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18. Victor O. Ocampo 11/30/94
VP Ocampo
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20. DE Ball 11/30/94
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7. Abstract

This document provides additional and supplemental information to WHC-SD-W112-FDC-001, Project W-112. It provides additional requirements for the design and summarizes Westinghouse Hanford Company key design guidance and establishes the technical baseline agreements to be used for definitive design of the Project W-112 facilities.

APPROVED FOR PUBLIC RELEASE 12-16-94

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SUPPLEMENTAL DESIGN REQUIREMENTS DOCUMENT
ENHANCED RADIOACTIVE AND MIXED WASTE
STORAGE PHASE V PROJECT W-112

Issued By:

Westinghouse Hanford Company
November 1994

for the
United States Department of Energy, Richland Operations Office
Richland, Washington

Prepared by: V. P. Ocampo, Principal Engineer — 11/30/94 Date

Contractor Approval:

D. E. Ball, Manager — 11/30/94 Date
WRAP Mechanical Engineering

D. J. Hart, Manager — 12/5/94 Date
West Facility Safety Assurance

S. R. Briggs, Manager — 12/5/94 Date
Solid Waste Operations Complex

M. M. McCarthy, Manager — 8 Dec 94 Date
Restoration and Upgrade Programs

D. J. Carrell, Manager — 12/9/94 Date
Environmental Policy

H. Spanheimer — 12/01/94 Date
Quality Assurance

T. L. Erickson, Manager — 12-7-94 Date
Restoration Projects

J. A. Swenson, Manager — 12/11/94 Date
Solid Waste Projects

SUPPLEMENTAL DESIGN REQUIREMENTS DOCUMENT ENHANCED RADIOACTIVE AND MIXED WASTE STORAGE PHASE V PROJECT W-112

November 1994

G. F. Boothe
T. M. Greager
K. D. Johnson
S. L. Kooiker
J. D. Martin
V. P. Ocampo

Westinghouse Hanford Company
Richland, Washington

ACRONYMS, ABBREVIATIONS AND INITIALIZATIONS

A/E	architect/engineer
AAS	Alarm and Annunciator System
AGVS	Automated Guided Vehicle System
ASRS	Automatic Stacker Retriever System
CAM	continuous air monitor
CH	contact-handled
DE	drum equivalent
DIS	Drum Inspection System
DMS	Data Management System
DOE	U.S. Department of Energy
DOT	Department of Transportation
FAP	fission and activation product
FDC	Functional Design Criteria
GTCIII	greater-than Class III
HEPA	high efficiency particulate air
HGSS	Head Gas Sampling Subsystem
HLAN	Hanford Local Area Network
HPT	Health Physics Technician
I&C	Instrumentation and Control
MLLW	mixed low-level waste
LLW	low-level waste
MFP	mixed fission products
M&TE	measuring and test equipment
MW	mixed waste (hazardous constituents)
PE	plutonium equivalent
PCS	Plant Control System
PMS	Plant Monitoring System
SDRD	Supplemental Design Requirements Document
SWB	standard waste box
SWITS	Solid Waste Information Tracking System
SWOC	Solid Waste Operations Complex
TBD	to be determined
TCP	Transmission Control Protocol
TRU	transuranic
TRUM	transuranic mix
Raytheon	Raytheon Engineers & Constructors
WAC	Washington Administrative Code
WHC	Westinghouse Hanford Company
WRAP	Waste Receiving and Processing

CONTENTS

SUPPLEMENTAL DESIGN REQUIREMENTS DOCUMENT ENHANCED RADIOACTIVE AND MIXED WASTE STORAGE PHASE V PROJECT W-112

1.0 INTRODUCTION

1.1 BACKGROUND

This Supplemental Design Requirements Document (SDRD) is used to communicate Project W-112 specific plant design information from Westinghouse Hanford Company (WHC) to the United States Department of Energy (DOE) and the cognizant Architect Engineer (A/E). The SDRD is prepared after the completion of a project Conceptual Design Report (CDR) and prior to the initiation of definitive design.

Information in the SDRD serves two purposes.

1. Conveys design requirements that are too detailed for inclusion in a Functional Design Criteria (FDC) document.

2. Serves as a means of change control for design commitments in the Title I and Title II Design.

The Project W-112 SDRD has been restructured from the equipment based outline used in previous SDRDs to a functional systems outline. This was done to facilitate identification of deficiencies in the information provided in the initial draft SDRD and aid design confirmation. The format and content of this SDRD adhere as closely as practicable to the requirements of WHC-CM-6-1, Standard Engineering Practices for Functional Design Criteria.

1.2 SCOPE

The overall systems engineering steps used to reach construction and operation of Project W-112 are depicted in Figure 1. The Project W-112 SDRD focuses on the requirements to address the functional analysis provided in Figure 1. This information is provided in Sections 2 through 4 of this SDRD.

The mission of Project W-112 on the Hanford site is:

