to make a decision based upon the availability of a processing facility to either correct the failure parameter of containers needing repackaging and continue to provide a limited amount of certified waste for shipment to WIPP or to process all containers through a facility and certify/ship to WIPP.		September 30, 1997
YLW.11	**Develop/ Provide Repackage Capability** *Description:* Poly boxes are not approved Type A or 7A package and will require overpackaging in a SWB or 10-drum overpack to correct this failure parameter. Poly Boxes are non-filtered and will require filter installation before shipment to WIPP.	October 1, 1997	September 30, 1998
YLW.12	**Certify Poly Box Generator** *Description:* Once the existing waste generators have an approved certification plan newly generated waste packages will be certifiable for shipment to WIPP and a percentage of the existing legacy packages should be certifiable using a combination of process knowledge, and historical documentation and NDA/NDE information. *Implements Function(s):* 4 - Validate Waste	October 1, 1998	September 30, 2003
YLW.13	**Repackage Poly Box** *Description:* Poly Boxes will be repackaged into standard waste boxes or 10-drum overpacks to meet transport and acceptance requirements for disposal at WIPP.	October 1, 1999	September 30, 2003

Yellow Initiative - Ship Repackaged Waste (12%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
YLW.21	**Develop/Provide Odd-Sized, Cask, Drums Capability** *Description:* The odd-sized containers and casks do not meet DOT Specification 7A package testing requirements and are not acceptable for shipment in the TRUPACT-II or receipt/storage at the WIPP Site. Drums are either damaged or have questionable integrity. All containers require repackaging or overpacking to correct the failure parameter.	October 1, 1998	September 29, 1999
YLW.22	**Certify Odd-Sized/Cask/Drums Generator** *Description:* A limited percent of the legacy odd-sized containers casks and drums could probably be certified using a combination of process knowledge, historical waste data, and NDA/NDE. The containers would need to be repackaged in a drum or WIPP acceptable overpack (SWP or 10-drum overpack). *Implements Function(s):* 4 - Validate Waste	October 1, 1999	September 30, 2003
YLW.23	**Repackage Odd-Sized/Casks/Drums** *Description:* Repackage the waste currently contained in this inventory into Standard Waste Boxes, 10 drum overpacks or new drums to meet transport and acceptance requirements for disposal at WIPP.	October 2, 2000	September 30, 2003

Green Initiative - Ship Processed Waste (50%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
GRN.0	**Green Initiative: Ship Cert. by Processing** *Description:* A significant volume percentage of TRU waste generated by SRS must be processed to correct the failure parameters of that waste or existing package. This waste will require processing at SRS or at a centralized processing site to correct the failure parameters and produce a certifiable waste package that will be acceptable at the WIPP.		

Green Initiative - Ship Processed Waste (50%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
GRN.40	**Conceptual Design - TWCPB** *Description:* A conceptual design will be necessary to estimate the total funding needs and project requirements to support funding and construction for a facility to process waste. *Implements Function(s):* 3 - Process Waste		April 30, 1997
GRN.41	**Determine Facility Requirements** *Description:* The requirements of a processing facility, must be determined to request project funding, design and eventual construction of the facility. *Implements Function(s):* 3 - Process Waste	October 1, 1996	April 30, 1997
GRN.42	**Project Validation - TWCPB** *Description:* The project to construct a processing facility will require validation before proceeding with conceptual design, funding appropriation and construction. *Implements Function(s):* 3 - Process Waste		April 30, 1997
GRN.50	**Feasibility Study - Alternate Transportation** *Description:* A study needs to determine if an alternate transportation system is justifiable based upon where the waste will be processed and if the processing and disposal facilities could receive and handle waste shipped using alternate systems.	June 2, 1997	December 31, 1997
GRN.51	**In-Depth Option Analysis for Processing** *Description:* Waste identified as requiring red initiative (Processing) will need to be addressed via an in-depth analysis to determine the volume of waste, the extent of processing, when processing must start/end, how the resultant waste stream will be characterized and certified, whether the waste will be processed on-site or at an off-site location.	January 5, 1998	March 31, 1998
GRN.52	**Processing Decision** *Description:* Once the in-depth option analysis is complete a decision must be made to either provide		March 31, 1998

Green Initiative - Ship Processed Waste (50%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
	on-site processing or pursue off-site sources. Schedule the processing to align with the end state dates, and ensure transportation systems are available if off-site processing is selected.		
GRN.53	**Revise Processing Facility Requirements** *Description:* Transportation systems are expected to be designed or revised to permit the movement of TRU waste packages that currently require processing.	April 1, 1998	September 30, 1998
GRN.60	**Congressional Appropriation - TWCPB** *Description:* The cost of a processing facility would require specific appropriation of the funding by Congress. *Implements Function(s):* 3 - Process Waste		October 1, 1998
GRN.61	**Design - TWCPB** *Description:* "Design" identifies the time line necessary to site and plan the erection of a facility to process waste. A conceptual design will be necessary to estimate the total funding needs and project requirements to support funding and construction. The projected cost of a processing facility will require line item approval in the DOE HQ budget submittal. *Implements Function(s):* 3 - Process Waste	October 1, 1998	September 28, 2001
GRN.62	**Construct / Start-Up TWCPB** *Description:* "Construct" is the time line necessary to build a processing facility. *Implements Function(s):* 3 - Process Waste	October 1, 2004	September 30, 2008
GRN.63	**Operate Facility** *Description:* Begin processing waste to correct or eliminate the failure parameters currently preventing shipment and disposal at WIPP. *Implements Function(s):* 3 - Process Waste	October 1, 2008	September 30, 2015

Green Initiative - Ship Processed Waste (50%) Activities

Activity No.	Activity Title / Description	Start Date	End Date
GRN.81	**Certify Waste Process** *Description:* If waste is processed the resulting waste stream would be new and the process would have to be certified in either a new or amended certification plan by the operators of the process. *Implements Function(s):* 4 - Validate Waste	October 1, 1999	September 29, 2006
GRN.82	**Regulatory Permit Devel-Submittal-Review** *Description:* Regulatory of permits for submittal and review.	April 1, 1999	September 30, 2004
GRN.91	**Develop / Provide Alternate Transportation System** *Description:* The development of any alternate or new system would have to be compatible with loading/unloading/handling facilities at: the point of generation/storage; at the processing facility; or at the WIPP Disposal Site. *Implements Function(s):* 3 - Process Waste	April 1, 1998	March 30, 2006
GRN.92	**Obtain Approval for new Transportation Syst.** *Description:* An enhanced transportation system would allow SRS to move more TRU packages to either the WIPP Site or to a centralized processing system to correct existing failure parameters. The Nuclear Regulatory Commission must approve changes to or new transportation systems for the TRU waste packages.	April 1, 1998	March 30, 2006

Select Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
A.0	**Storage (Select)** *Description:* A continued need for TRU waste package storage including the need for additional storage space over the next decade or more needs to be identified. Newly generated TRU mixed waste containers and retrieved waste containers must be		

Select Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
	stored on RCRA permitted pads in compliance to regulations governing hazardous waste storage, container and storage area conditions, and inspections. Certifiable waste containers will require segregation and controls necessary to preserve their certification status.		
A.101	**Baseline Ops - Storage Pads** *Description:* Generators' TRU waste forecasts predict the continued generation of approximately 300 cubic meters of TRU waste annually during the next ten years that will be shipped to Solid Waste Management Department (SWMD) for storage. SWMD will retrieve 8800 drums from soil covered pads, and sort several thousand drums in the 10-100 nanocurie/gram waste grouping. All of this work includes container and storage area inspection/maintenance is described as baseline operations.	October 1, 1996	September 30, 2015
A.101.1	**Provide TRU Storage Pads** *Description:* At least 2 additional storage pads will be required to store transuranic waste packages generated or relocated during out-year operations.	October 1, 1996	September 30, 1997
A.104	**Retrieval Project (Drums)** *Description:* A retrieval project to remove 8800 drums of waste being managed as TRU on soil covered pads which have reached or exceeded the 20-year integrity limit is scheduled to commence in FY97 and continue through FY-01. The drums will be retrieved, inspected and relocated to a storage location that will provide protection from inclement weather.	October 1, 1996	December 31, 1996
A.1041	**Retrieve Drums** *Description:* Phase I retrieval will remove all 8800 drums currently stored on pads mounded with soil.	June 2, 1997	May 31, 2002
A.1042	**Retrieval Project Phase II** *Description:* Retrieval Phase II will include the culverts, casks, black boxes, odd-sized containers currently stored on pads mounded with soil.	October 2, 2006	September 30, 2008

Select Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
A.1043	**Retrieve Phase II** *Description:* Retireve Phase II is not currently scheduled or funded at SRS.	October 1, 2008	September 30, 2010
A.1051	**LLW / MLLW Disposal Plans** *Description:* An In Depth Option Analysis (IDOA) identifying the path forward, certification, and disposition of waste packages reclassified from TRU waste to Low-Level Mixed Waste must be performed to document the requirements and impacts on the SWMD. The analysis would include: characterization, certification, treatment, repackaging or overpackaging, ownership, impact on Container Management Plan, STP, vault disposal plan, and SWMP, Permit requirements.	October 1, 1996	August 29, 1997
A.1052	**Decision: Path Forward - Treatment & Disposition 10-100 Waste** *Description:* Final decision based on In Depth Option Analysis (IDOA) for the treatment and disposition of 10-100 waste (see A.1051).		August 29, 1997
A.1062	**Segregate: 10-100 LLW** *Description:* Non-destructive assay measurements can currently determine a 10-100 nanocurie/gram concentrations in 55-gallon drums containing Pu239 contamination which allows reclassifying these containers as low-level waste. Enhanced assay equipment to measure 10-100 nCi/gm concentrations in drums containing Pu238 is expected to be available in the next fiscal year. This reclassification will permit segregating LLW drums from TRU drums but will not permit disposal.	October 1, 1996	September 28, 2007
A.1063	**Dispose of 10-100 LLW** *Description:* (Refer to A-1062) A certification plan will need to be amended to include disposal of reclassified waste in the EAV. The waste may need additional characterization to obtain disposal approval in the SRS vaults.	October 1, 1997	September 28, 2007
A.1064	**Segregate: 10-100 MLLW** *Description:* Mixed waste has listed waste (Land Disposal Restriction) and must be treated within	October 1, 1996	September 28, 2007

Select Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
	one year after being reclassified as LLW/MW. The waste must be stored in accordance with the RCRA permit requirements/regulations.		
A.1066	**Dispose of 10-100 MLLW** *Description:* The disposal of MLLW is regulated by Federal and State agencies. There aren't any current treatment/disposal facilities available for these waste containers.	June 3, 2002	September 28, 2007

Characterize Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
C.1	**Operate ETWAF** *Description:* The existing Waste Assay Facility at SRS is used to perform non-destructive analysis, non-destructive examination of TRU waste drums. Either this existing facility, a future facility, portable or mobile equipment, or a combination of these options must be operable to support characterization and eventual certification of TRU waste packages/containers.	October 1, 1996	September 29, 2000
C.2	**Determine ETWAF Replacement** *Description:* The existing Waste Assay Facility is currently located on a CERCLA site scheduled for capping and closure in the near future. The existing size, equipment, and location of this facility would not satisfy future characterization, certification, and transport loading needs.	October 1, 1996	September 30, 1998
C.3	**ETWAF Replacement Decision** *Description:* A decision to provide a replacement facility or alternate location to provide characterization, certification and transportation support must be made to support continued "blue" and "yellow" initiatives.		September 30, 1998
C.4	**Provide ETWAF Replacement** *Description:* If a new location or new facility is proposed the Site will have to be prepared to	October 1, 1998	September 29, 2000

Characterize Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
	support continued characterization, certification and transportation of TRU Waste packages.		
C.5	**Operate ETWAF Replacement** *Description:* Training, funding, and staffing a Waste Assay Facility to continue characterization, certification, and transportation of TRU waste packages.	October 2, 2000	September 30, 2015
C.6	**Update / Develop Characterization Capability** *Description:* Enhanced assay capabilities for measuring the quantity of Pu238 and higher gram quantities on all TRU isotopes, imaging of containers other than 55-gallon drums and gas sampling capabilities of waste containers.	October 1, 1996	September 30, 2002
C.7	**Demonstrate Characterization Capability** *Description:* As newer and improved systems are developed there is a need to demonstrate these systems to ensure their capability meets the characterization needs at SRS before selecting a specific piece of equipment or system.	October 1, 1996	September 30, 2002
C.8	**Provide Characterization Capability** *Description:* Once a piece of equipment or system has demonstrated the ability to improve our characterization needs the justification and funding to provide such equipment is necessary.	October 1, 1998	September 30, 2005

Process Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
GRN.40	**Conceptual Design - TWCPB** *Description:* A conceptual design will be necessary to estimate the total funding needs and project requirements to support funding and construction for a facility to process waste. *Implements Function(s):* I.3 - Green Initiative - Ship Processed Waste (50%)		April 30, 1997

Process Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
GRN.41	**Determine Facility Requirements** *Description:* The requirements of a processing facility, must be determined to request project funding, design and eventual construction of the facility. *Implements Function(s):* I.3 - Green Initiative - Ship Processed Waste (50%)	October 1, 1996	April 30, 1997
GRN.42	**Project Validation - TWCPB** *Description:* The project to construct a processing facility will require validation before proceeding with conceptual design, funding appropriation and construction. *Implements Function(s):* I.3 - Green Initiative - Ship Processed Waste (50%)		April 30, 1997
GRN.60	**Congressional Appropriation - TWCPB** *Description:* The cost of a processing facility would require specific appropriation of the funding by Congress. *Implements Function(s):* I.3 - Green Initiative - Ship Processed Waste (50%)		October 1, 1998
GRN.61	**Design - TWCPB** *Description:* "Design" identifies the time line necessary to site and plan the erection of a facility to process waste. A conceptual design will be necessary to estimate the total funding needs and project requirements to support funding and construction. The projected cost of a processing facility will require line item approval in the DOE HQ budget submittal. *Implements Function(s):* I.3 - Green Initiative - Ship Processed Waste (50%)	October 1, 1998	September 28, 2001
GRN.62	**Construct / Start-Up TWCPB** *Description:* "Construct" is the time line necessary to build a processing facility. *Implements Function(s):*	October 1, 2004	September 30, 2008

Process Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
	I.3 - Green Initiative - Ship Processed Waste (50%)		
GRN.63	**Operate Facility** *Description:* Begin processing waste to correct or eliminate the failure parameters currently preventing shipment and disposal at WIPP. *Implements Function(s):* I.3 - Green Initiative - Ship Processed Waste (50%)	October 1, 2008	September 30, 2015
GRN.91	**Develop/Provide Alternate Transportation System** *Description:* The development of any alternate or new system would have to be compatible with loading/unloading/handling facilities at: the point of generation/storage; at the processing facility; or at the WIPP Disposal Site. *Implements Function(s):* I.3 - Green Initiative - Ship Processed Waste (50%)	April 1, 1998	March 30, 2006

Validate Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
BLU.11	**Certify FB Line, Newly Generated Waste** *Description:* The generator must submit a Waste Certification Plan and obtain certification approval from the WIPP WACCC. (see BLU.2) The first waste generator at SRS has been identified as the F Area facility. *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)	November 1, 1996	November 23, 1998
BLU.12	**Certify FB Line, Legacy** *Description:* After the generator receives WIPP WACCC approval of their certification plan, the SWMD shall submit or amend the certification plan to include legacy waste from the original generator using historical waste data, process knowledge, and characterization measurements to validate waste	November 24, 1997	November 23, 1998

Validate Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
	content and packaging information. There appears to be enough information available to develop a certification plan that would include waste generated during the previous 5 to 10 years. *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)		
BLU.21	**Certify F Canyon, Newly Generated Waste** *Description:* The second generator will be one of the four remaining SRS TRU waste generators. (See BLU.11 for more detail) *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)	November 24, 1998	November 22, 2000
BLU.22	**Certify F Canyon, Legacy** *Description:* See BLU.21 and BLU.12 for more information. *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)	November 23, 1999	November 22, 2000
BLU.31	**Certify HB Line, Newly Generated Waste** *Description:* See BLU.21 for information on 3rd generator and BLU.11 for detail. *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)	October 1, 1999	October 1, 2001
BLU.32	**Certify HB LIne, Legacy** *Description:* See BLU.21 and BLU.12 for more detail. *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)	October 3, 2000	October 1, 2001