1. To store and the interfacility transport of CH LLW, LLMW and TRU waste in drums and boxes

2. Provide the general support facilities for the SWOC

3. Installation of paved roads and utilities for the SWOC facilities.

Fig. 1 Project W-112 Functional Analysis
Sht. 1 of 4

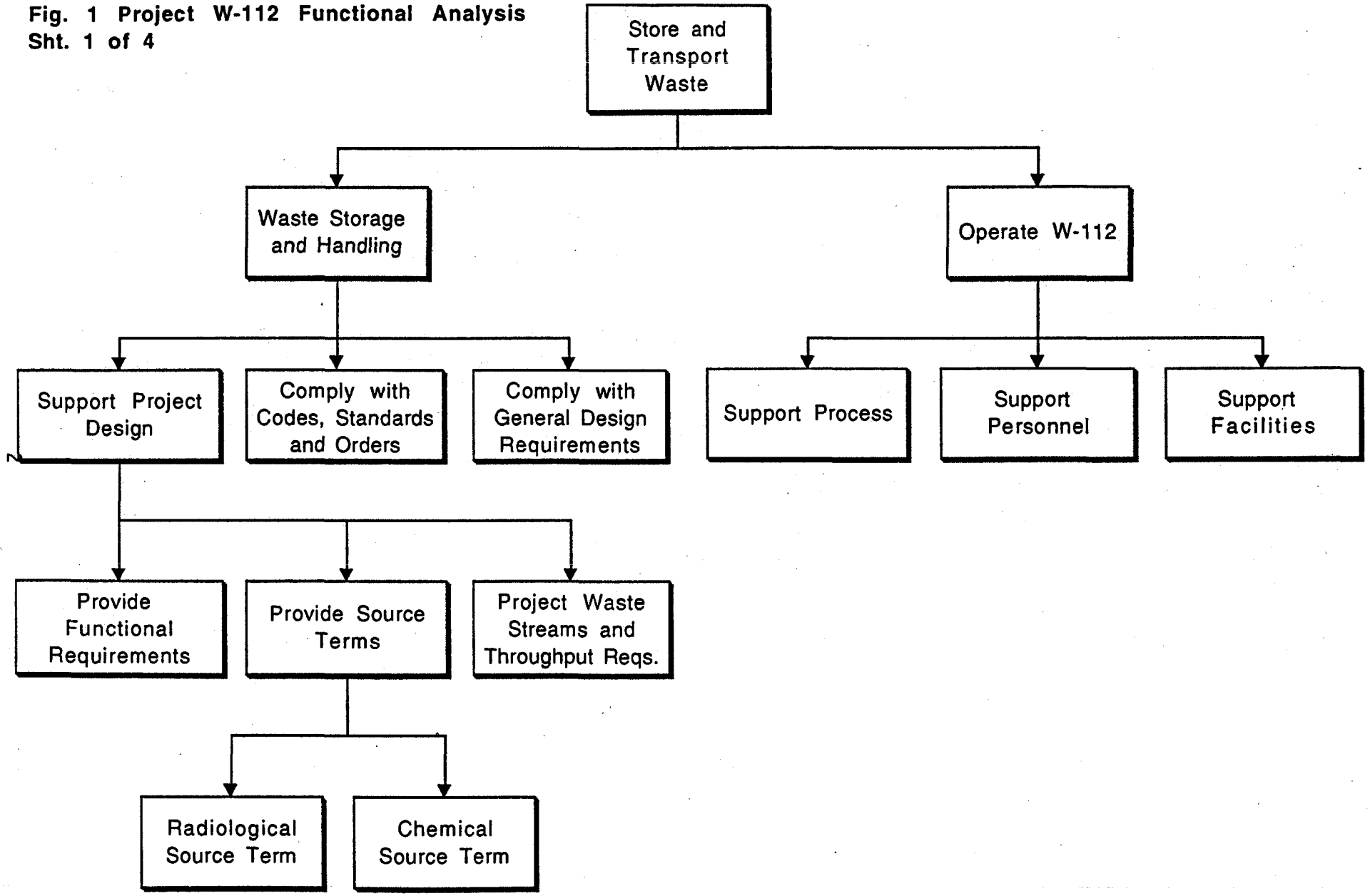


Fig. 1 Project W-112 Functional Analysis
Sht. 2 of 4

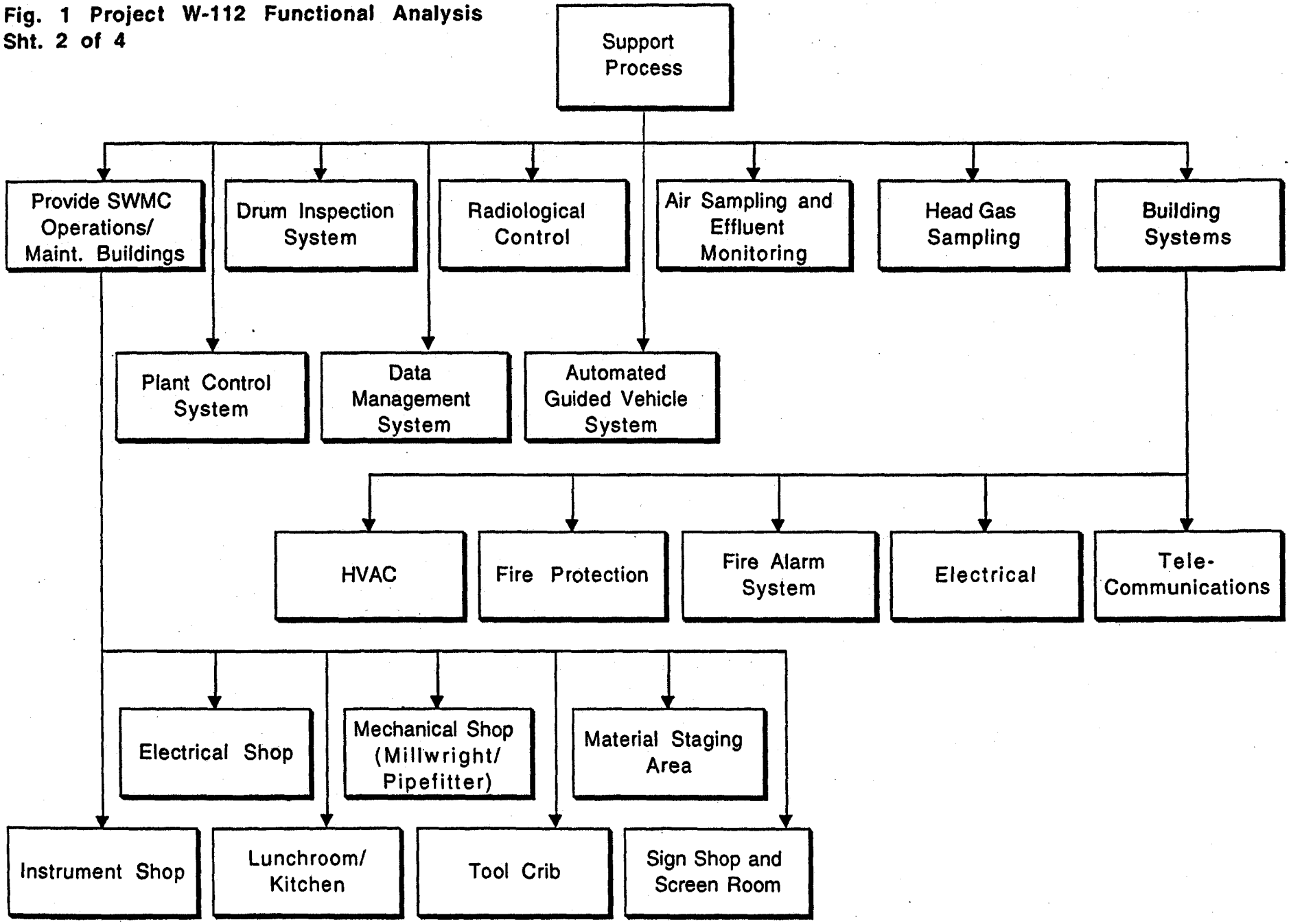