Validate Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
BLU.41	**Certify H Canyon, Newly Generated Waste** *Description:* See BLU.21 and BLU.12 for more detail. *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)	October 2, 2000	September 27, 2002
BLU.42	**Certify H Canyon, Legacy** *Description:* See BLU.21 and BLU.12 for more detail. *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)	October 1, 2001	September 27, 2002
BLU.51	**Certify SRTC, Newly Generated Waste** *Description:* See BLUN.21 and BLU.12 for more detail. *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)	October 1, 2001	September 30, 2003
BLU.52	**Certify SRTC, Legacy** *Description:* See BLU.21 and BLU.12 for more detail. *Implements Function(s):* I.1 - Blue Initiative - Begin Shipment of Certifiable Waste (10%)	October 1, 2002	September 29, 2003
GRN.81	**Certify Waste Process** *Description:* If waste is processed the resulting waste stream would be new and the process would have to be certified in either a new or amended certification plan by the operators of the process. *Implements Function(s):* I.3 - Green Initiative - Ship Processed Waste (50%)	October 1, 1999	September 29, 2006
YLW.12	**Certify Poly Box Generator** *Description:* Once the existing waste generators have an approved certification plan newly generated waste packages will be certifiable for shipment to WIPP and a percentage of the existing legacy	October 1, 1998	September 30, 2003

Validate Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
	packages should be certifiable using a combination of process knowledge, and historical documentation and NDA/NDE information. *Implements Function(s):* I.2 - Yellow Initiative - Ship Repackaged Waste (12%)		
YLW.22	**Certify Odd-Sized/Cask/Drums Generator** *Description:* A limited percent of the legacy odd-sized containers casks and drums could probably be certified using a combination of process knowledge, historical waste data, and NDA/NDE. The containers would need to be repackaged in a drum or WIPP acceptable overpack (SWP or 10-drum overpack). *Implements Function(s):* I.2 - Yellow Initiative - Ship Repackaged Waste (12%)	October 1, 1999	September 30, 2003

Transport Waste Activities

Activity No.	Activity Title / Description	Start Date	End Date
F.1	**TRUPACT-II Envelope Expansion** *Description:* If the current TRUPACT-II limitations which prohibit a significant volume of SRS waste could be relaxed, changed, or exempted, a higher percentage of waste packages could be transported using TRUPACT-II. If the TRUPACT-II envelope can't be expanded an alternate transport system will be required to support SRS reaching an end state condition.	October 1, 1996	September 29, 2005

Perform Program Management Activities

Activity No.	Activity Title / Description	Start Date	End Date
G.0	**Program Management** *Description:* A TRU Program Management Group must be established to ensure that identified tasks, requirements, and milestones are being scheduled,		

Perform Program Management Activities

Activity No.	Activity Title / Description	Start Date	End Date
	funded, and maintained. Also, this group needs to interface with Carlsbad Area Office (CAO) and other programs in the complex to maintain the program.		
G.2	**Generate SRS Policy for Newly Generated Waste** *Description:* SRS must support a policy to ensure that newly generated waste is packaged as certifiable TRU waste. Generators must develop a certification plan and begin producing certifiable waste packages as soon as possible to reduce the volume of legacy waste especially those packages that fail go to the red initiative processing which is expensive.	October 1, 1996	September 30, 1997
G.2.1	**Develop / Implement SRS Policy/Procedures** *Description:* The Ship-To-WIPP 1995 Plan identified the need to develop, upgrade, and implement SRS Policy/ Procedures required to support the characterization and certification of TRU Waste packages targeted for shipment from SRS to WIPP.	October 1, 1996	September 30, 1998
G.4	**Develop Data Management System** *Description:* Search generators records for data that will provide process knowledge and reduce the amount or degree of characterization/analysis/ testing.	October 1, 1996	September 30, 1997
G.5	**Develop COBRA Replacement** *Description:* The existing waste database (COBRA) at SRS includes all wastes that have been generated, stored, and disposed of at the Site. The need to develop a specific TRU Waste data system to support the certification and eventual shipment of waste to WIPP has been identified.	October 1, 1996	September 30, 1997
G.106	**Maintain Program Support & B/L Documentation** *Description:* Once legacy waste data and process knowledge information is obtained, that information baseline waste package documentation and any characterization performed would be placed in a records management system dedicated to support the TRU Waste and Waste Certification Program.	October 1, 1996	September 30, 2015

Perform Program Management Activities

Activity No.	Activity Title / Description	Start Date	End Date
G.1051	**Retrieve Legacy Waste Data from Generators** *Description:* The SWMD will have to search the generating facilities historical waste data to enhance the process knowledge and waste packaging information available in the archives. Capturing this information would reduce the amount of sampling and analysis required to characterize legacy waste packages.	October 1, 1996	September 30, 2003

6.0 CONCLUSION

This Strategic Plan identifies a path forward and provides incremental solutions that reduce the SRS TRU waste inventory by removing newly generated TRU and a portion of the legacy waste being stored at SRS and transporting this waste to WIPP. Additionally, the Plan identifies activities to be implemented concurrent with inventory reduction which fill the critical program gaps such as transportation and processing that are essential to reach the End State Goal. The Plan's aim is to maximize "Doing what we can, with what we have, from where we are".

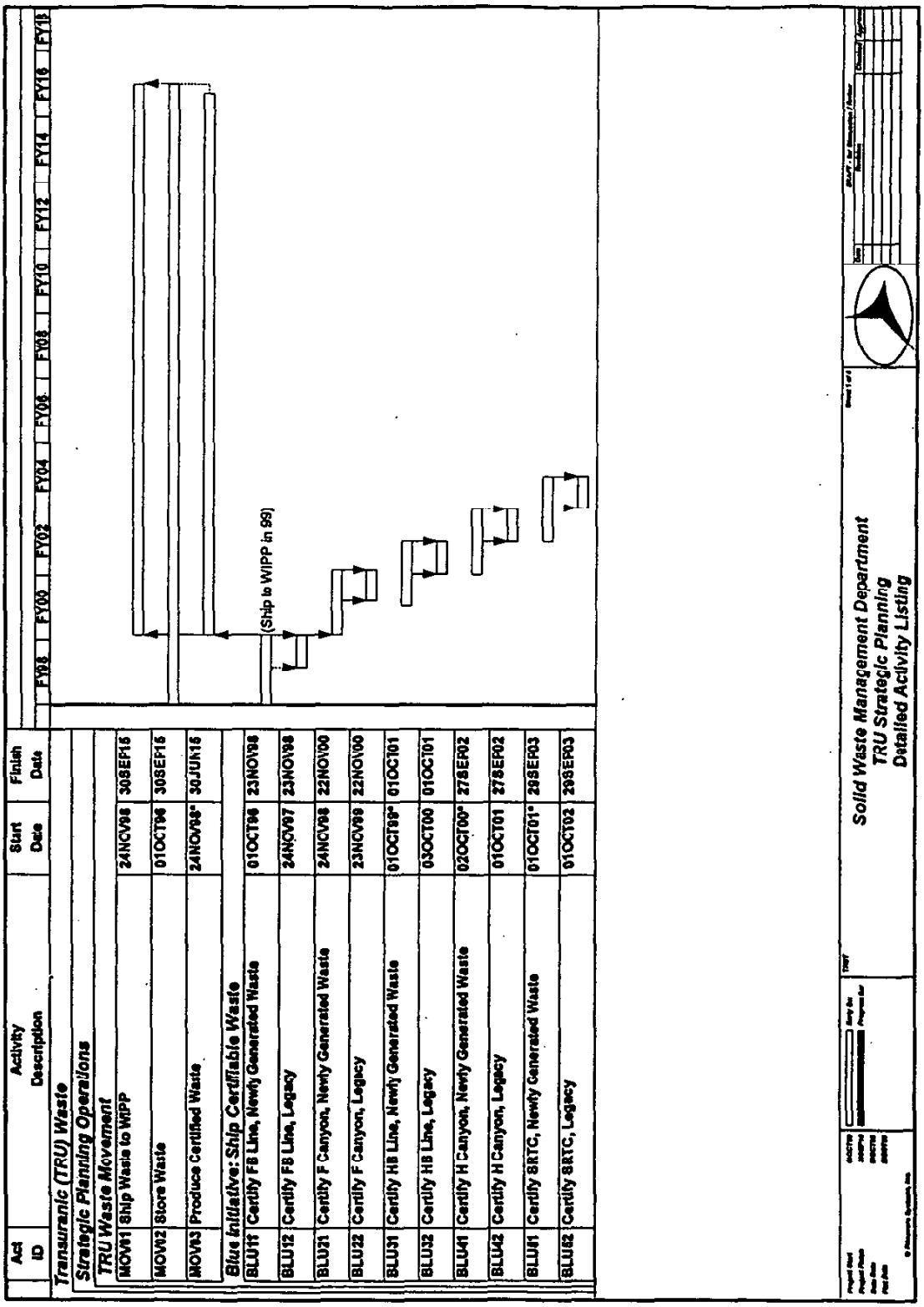
Using this plan as roadmap, detailed tactical schedules need to be developed. The following additional steps are required:

- prioritize major action items.
- develop the details necessary for integrated resource loaded tactical schedules.
- identify responsible persons.
- develop cost estimates that align the necessary activities with projected funding levels over the next several years.

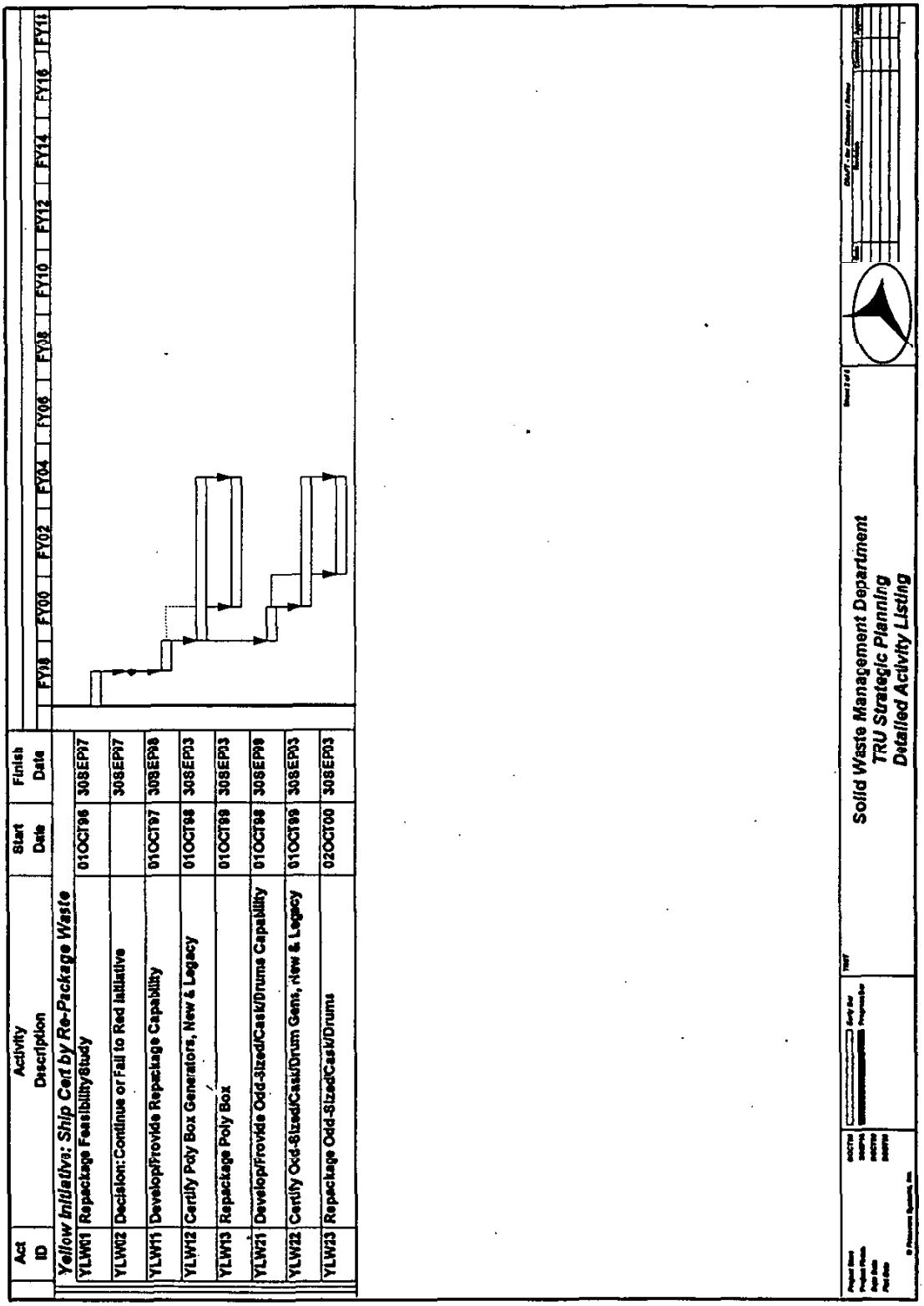
These additional steps are required for the optimization of the implementation schedule proposed in this Plan. Critical to this effort is the inclusion of all involved SRS organizations (i.e., generators, budget, certification, TRU operations, etc.) having a role in the implementation effort. Additionally, the Strategic Plan must interface site activities with National Environmental Management Integration Team efforts to ensure consistency and to use the collective expertise to resolve National TRU Program issues which benefit all sites.

The key to success for the SRS and National TRU Programs with currently projected funding is the utilization of existing DOE Complex capability to satisfy common site processing needs rather than constructing duplicate processing facilities at each site. This utilization can only be possible with the resolution of the transportation limitations currently restricting inter-site shipments. The cost savings ($572M for SRS alone) resulting from this integration could greatly improve the probability of program success and could provide greater risk reduction in a shorter timeframe. This risk reduction would not only result from decreased storage but also the reduced processing requirements affected by higher transportation limits. Without the transportation issue resolution, the probability of success for the TRU Program is significantly decreased or prolonged due to limited funding.

APPENDIX A: Activity Listing and Schedule



APPENDIX A: Activity Listing and Schedule (continued)