Fig. 1 Project W-112 Functional Analysis
Sht. 3 of 4

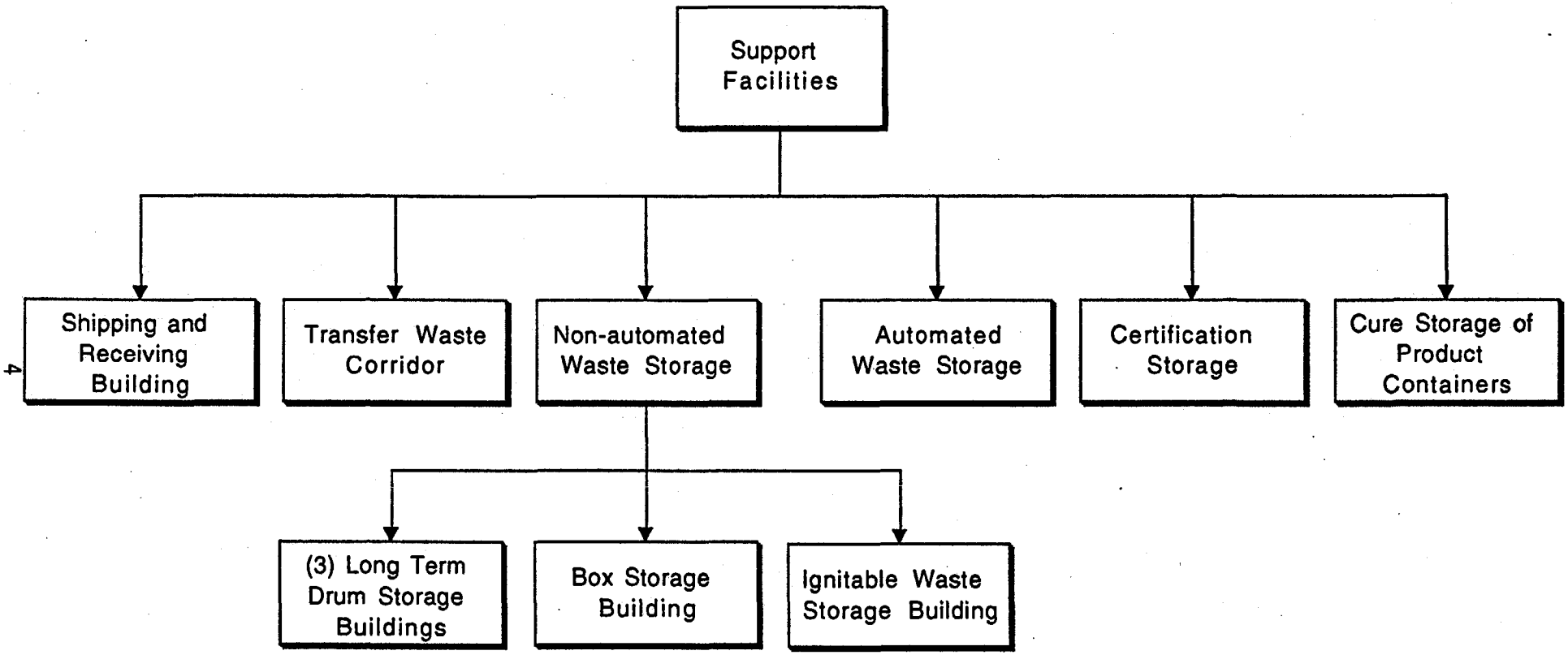
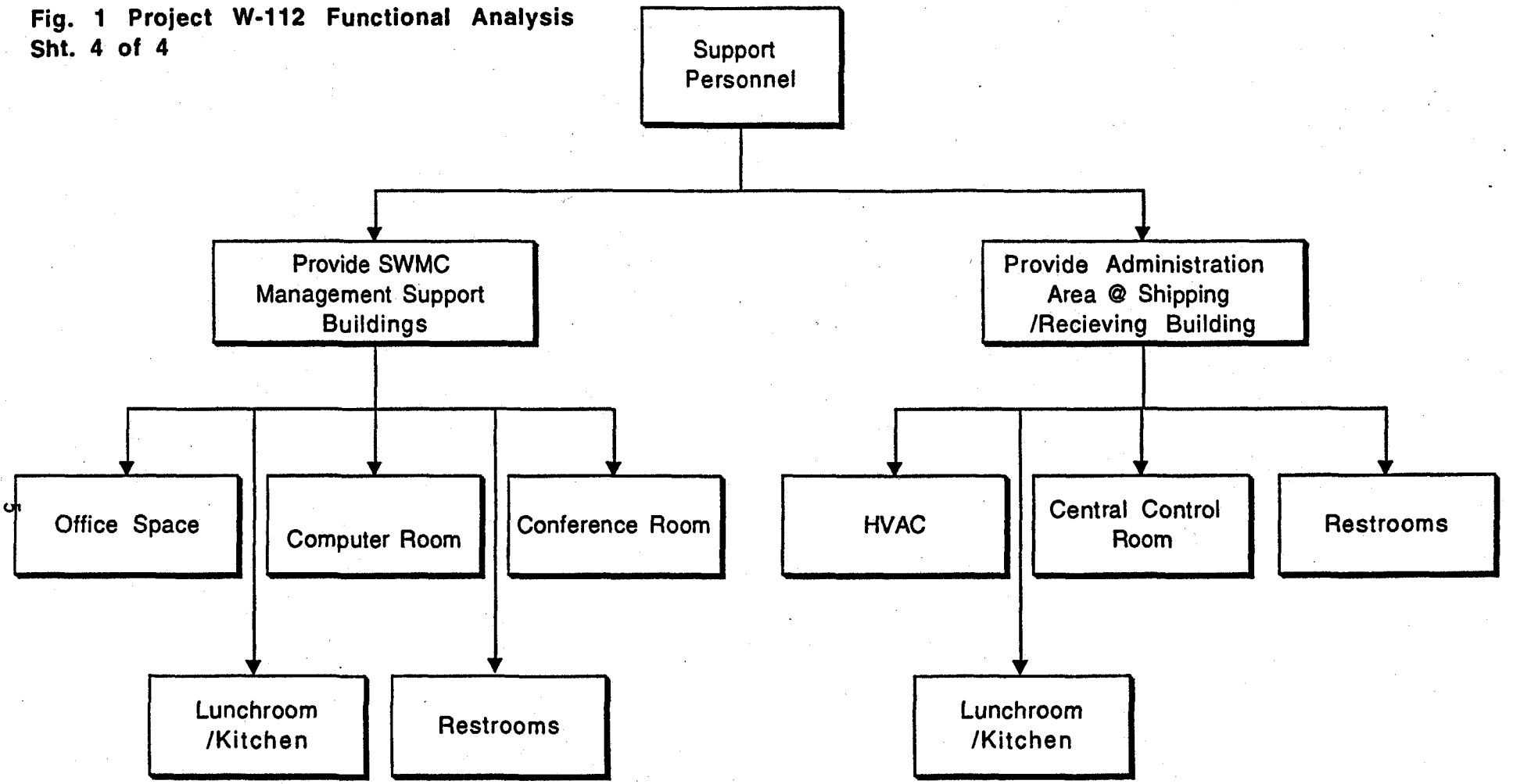


Fig. 1 Project W-112 Functional Analysis
Sht. 4 of 4



1.3 SITE LOCATION

The conceptual locations of the Project W-112 facilities are discussed on WHC-SD-W-112-ES-006 Rev.0 (Campbell and Nash 1994), Solid Waste Management Complex, Site Development Plan.