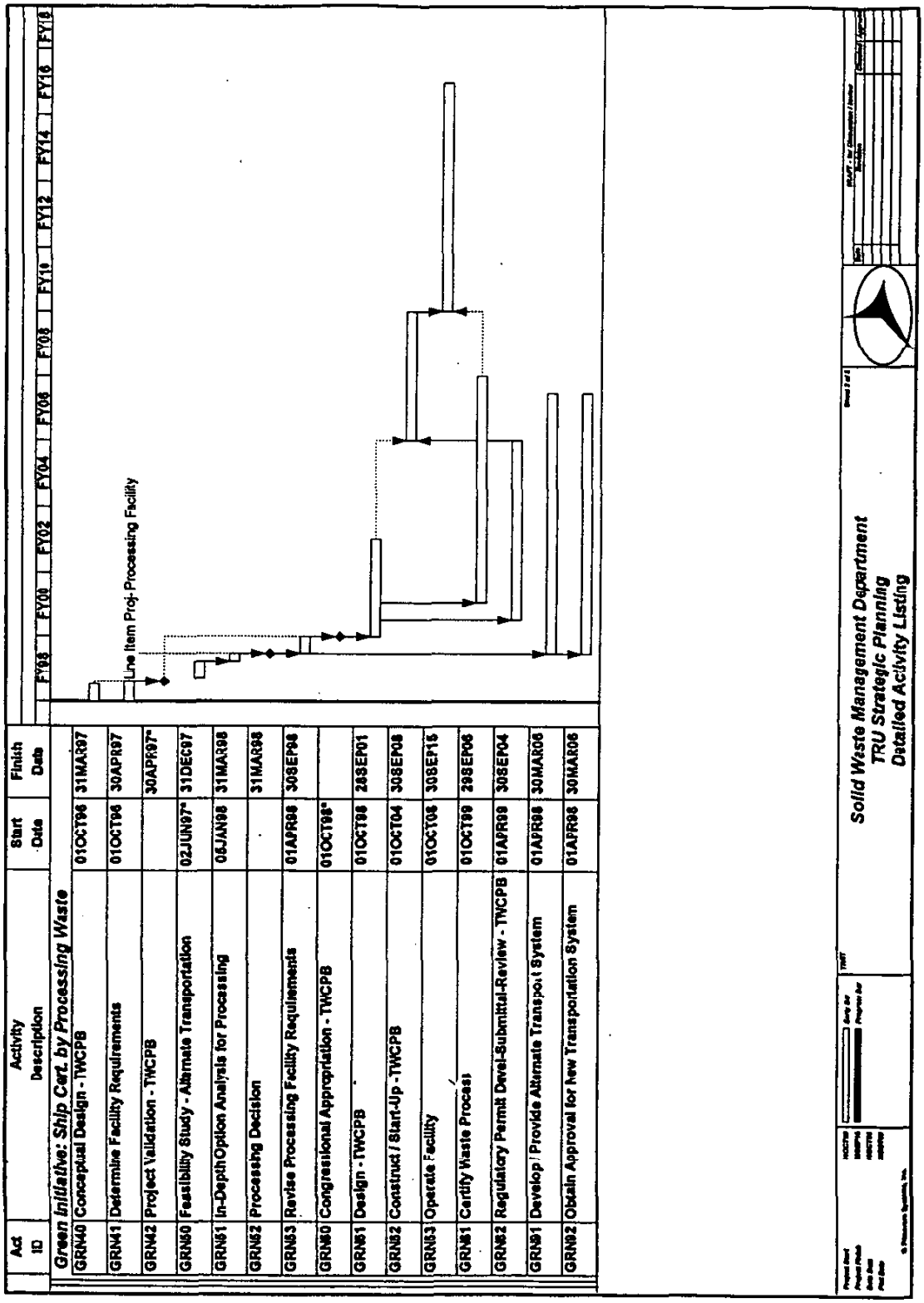


Act ID	Activity Description	Start Date	Finish Date
Yellow Initiative: Ship Cert by Re-Package Waste			
YLW01	Repackage Feasibility Study	01OCT96	30SEP97
YLW02	Decision: Continue or Fail to Red Initiative		30SEP97
YLW11	Develop/Provide Repackage Capability	01OCT97	30SEP98
YLW12	Certify Poly Box Generators, New & Legacy	01OCT98	30SEP03
YLW13	Repackage Poly Box	01OCT99	30SEP03
YLW21	Develop/Provide Odd-Sized/Cask/Drums Capability	01OCT98	30SEP99
YLW22	Certify Odd-Sized/Cask/Drum Gens, New & Legacy	01OCT99	30SEP03
YLW23	Repackage Odd-Sized/Cask/Drums	02OCT00	30SEP03

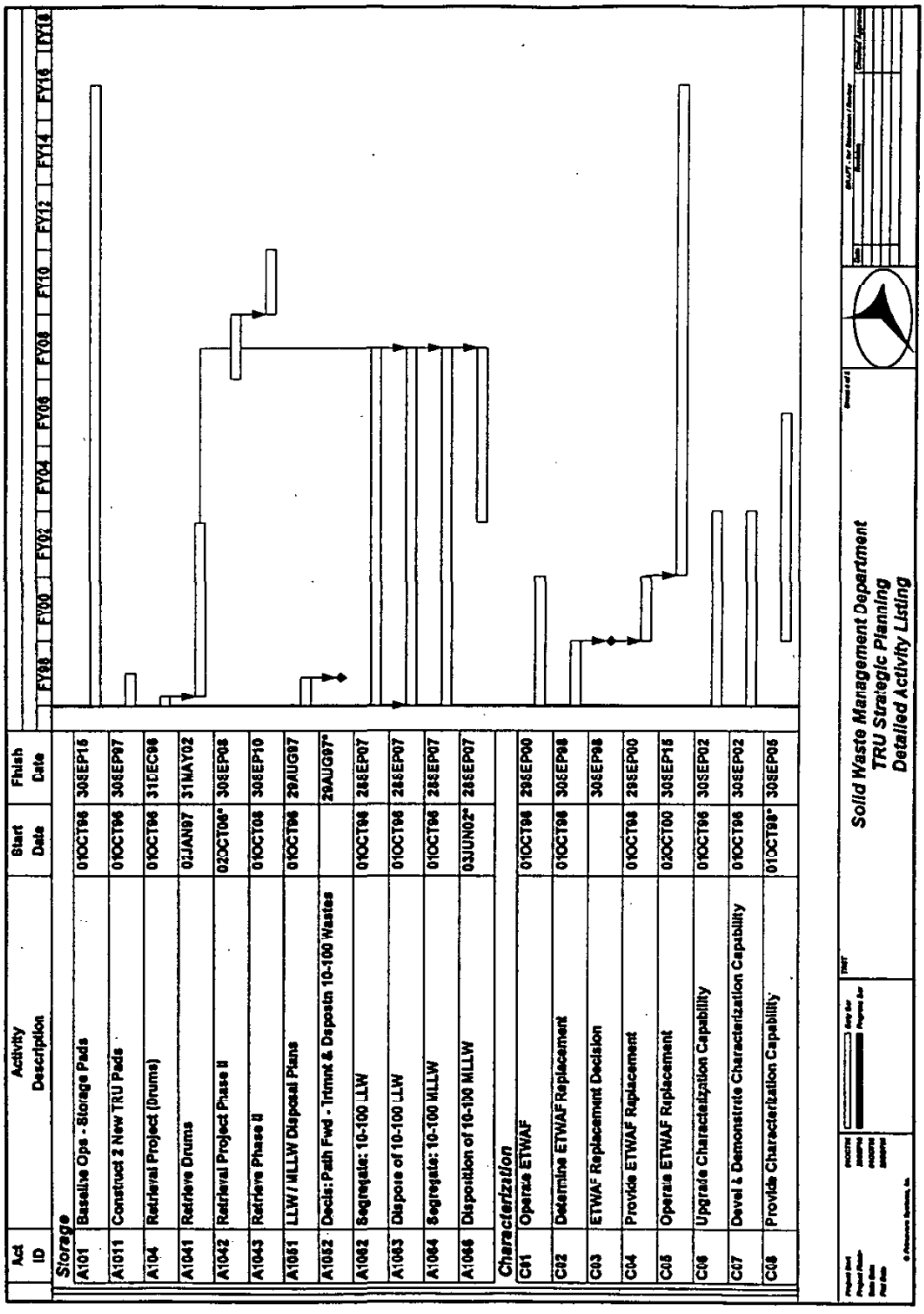
FY98 FY00 FY02 FY04 FY06 FY08 FY10 FY12 FY14 FY16 FY18

Solid Waste Management Department
TRU Strategic Planning
Detailed Activity Listing

APPENDIX A: Activity Listing and Schedule (continued)

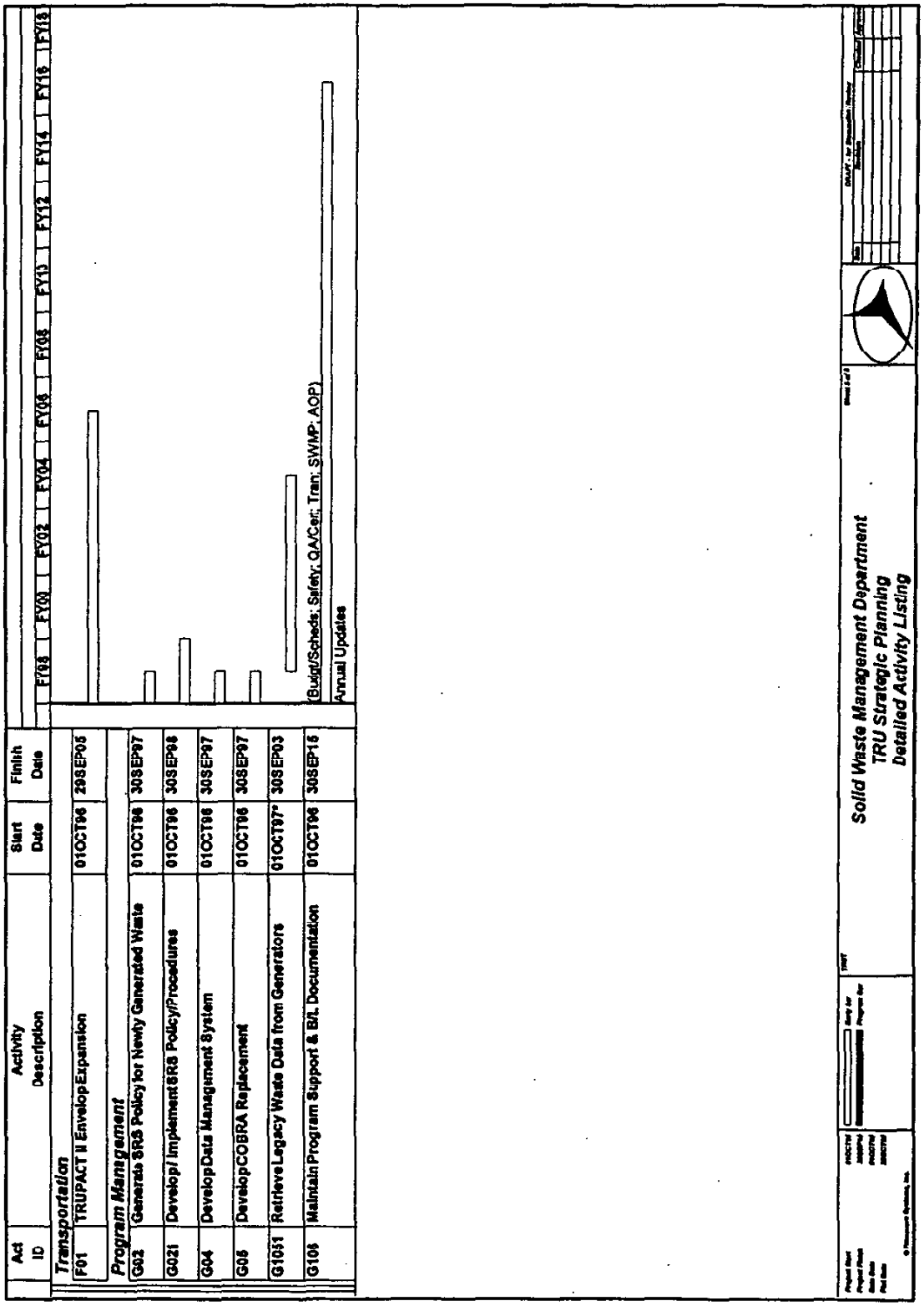


APPENDIX A: Activity Listing and Schedule (continued)

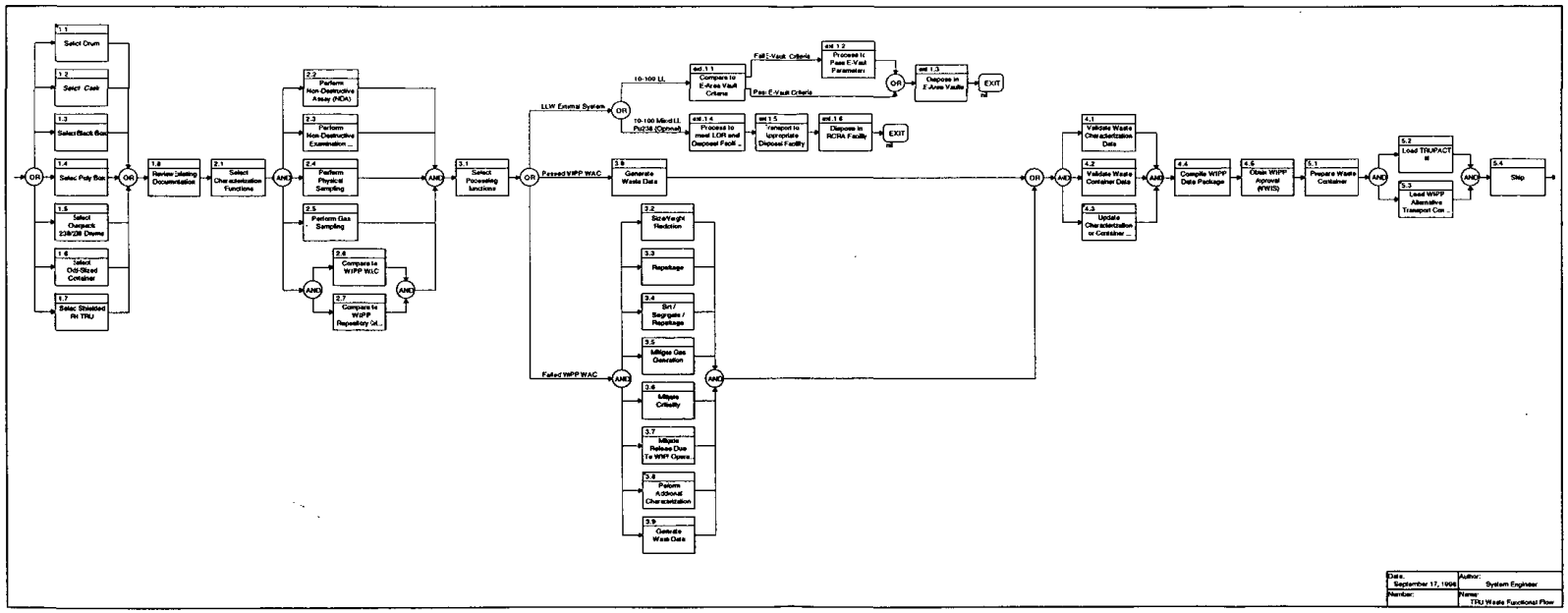


Act ID	Activity Description	Start Date	Finish Date
Storage			
A101	Baseline Ops - Storage Pads	01OCT96	30SEP15
A1011	Construct 2 New TRU Pads	01OCT96	30SEP97
A104	Retrieval Project (Drums)	01OCT96	31DEC98
A1041	Retrieve Drums	02JAN97	31MAY02
A1042	Retrieval Project Phase II	02OCT06*	30SEP08
A1043	Retrieve Phase II	01OCT08	30SEP10
A1051	LLW / MLLW Disposal Plans	01OCT96	29AUG97
A1052	Decis: Path Fwd - Trtmnt & Dispstn 10-100 Wastes		29AUG97*
A1062	Segregate: 10-100 LLW	01OCT96	28SEP07
A1063	Dispse of 10-100 LLW	01OCT96	28SEP07
A1064	Segregate: 10-100 MLLW	01OCT96	28SEP07
A1065	Disposition of 10-100 MLLW	03JUN02*	28SEP07
Characterization			
C01	Operate ETWAF	01OCT96	29SEP00
C02	Determine ETWAF Replacement	01OCT96	30SEP96
C03	ETWAF Replacement Decision		30SEP96
C04	Provide ETWAF Replacement	01OCT96	29SEP00
C05	Operate ETWAF Replacement	02OCT00	30SEP15
C06	Upgrade Characterization Capability	01OCT96	30SEP02
C07	Devel & Demonstrate Characterization Capability	01OCT96	30SEP02
C08	Provide Characterization Capability	01OCT96*	30SEP05

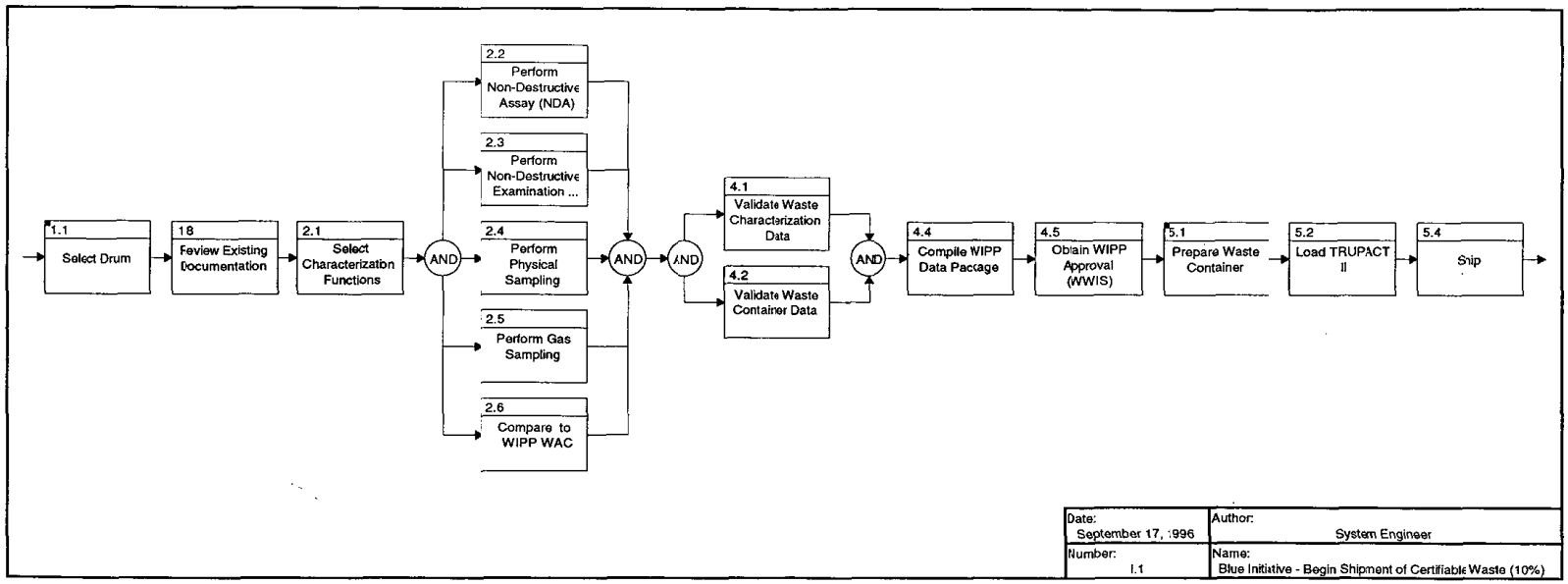
APPENDIX A: Activity Listing and Schedule (continued)