2.0 PROJECT CRITERIA

2.1 PROJECT DESIGN BASES

2.1.1 Functional Requirements

This document supplements WHC-SD-W112-FDC-001 Revision 2, Functional Design Criteria for the Enhanced Radioactive Mixed Waste Storage Phase V, Project W-112. As an extension of the FDC, the information in this SDRD shall not conflict with the FDC. The FDC shall govern if contradictions occur. The SDRD provides additional requirements, summarizes key WHC design guidance and establishes baseline technical agreements to be used in definitive design of the Project W-112 facilities.

The requirements provided in this document do not relieve the A/E of any design initiative or responsibility. The information contained herein represents the WHC technical position based on experience with similar facilities and is in the interest of consistency with other DOE facilities, where possible.

This document contains design bases and supplemental requirements which, if changed, could impact project cost or schedule. Therefore, deviations from this guidance must be made with WHC concurrence. Changes to this document will constitute a Level II change in accordance with established WHC change control procedures.

2.1.2 Waste Feed Streams and Throughput Requirements

Phase V will receive and transport only contact handled waste containers. Contact handled is defined as having an external dose rate not exceeding 200 mrem per hour. The containers may have TRU, mixed, low-level or hazardous waste constituents or any combination of these waste types.

The Phase V facility throughput is based on 175 operating days/year, 1 8-hour shift/day. The shipping/receiving and head gas sampling areas can expect an actual operating time of 7 hours/day. The automated equipment will be available and expected to operate the full 8-hour shift.

Figure 2 shows the intra-facility interfaces with respect to Project W-112 transfer corridor maximum daily container flowrates that will be required.

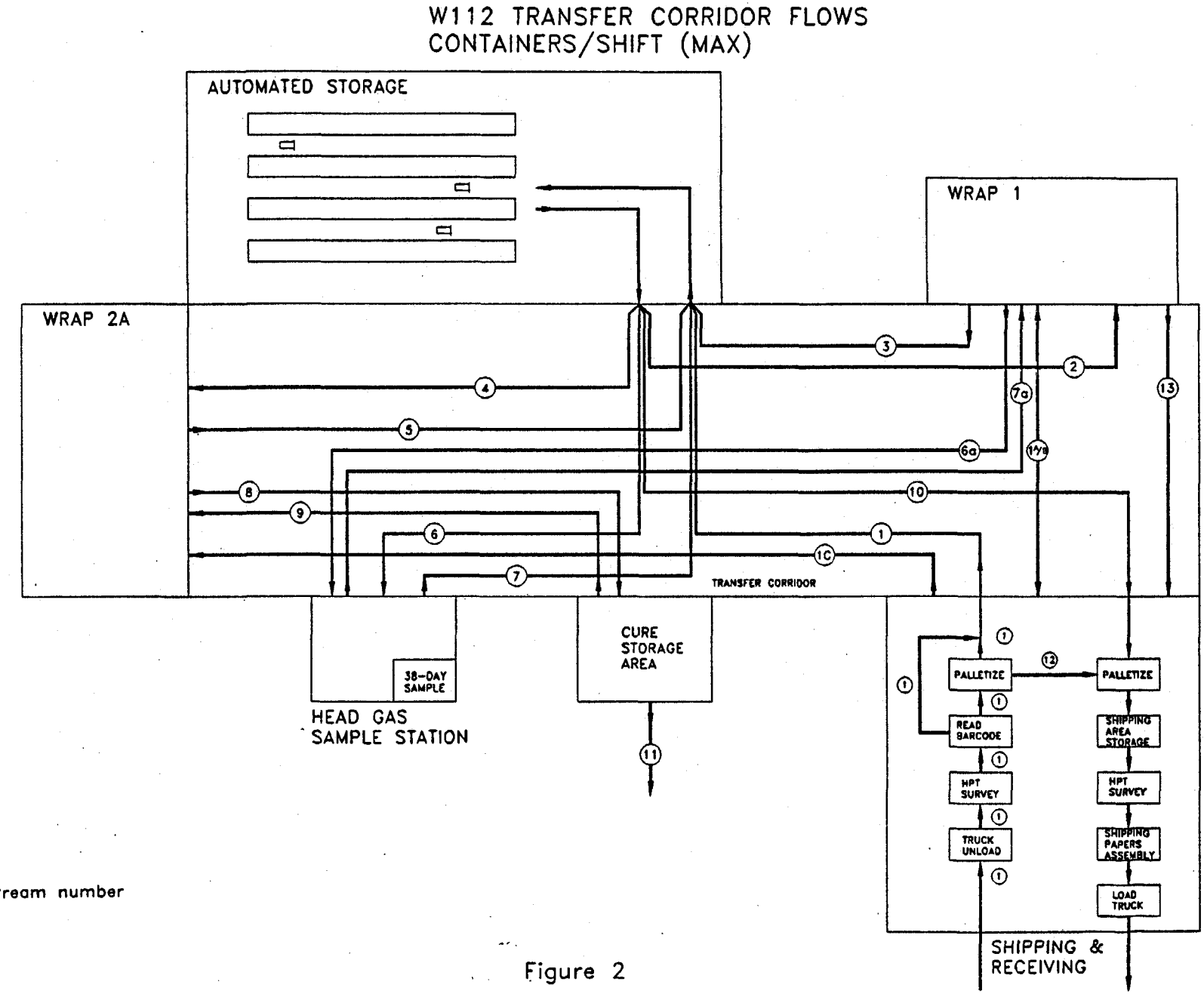

W112 TRANSFER CORRIDOR FLOWS
CONTAINERS/SHIFT (MAX)
AUTOMATED STORAGE
WRAP 1
WRAP 2A
TRANSFER CORRIDOR
CURE STORAGE AREA
38-DAY SAMPLE
HEAD GAS SAMPLE STATION
PALLETIZE
READ BARCODE
HPT SURVEY
TRUCK UNLOAD
PALLETIZE
SHIPPING AREA STORAGE
HPT SURVEY
SHIPPING PAPERS ASSEMBLY
LOAD TRUCK
SHIPPING & RECEIVING
(X) = stream number

Figure 2

Table 1 defines the number of drums/boxes that Project W-112 will receive, transport and store on a per day single shift basis using the transfer corridor.

Table 1. W-112 TRANSFER CORRIDOR FLOWRATES.

STREAM NUMBER	DESCRIPTION	STREAM COMPONENTS	UNITS/SHIFT (ROUNDED OFF TO NEAREST WHOLE NUMBER)	Trucks/DAY (NOTE)	BASIS
1	55-gal drums or 85-gal o.p. of LLW, TRU, STRU	1a. WRAP 1 feed	39		WRAP 1 SDRD REV 3 [(A + B + C), Table 1]
	55-gal drums or 85-gal o.p. of MLLW	1b. WRAP 2A feed	23		WRAP 2A SDRD REV 0 [(1), Table 5]
				7	W112 FDC REV 2
1 A/B	Standard Waste Boxes	1A/B WRAP 1 Feed/Return	1		WRAP 1 SDRD REV 3 [(H), Table 1]
1C	Waste Boxes (5'x5'x9' maximum)	1Ca. WRAP 2A Box Breakdown Feed	1		WRAP 2A SDRD REV 0 [(2), Table 5]
	55-gal & 85-gal o.p.	1Cb. WRAP 2A Box Breakdown Feed	1		WRAP 2A SDRD REV 0 [(2), Table 5]
2	55-gal drums & 85-gal o.p.	2a. WRAP 1 feed	39		WRAP 1 SDRD REV 3 [(A + B + C), Table 1]
	55-gal TRU drums	2b. TRUPAC load	23		WRAP 1 SDRD REV 3 [(I), Table 1]
3	Processed TRU & LLW 55-gal drums	3. WRAP 1 product	39		WRAP 1 SDRD REV 3 [(D8 + E8 + B2 + C2), Table 1]
4	55-gal drum of MLLW & 85-gal o.p. for sampling	4a. WRAP 2A characterization/verification sampling feed	5		WRAP 2A SDRD Rev 0 [(20% of incoming drums)]
	55-gal & 85-gal o.p. for processing	4b. WRAP 2A process feed	23		WRAP 2A SDRD REV 0 [(3), Table 5]

STREAM NUMBER	DESCRIPTION	STREAM COMPONENTS	UNITS/SHIFT (ROUNDED OFF TO NEAREST WHOLE NUMBER)	Trucks/DAY (NOTE)	BASIS
5	Sampled 55-gal drums & 85-gal o.p. of MLLW from sampling	5a. WRAP 2A sampled drums	5		WRAP 2A SDRD REV 0 [(20% of incoming drums)]
	55-gal drums of MLLW	5b. Box Breakdown Product in drums	2		WRAP 2A SDRD REV 0 [(2), Table 5]
6	55-gal drums of TRU	6. Head gas sampling feed	23		WRAP 1 SDRD REV 3 [(I), Table 1]
6a	Std. waste boxes of TRU	6a. Head gas sampling feed	1		WRAP 1 SDRD REV 3 [(H), Table 1]
7	55-gal drums of TRU	7. Return from head gas sampling	23		WRAP 1 SDRD REV 3 [(I), Table 1]
7a	Std. waste boxes of TRU	7a. Return from head gas sampling	1		WRAP 1 SDRD REV 3 [(H), Table 1]
8	4'x4'x4' product boxes	8a. WRAP 2A product to cure storage	7		WRAP 2A SDRD REV 0 [(8) + (9) + (10), Table 5, ECN#16491]
	4'x4'x4' product boxes	8b. WRAP 2A destructive exam product return to cure storage	1		WRAP 2A SDRD REV 0 [(2), Table 5]
9	4'x4'x4' product boxes	9a. WRAP 2A product destructive exam feed	1		WRAP 2A SDRD REV 0 [(2), Table 5]
	4'x4'x4' product boxes	9b. WRAP 2A product rework	1		WRAP 2A SDRD REV 0 [(2), Table 5]

STREAM NUMBER	DESCRIPTION	STREAM COMPONENTS	UNITS/SHIFT (ROUNDED OFF TO NEAREST WHOLE NUMBER)	Trucks/DAY (NOTE)	BASIS
10	85-gal drums of LLW	10. WRAP 1 compacted LLW product	16	8	WRAP 1 SDRD REV 3 [(J, Table 1)] W112 FDC REV 2
11	4'x4'x4' product boxes for shipment	11. WRAP 2A cured product to disposal	8		WRAP 2A SDRD REV 0 [(12), Table 5)]
12	Wooden pallets	(Wooden pallets will be replaced with metal pallets where used in the facility)	16 min.		Assumes all drums are received on wood pallets, 4 drums per pallet
13	Empty 85-gal overpacks	WRAP 1 recycled overpacks	14		WRAP 1 SDRD REV 3 [(L), Table 1]

NOTE: 1) Number of trucks is the number required by the FDC. It does not reflect the number of pallets derived by this flowsheet.

2.1.3 Source Terms

Refer to WHC-SD-W306-TI-001, Rev.2, "Radiological and Chemical Source Terms for Solid Waste Operations Complex," (Boothe 1994) for the applicable source terms for Project W-112.

3.0 PROCESS CRITERIA

3.1 WASTE HANDLING

3.1.1 Ship and Receive Waste

Tables 2 and 3 have been developed with respect to the shipping and receiving module as shown in Figure 2.

Table 2. SHIPPING and RECEIVING MODULE - RECEIPTS.

SOURCE	WASTE	FORM	RECEIVING RATE	VEHICLE
Solid waste retrieval	Suspect TRU	Overpack drums	16/shift	Flatbed or Van
Onsite generators	TRU/TRUM/LLW/ MLLW/GTCIII	DOT 17C drums	20/shift	Flatbed or Van
Offsite generators	TRU/TRUM/MLLW/ GTCIII	DOT 17C drums DOT 17H/17C drums	40/shift	Flatbed w/cask Flatbed w/cask
WRAP 2A	MLLW	5'x5'x9'	1/shift	(TBD) forklift
WRAP 1	TRU/TRUM	SWB	1/shift	(TBD) forklift

Table 3. SHIPPING and RECEIVING MODULE - SHIPMENTS.

SOURCE	WASTE	FORM	SHIPPING RATE	VEHICLE
Lag storage from WRAP Module 1	LLW	Disposal drums	4/shift	Flatbed or van
Lag storage from WRAP Module 2A	MLLW	Boxes	8/shift	Flatbed

3.1.2 SWOC Pallet Design

A. Pallet shall be made of metal and/or non-flammable materials. The pallet will not contribute to the fire loading of the storage facilities.

B. The pallet will hold up to four (4) 85 gallon drums or four (4) 55 gallon drums.

C. The pallet shall have fork lift pickup slots to fit forks from each side.

D. The maximum pallet contents will be 4,000 lb based on WRAP 1 limits. A fully loaded pallet (4,000 lb) shall support the weight of 2 additional fully loaded pallets stacked on top of it.

E. The pallet will have a flat bottom surface to allow being moved by roller conveyors and the ASRS.

F. The exposed sides around the bottom of the drum (visible from the perimeter of the pallet) shall be visibly inspected.