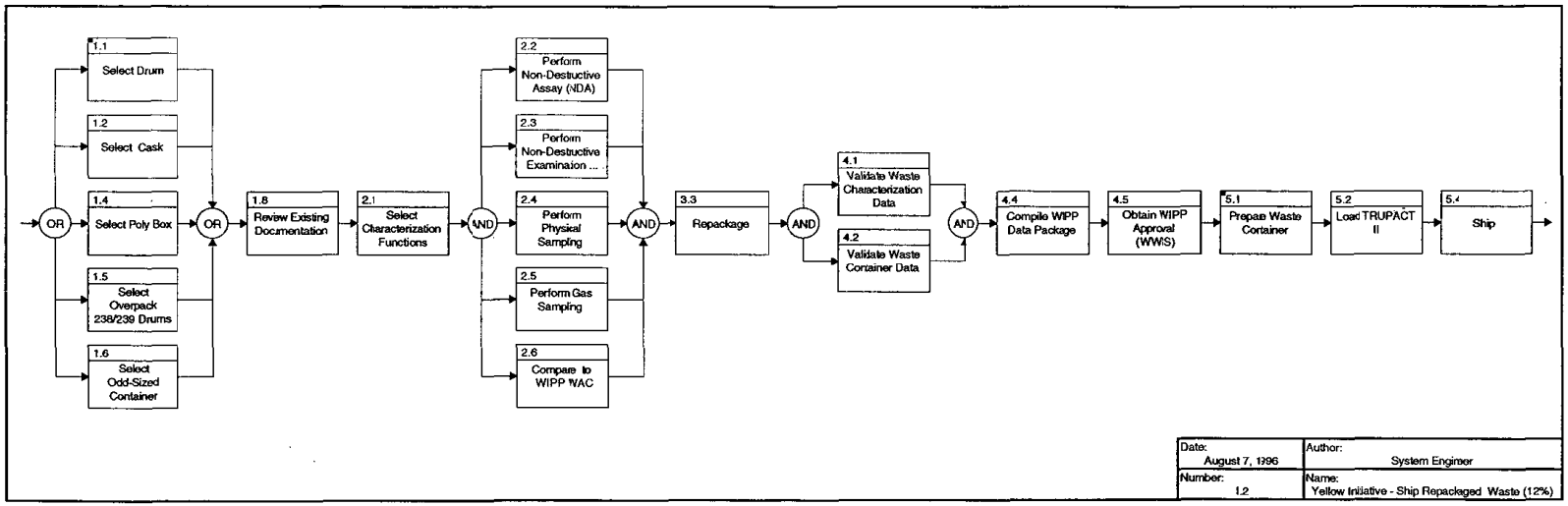
APPENDIX B: Functional Flow Block Diagrams



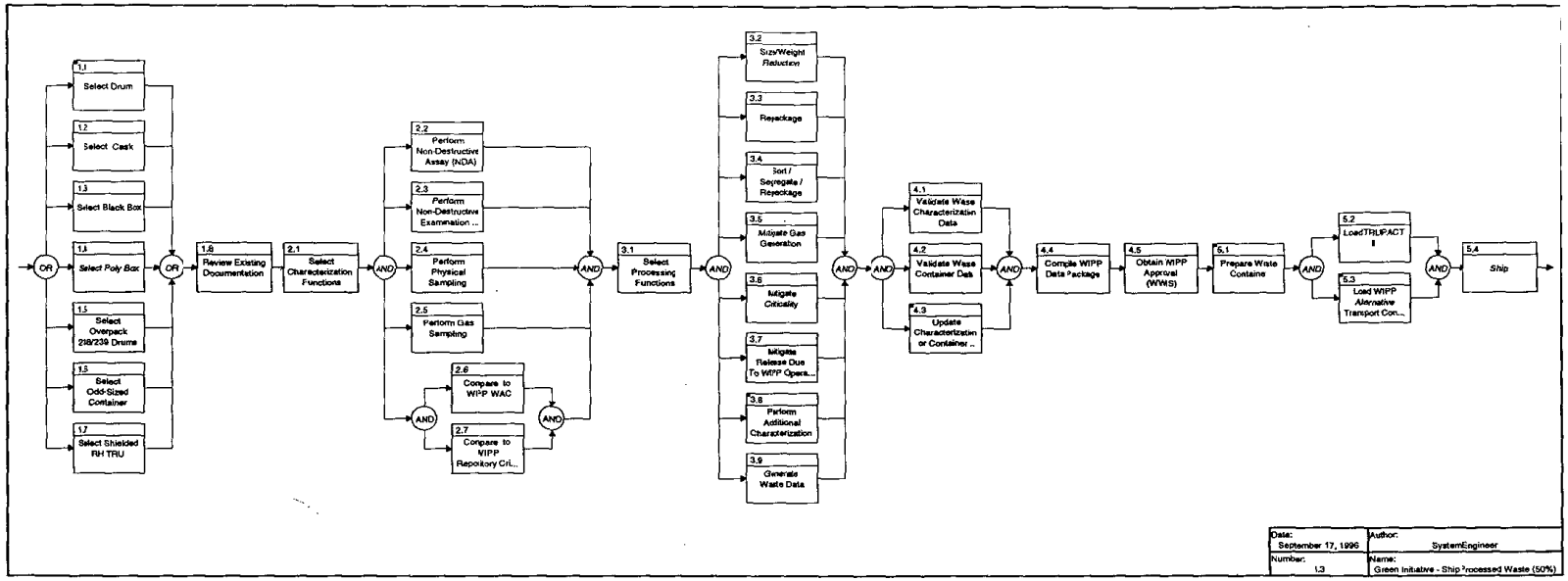
APPENDIX B: Functional Flow Block Diagrams (continued)



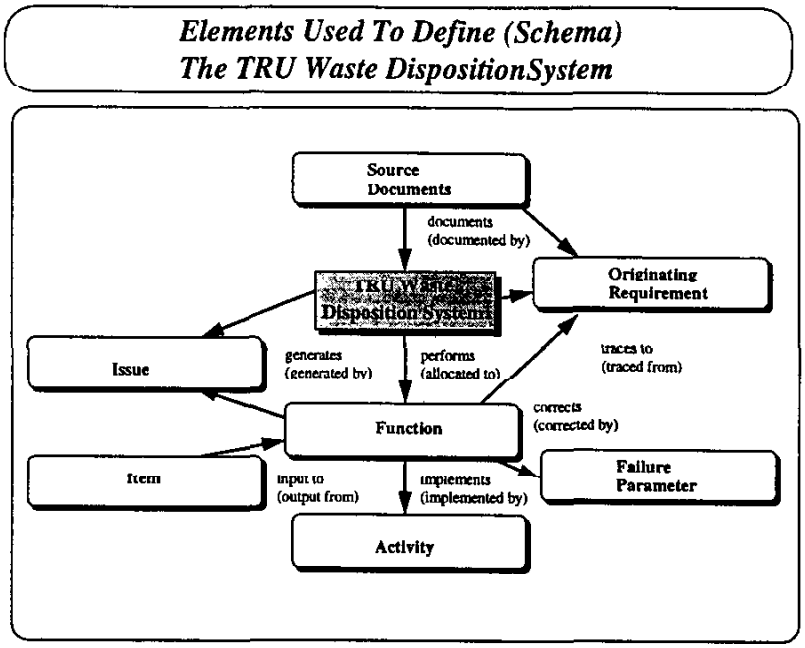
APPENDIX B: Functional Flow Block Diagrams (continued)



APPENDIX B: Functional Flow Block Diagrams (continued)



APPENDIX C: Database Schema Description



The elements of the Core® software utilized in the TRU Waste Disposition supporting documentation are illustrated in the figure, Elements Used to Define (Schema) The TRU Waste Disposition System. Each box notates the elements utilized and the verbs notated between the elements define the relationships between the elements. The following explains the elements and their relationships:

TRU Waste Disposition ***System***: the complex method to disposition TRU Waste
- ***Performs*** Functions
- ***Generates*** Issues
- ***Documented By*** Source Documents
- ***Traced From*** Originating Requirements

Function: the service performed to accomplish a process
- ***Corrects*** Failure Parameter
- ***Implemented By*** Activities
- Item ***Input To /Output From***
- ***Generates*** Issues
- ***Allocated To*** TRU Waste Disposition System
- ***Documented By*** Source Document
- ***Traces To*** Originating Requirement

Issue: a topic which requires resolution
- ***Generated By*** Function, TRU Waste Disposition System

Item: The component of the TRU waste system that requires processing
- ***Input To*** and ***Output From*** Function

Activity: The required movement to accomplish a function
Implements Function

Failure Parameter: the bounding of what is acceptable/unacceptable criteria
Corrected By Function

Originating Requirement: is the driver or need to accomplish the process.
Documented By Source Document
Traces To Function, TRU Waste Disposition System

Source Documents: Origin of reference
Documents TRU Waste Disposition System, Function, Originating Requirements

APPENDIX D: Maintenance

Figure D-1, TRU Maintenance Model Functional Flow illustrates the steps to follow in order to bring up CORE® and the succeeding steps to load and access the TRU Waste Disposition model. These steps will enable the user to load and then access the database in order to view or update the existing model. The final step will walk the user through generating the TRU Strategic Plan Script which provides the supporting documentation for the TRU Strategic Plan.