G. The pallet will be stackable with other pallets when empty.

H. The pallet will be a containment type pallet that will hold at least 15 gallons leaked waste.

3.2 CENTRAL SHIPPING AND RECEIVING BUILDING

A. The shipping/receiving area will accept drums for transportation to the Automated Storage Building and WRAP facilities via the transfer corridor. Also, drums will be transferred from this area on their way to the Long-term Storage Buildings.

B. Small boxes (e.g., 5'x5'x9' box, weighing up to 12,000 lb) will be transferred through this area on their way to WRAP 2A.

C. Standard Waste Boxes will be transferred through this area on their way to WRAP 1.

D. An overhead crane shall be provided for truck loading and unloading operations.

1. Maximum tractor/trailer dimensions are:

   a. Tractor: 25 ft long x 10 ft wide over the mirrors

   b. Trailer: 45 ft long overall

   c. Combined length: 60 to 65 ft, depending on weight distribution to the front axle

   d. Height to bottom of trailer bed: 45 to 48 in.

2. Maximum van/truck dimensions are:

   a. Van box: 18 to 25 ft long

   b. Cab/Engine: 8 ft long

   c. Overall length: 26 to 33 ft

   d. Overall height: 13 ft 4 in.

   e. Height to bed: 54 to 55 in.

   f. Width over mirrors: 10 ft.

E. A jib crane shall be provided for the palletizing operation. Drums will generally be received on pallets but may be received as single drums. Palletize or segregate drums by compatible waste types or destination.

F. Space and battery recharging equipment for the forktruck and automated vehicle batteries shall be provided.

G. A storage cabinet similar to an office cabinet (6 ft H x 3 ft W x 1.5 ft D) will be used to store crane riggings extra bales, clevis pieces, etc. Seven hooks on the wall spaced 1.5 ft apart will be used for storing slings.

H. A storage cabinet that is similar to an office storage cabinet (6 ft H x 3 ft W x 1.5 ft D) will be used for storage of HPTs survey equipment.

I. Storage for a one day supply of pallets near the palletizing station shall be provided.

J. The waste containers are not stacked more than 1 high.

3.3 TRANSFER WASTE

3.3.1 Transfer Corridor

A. The transfer corridor will be used to transfer:

1. Drums from the shipping/receiving area to and from the Automated Storage Building, the Head Gas Sampling Station, WRAP 1, WRAP 2A and the Cure Storage Building

2. Small boxes, 5'x5'x9', weighing up to 12,000 lbs, to the Head Gas Sampling Station and WRAP 2A

3. Product containers, 4'x4'x4', weighing up to 10,000 lb (grouted waste) and 6000 lbs (polyethylene), from WRAP 2A to the cure storage area. Product containers surface dose rate expected to be 10 mrem/hr.

B. The drums will be transferred by automated vehicles and small boxes may be transferred by automated vehicles or manually controlled vehicles. Large boxes greater than 5'x5'x9' will not be transported in the corridor.

C. The transfer corridor shall comply with WAC 173-303, Dangerous Waste Regulations, specifically Section 630, with respect to inspection of the containment system. Inspection will be done manually. Manual inspection consists of an individual walking through the facility and inspecting the facility flooring and containment system for leaks and signs of damage.

D. Where the transfer corridor connects to WRAP 2A, there shall be a provision for movement of boxes to and from the W-112 box storage building to WRAP 2A and back to the box storage building.

E. Transfer corridor slope if any is not to exceed one half percent.

3.4 NON-AUTOMATED WASTE STORAGE

A. The non-automated waste storage facility will have buildings that will store approximately 20,000 drum equivalent that are expected to be held over a long period of time. The buildings that are going to be used as storage facilities will be permitted as (RCRA storage) facilities.

B. The non-automated waste storage facility will comply with WHC-CM-7-5, Environmental Compliance Manual, Section 7.0 Solid Waste Management and WAC 173-303, Dangerous Waste Regulations, specifically Section 630. This addresses the weekly inspection, container, containment and segregation requirements.

C. Confinement ventilation will not be required for the Project W-112 non-automated facility.

D. Storage racks for drums in both the automated and non-automated storage buildings shall be designated a WHC safety classification in order to properly design for the required earthquake ground motions as defined in SDC-4.1 (HPS 1993). In any area where waste containers are stored more than 3-high, the design must prevent the upper containers from falling out of position due to the earthquake ground motion. Also, recommendations based on the WHC Fire Propagation Test being conducted by WHC will be incorporated as required.

3.4.1 Long-term Drum Storage Building

A. The long-term storage buildings are to be located close to the administration/central shipping and receiving building to facilitate ease of forklift travel to handle waste container traffic.

B. The drums are stacked 3 high on metal (non-containment) pallets are required to be inspected weekly, per WAC 173-303-630. The drum inspection system will be mounted on an automated guided vehicle.

C. The drums that are stacked 3 high on metal (non-containment) pallets will be banded together (four to a pallet).

3.4.2 Box Storage Building

A. An overhead crane with an auxiliary hoist shall be provided for loading and unloading of boxes from the Standard Waste Boxes (maximum gross weight of 4000 lbs) to the 13 ft W x 22 ft L x 14.5 H overpack box (maximum gross weight of 80,000 lbs) listed in the FDC Rev. 2, Table 3-1, Waste Containers To Be Handled.

B. Inspection will be done manually. Manual inspection consists of an individual walking through the facility and observing the boxes for corrosion, leaks and signs of damage. Facility flooring and containment system shall also be inspected for leaks and signs of damage.

C. The boxes are not stacked more than 1 high.

3.4.3 Ignitable Waste Storage Building

A. A NEC hazardous location classification of the building shall be done per NFPA requirements during the design such that the electrical installation shall comply with the NEC requirements for areas classified as hazardous locations.

B. The drums are required to be inspected weekly, per WAC 173-303-630. Inspection will be done manually. Manual inspection consists of an individual walking through the facility and observing the drums for corrosion, leaks and signs of damage. Facility flooring and containment system shall also be inspected for leaks and signs of damage.

C. The drums are not stacked more than 1 high.

3.5 PRODUCT CONTAINER CURE STORAGE AREA

3.5.1 Functional Requirements

A. After pouring the grouted waste form in the waste container, move it to cure storage within eight hours.

B. Allow grouted wastes to cure for a minimum of 48 hours.

C. The grouted waste form temperature, while in cure storage, should not drop below 50 °F.

D. The waste forms while in cure storage should not experience wide cyclic temperature fluctuations (> 30°F, i.e., thermal shock, diurnal cycling).

E. For grouted waste forms, separation of containers to allow for natural or forced convective cooling is not necessary. Leave at least 1 inch between containers.

F. Storage for containers of wastes encapsulated in polyethylene should allow for free air circulation for convective cooling.

3.5.2 Storage Capability

The space requirement for the total of 60 boxes in the cure storage should be optimized based on the following:

1. boxes are 4'x4'x4'

2. Boxes are not stacked (1 high)

3. One foot minimum separation is to be maintained between the ends of boxes for natural air circulation and manual inspection

4. Ten foot forklift aisle(s) are required.

3.6 PRODUCT CONTAINER CERTIFICATION STORAGE AREA

3.6.1 Functional Requirements

Prior to disposal, waste containers should be stored inside - not exposed to weather [(rain, snow and temperature cycles (< 31°F in 24 hours)].

3.6.2 Storage Capability

The space requirement for the total of 320 boxes in the certification storage should be optimized based on the following:

1. Boxes are 4'x4'x4'

2. Boxes are stacked (2) high and (2) deep

3. Separation is required to allow weekly inspection per WAC-173-303-630

4. Ten foot forklift aisle(s) are required

3.7 AUTOMATED WASTE STORAGE

A. The automated waste storage facility will comply with WHC-CM-7-5, Environmental Compliance Manual, Section 7.0 Solid Waste Management and WAC 173-303, Dangerous Waste Regulations, specifically Section 630. This addresses the weekly inspection, container, containment and segregation requirements.

B. Confinement ventilation will not be required for the Project W-112 automated waste storage facility.

C. Palletize/depalletize drums to provide batching capability by waste type if drums will be transported or stored on pallets.

D. Expansion capability to accommodate 30,000 drums. This will include expanding the interface with the transfer corridor in terms of a larger doorway and potentially adding more pickup/drop point (P/D) stations.

E. The automated storage system must have the capability to interface with the automated vehicles to allow drop-off of material.

F. Space to accommodate a fire protection system will be built into the automated storage racks. The following fire protection standards apply to the design:

1. NFPA 231, Standard for General Storage

2. NFPA 231C, Standard for Rack Storage of Materials

3. Factory Mutual Loss Prevention Data Sheet 8-33S (1989).

G. The storage racks must be sized to accommodate both 55-gallon drums and 85-gallon overpacks. The shelves in the storage racks need to have similar containment capability (hold at least 15 gallons leaked waste) as the containment pallets.

H. Operations are to be performed remotely so that no operators are required in the rack storage area to increase safety and reduce the dose received by an operator.

I. The drums in the storage racks are required to be inspected weekly, per WAC 173-303-630. The drum inspection system will be mounted on an automatic guided vehicle or on the storage rack.

J. The drums are stored more than 3-high (6 high/2 rows per rack), the design must prevent the upper containers from falling out of position due to earthquake ground motions as defined in SDC 4.1 (HPS 1993).

3.8 HEAD GAS SAMPLING

3.8.1 Sampling Station

A. The ambient temperature of the head gas sampling area shall be maintained at 25°± 5° C.

B. WRAP 1 expects to ship 23 TRU drums to WIPP per day. It is expected to take approximately 30 minutes to sample a container and evaluate the results. It is anticipated that not all containers will require sampling. Since there is no well founded estimate, it will be designed for sampling 50% of the containers or 9 per day with the ability to easily expand to a second sampling station if it becomes necessary. WRAP 1 provides double lidded, vented drums. Headspace sampling will be under the drum lid without the need to sample all of the inner voids in the drum.

C. The three (3) day temperature equalization area shall be designed for 69 (23 x 3) containers plus space for an extra day supply of 23 containers to allow the sampling to continue on an uninterrupted basis in case the transport system goes down. This makes a total of 92 containers (86 drums and 6 SWBs) in the sampling area. The capability to expand to a second sample station shall be incorporated into the design.

D. The station shall have the capability to sample SWBs. The requirements at this time is to sample the container headspace only. This implies that a SWB containing drums need only have the space around the drums sampled, not each individual drum head space.

E. The samples must be stored at specific temperatures depending on the sample type.

1. Analyte gases in a SUMMA™[1] canister 100 ml minimum volume is to be stored at ambient conditions.

2. Volatile organic compounds gases in a SUMMA™ canister 250 ml minimum volume is to be stored at 0 to 40 degree C. Alternatively, if available headspace is limited, 100 ml samples may be collected for determination of volatiles.

3. Nitrogen oxides in a SUMMA™ canister 100 ml minimum volume is to be stored at ambient conditions. A separate headspace sample will not be required if mass spectrometry is used for inorganic gas analysis.

F. It is not anticipated that there will be requirements to archive physical headgas samples provided that the samples are taken per EPA SW-846, Data Quality Requirements.

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[1]The SUMMA is a Registered Trademark of MOLECTRICS, INC., Cleveland, Ohio.

G. Adequate protection/shielding shall be provided to the station operators per WHC-CM-1-6.

H. All sample containers shall be handled so that cross-contamination is minimized. The sample canisters must be properly cleaned prior to sampling.

I. The sampling manifold must:

1. Be maintained above the ambient temperature to reduce the potential for analytes to adhere to the system's internal surfaces

2. Be properly cleaned prior to sampling and is evacuated prior to each use

3. Not use plastic materials (with the exception of Teflon).

J. The flow through the sample bottles shall be controlled with flow control valves and measured with flow indicators for a specified period of time (TBD) to ensure ample gas samples have been collected.

K. The head gas sampling/analysis instrumentation to be provided shall have the same instruments as the Project W-113 Container Venting System (CVS) gas sampling/analysis instrumentation.

3.8.2 38-day Sample Station

A. One 38-day sample station shall be provided. It is estimated that WRAP 1 will process 2 to 3 TRUCON Code 4 type drums per year. There is no estimate at this time as to the number of Type 1, 2, and 3 drums that will exceed the decay heat/G values. Assuming the number is on the same order as the Type 4 drums, one sampling station should suffice.

B. The ambient temperature of the 38-day sample station shall be maintained at $25^{\circ} \pm 5^{\circ}$ C.

C. Station capacity designed for one (1) drum but can be expanded for two (2) drums.

D. A monorail hoist shall be provided at the station.

3.9 PLANT CONTROL SYSTEM

Refer to WHC-SD-W306-SDRD-001 Rev.0, Supplemental Design Requirements Document Solid Waste Operations Complex, (Ocampo 1994) for the Project W-112 Plant Control System (PCS) general functional requirements and the PCS interfaces to the Project W-112 subsystems (i.e., Automatic Guided Vehicles, Head Gas Sampling, Drum Inspection, Alarm Annunciation and Barcode Readers).

3.10 DATA MANAGEMENT SYSTEM

Refer to WHC-SD-W306-SDRD-001 Rev.0, Supplemental Design Requirements Document Solid Waste Operations Complex, (Ocampo 1994) for the Project W-112 Data Management System (DMS) general functional requirements and the interfaces to the Project W-112 PCS.