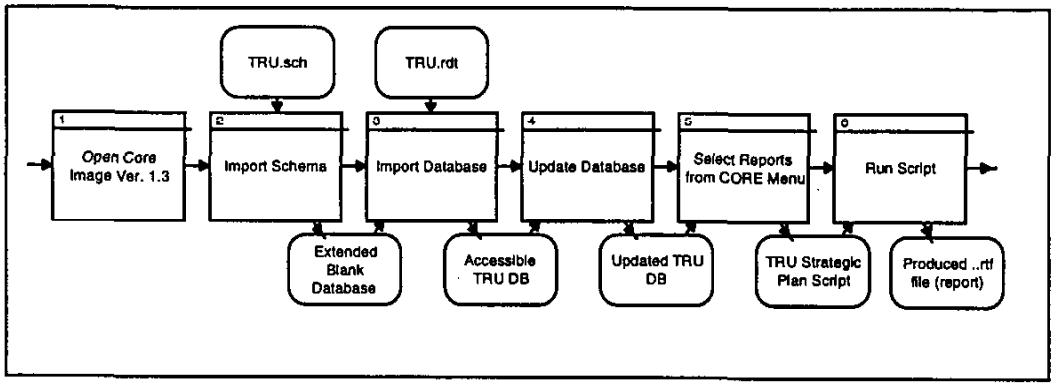


Figure D-1, TRU MAINTENANCE MODEL FUNCTIONAL FLOW

Before this maintenance model is followed it must be understood that the TRU Disposition Program model (TRU image) will only run in Core Version 1.3, and that the proper report directory is established in the Core13 directory.

- This directory is Core13\Reports\TRU. The files from the floppy disk labeled "TRU" will be copied to this directory. This "TRU" floppy disk consists of the report scripts.
- First, the TRU sub-directory needs to be created. After entering File Manager highlight the Core13\Reports sub-directory on C Drive. Then select 'Create Directory' from the File menu in File Manager. The current Directory of Core13\Reports will be displayed enter Name of TRU and click OK, the sub-directory will be created.
- Copy the files from the A Drive disk labeled "TRU" by using the File Manager. First 'select files' on Drive A by selecting this command from the File menu, with the cursor on the files, the files will then be highlighted, then select from the File menu, Copy. This command will bring up the window containing the files you want to copy from, and then prompts you to enter the path to copy to c:\CORE13\Reports\TRU\. Make sure you have copied all the files into the TRU sub-directory from the A Drive.

The step by step process to import and access the TRU image will be defined by following the maintenance functional flow:

1. Open Core Image Version 1.3 - Once the Core Version 1.3 software has been loaded on the C Drive, the blank Core image is then accessed.

- This may be done one of two ways, either by double-clicking on the Core Image Icon from the Core 1.3 Program Group in the Program Manager, or by accessing File Manager in the Main Program Group, clicking on Drive C, and highlighting and clicking on the Core13 directory to illustrate the files within the directory. Find the Coreimag.cor file, highlight and double click to access.

- Once the Core image has been accessed, select the CORE menu Utilities, Preferences to bring up a window for configuring the presentations of diagrams within the image your working in. Toggle off the 'Maintain Log File' selection (the selection box will then be empty), click OK to exit.
- You may want to name your image now by doing a 'save image as', save as TRU.cor. This will be saved into the Core13 directory and will then be the file you will double-click for access of the TRU image.

2. Import Schema - The TRU Disposition Program model required some custom extension to the CORE® database. The custom elements added and their relationships constitute the extended schema. Those custom elements are, activities (implement, implemented by relationships) and failure parameters (corrected by, corrects relationships). Before the database can be imported the schema extension to the database must take place.

- Once the TRU image (blank) is accessed, the Schema Management selection from the CORE menu will be selected. This menu presents a sub-menu, Shift to Schema Mode, is the selection.
- The Schema Palette results. Select CORE menu, Schema Management, Import Schema. This allows you to import the schema extension file, TRU.sch from the A Drive into the CORE image.
- The Import Schema Definition screen results. Select Drive A, then highlight TRU.sch and click OK. This will load the schema extender file.
- To return to Database Mode select CORE menu, Schema Management, Shift to Database Mode.
- Save your extended image (i.e., database) by doing a 'save image'.
- The database has now been extended and is ready for importing the database.

3. Import Database - This enables you to load the data file called TRU.rdt into the empty extended image (i.e., database).

- From the CORE Palette access the CORE menu, select Database Management, Import Database.
- The Import Database screen will result. Select from the A Drive, TRU.rdt, double-click OK and the data file is imported into the image. If a conflict report generates, print the conflict file and see if any database elements have been eliminated.
- Once the data file has been successfully imported, save the image, File menu, Save Image.

4. Update Database - Now that the database has been imported, you may make changes to the database elements and/or extend the database to accommodate further extended needs. Each time updates are made to the original baseline database name do a Save Image As, to name the file differently for configuration management purposes. You may choose to save the file as revisions, i.e., TRUrev1.cor, or have the filename be date related, i.e., TRU909.cor. Also each time the database has had revisions made and a report generated you may want to export the database and the schema in order to recreate the report or database file later.

5. Select Reports from Core Menu - Once the "TRU" sub-directory has been created and the files have been copied from the TRU disk, the supporting report for the TRU Strategic Plan may be generated. This report is called the "TRU Strategic Plan Script". Select Reports from the CORE menu and Run Script.

6. Run Script - The Run Script selection presents a pull-down menu from which to select "TRU Strategic Plan Script".

- Prior to running the report, select the CORE menu Utilities, Preferences, Display Options, FFBD to bring up a window for configuring the presentation of FFBD diagrams in the report. Toggle off the 'Show Reference Nodes' option, toggle on the 'Show Frame' option, then click OK to exit.

- Once the report script is selected, the report requests "Select, or Name, Report Output File". Name the output file to be generated by entering <filename>.rtf. The directory for saving the file to defaults to \Core13.
- You are then asked to configure the "Report Settings", this refers to the report preparer name and address that goes on the cover page.
- The next screen requests "Select Primary System/Component of Strategic Plan". Select the *system*, TRU Waste Disposition Program, ADD to list and press the DONE button to complete the selection.
- The final step to compile the report is to "Select TRU Sections" to either ADD each section or ADD All to select the entire report. Then select DONE and the report will compile to the named .rtf file. The following sections can be selected.

  1.0 Source/Reference Documents

  2.0 Originating Requirements

  3.0 Failure Parameters

  4.0 System External Interfaces

  5.0 System Functions

  6.0 Failure Parameter / Corrective Function Traceability Matrix

  7.0 Item Dictionary

  8.0 Issues

  9.0 Action Plan Activities

  10.0 System Threads (i.e., Disposition Initiatives)

- View the report by opening the "rtf" file from Microsoft Word. Create or re-create the table-of-contents by highlighting the following text (first page after the report cover page).

  --Body of Table of Contents--

  and pressing the F9 key.

MDL	Minimum Detectable Limit
MLLW	Mixed Low Level Waste
n Ci/g	nanocuries per gram
NDA	Non-Destructive Assay
NDE	Non-Destructive Examination
NIST	National Institute of Standards
PECi	Plutonium Equivalent Curies
PRQL	Program Required Quantitation Limit
Pu	Plutonium
QA	Quality Assurance
QAP jp	Quality Assurance Program
QAPD	Quality Assurance Requirements and Description
QAPP	Quality Assurance Program Plan
QARD	Quality Assurance Requirements and Description
QC	Quality Control
RA	Radio Assay
RCRA	Resource Conservation Recovery Act
RH	Remote Handled
SCDHEC	South Carolina Department of Health and Environmental Control
SE	Systems Engineering
SNL	Sandia National Laboratories
SOP	Standard Operating Procedure
SRS	Savannah River Site
SRTC	Savannah River Technology Center