4.0 FACILITY CRITERIA

4.1 BUILDING STRUCTURES

4.1.1 Administration Area (Shipping & Receiving Building)

4.1.1.1 Control Room

A. A control area shall be provided for the Phase V Storage material handling computer system.

B. The control room shall be located near the central shipping/receiving area.

C. The control room shall have windows to view the activities in the transfer corridor and shipping/receiving areas.

4.1.2 SWMC Operations/Maintenance Building

4.1.2.1 Office Spaces

A. All offices except for secretaries, the receptionist, and the open bay office areas shall be hard walled.

B. An underfloor raceway system for electrical, data and communication cabling shall be used for open bays office areas.

4.1.2.2 Instrument Shop

A. The instrument shop shall be 58m^2 (625 ft^2) minimum size.

B. The instrument shop will have the following work stations.

1. Five 2-man work stations. Stanley Widmar, Type D4, Model MT-120 or equal.

2. Two 2-man work stations. Stanley Widmar, Type D4, Model CAST-96 or equal.

C. Each work station shall have be provided with:

1. Suitable drawers for storing hand assigned tools

2. An adjustable height bench stool per work space (anti-static type for the Stanley Widmar, Type D4, Model CAST-96 or equal)

3. One Ground Fault Circuit Interrupter (GFCI) protected 110 VAC, 20 ampere conditioned power

4. One compressed air line and one vacuum line .

D. The instrument shop shall be provided with:

1. Suitable shielding or shall be located to prevent EMI/RFI interference propagated from the welding booth

2. An anti-static ground around the instrument shop (the shop floor covering shall be anti-static tile)

3. One test stand for calibration of pressure/vacuum gauges and gas/liquid flow instruments (up to 2000 psig pressure using either dry nitrogen or air maybe used for pressure devices)

4. 90 psig compressed air (reduced to 25 psig at the work stations)

5. Humidity control (humidity shall be controlled to not fall below 30%)

6. One standard computer workstation with an HLAN drop

7. A small floor-mounted drill press

8. Windows for natural light

9. A minimum of three additional phone lines.

4.1.2.3 Electrical Shop

A. The electrical shop will have six 2-man work stations. Stanley Widmar, Type D4, Model MT-120 or equal.

B. Each work station shall be provided with:

1. An adjustable height bench stool per work space

2. Suitable drawers for storing assigned hand tools.

3. One GFCI protected 110 VAC, 20 ampere conditioned power

4. One compressed air line.

C. The electrical shop shall be provided with:

1. Suitable shielding or shall be located to prevent EMI/RFI interference propagated from the welding booth

2. 90 psig compressed air (reduced to 25 psig at the work stations)

3. Static ground around the electrical shop

4. A small floor-mounted drill press

5. A motor test facility with a 480 Vac, 100 Amp service

6. A dust-free 480-volt breaker test and storage facility

7. One standard computer workstation with an HLAN drop

8. A ventilated parts cleaning station

9. Humidity control (humidity shall be controlled to not fall below 30%).

4.1.2.4 Mechanical (Millwright/Pipefitter) Shop

A. The shop shall have a ventilated and solidly enclosed area for welding (three sides with the fourth side enclosed by a protective curtain). The welding area shall be provided with the following items:

1. Welding machine, Miller 300 ST or equal

2. Welding rod oven, Phoenix Bench Type 300 or equal

3. Metal welding table

4. Service sink.

B. The shop shall have an enclosed, sound proof, ventilated grinding area. The grinding area shall be provided with the following items:

1. One work bench

2. Bench-mounted sander

3. Large pedestal mounted grinder

4. Medium-size pedestal grinder.

C. The following equipment shall be provided in the shop.

1. A tube threader, Rigid Model 535 or equal.

2. A drill press, DoAll Model DJP-2 or equal.

3. A bandsaw, DoAll Model TF-1421 or equal.

4. A hydraulic press, SPX #SPE5513DS or equal.

5. A power hacksaw, Medalist Model LHM-450 or equal.

6. Locking cabinets for storage of parts and vendor manuals.

7. Three (12 ft x 3 ft) work benches.

8. An overhead monorail and hoist system for conveyance of objects from loading area into and throughout the shop.

4.1.2.5 Tool Crib

A. The tool crib shall be 75 m^2 (800 ft^2) minimum size.

B. The tool crib area shall have:

1. Storage space for a 90-day supply of consumables

2. Shelf storage space and working space for the control of approximately 75 pieces of controlled Measuring and Test Equipment (M&TE)

3. Cabinets for storage of tools and hand-held electric tools

4. One standard computer workstation with an HLAN drop

5. A less-than 90-day satellite waste accumulation area for small waste items which cannot be disposed in the normal office waste bins.

4.1.2.6 Material Staging Area

The material staging area shall be 360 m^2 (4,000 ft^2) minimum.

4.1.2.7 Sign Shop and Screen Room

A. The screen room shall be 53 m^2 (576 ft^2) minimum size.

B. The sign shop shall be 62 m^2 (672 ft^2) minimum size.

C. The sign shop and screen room shall be provided with the following:

1. Supply storage

2. Refrigerator for film storage

3. Ventilated dark room

4. Washout sink, with hot and cold running water

5. Flip-top counter

6. Developing table

7. Storage cabinet for developing chemicals

8. Storage for vinyl

9. Vinyl sheer

10. Layout and work table

11. Personal computer space and room for associated hardware (digitizer, jet screen, plotter, etc)

12. Satellite waste accumulation area for waste chemicals, paints, solvents, etc.

4.1.3 SWMC Management Support Building

4.1.3.1 Office Spaces

A. All offices except for secretaries, the receptionist, and the open bay office areas shall be hard walled.

B. An underfloor raceway system for electrical, data and communication cabling shall be used for open bays office areas.

4.1.3.2 Solid Waste Coordinator Office/Computer Room

A. The space shall be designed to facilitate the installation of a server/workstation computer system rack sized at 5 ft high x 20 inches wide x 33 inches deep.

B. In addition, allocate space for at least 6 workstations for 6 facility coordinator support personnels.

4.1.4 Miscellaneous Buildings Support Facilities

4.1.4.1 Restrooms

A. Separate male/female restrooms appropriately sized and ventilated for the specified building occupancy shall be provided.

B. Provisions shall be made to ensure restrooms are accessible to handicapped individuals.

C. Initial complement of furnishings for the rest rooms shall be provided.

4.1.4.2 Lunchrooms

A. Lunch rooms shall be designed to accomodate a maximum single-shift of 30 personnel (SWMC Management Support Building), 60 personnel (SWMC Operations and Maintenance Building), and 15 personnel (Administration Area, Central Shipping/Receiving Building).

B. Initial complement of furnishings for the lunch rooms shall be provided.

4.2 EQUIPMENT DESIGN REQUIREMENTS

4.2.1 Drum Inspection System

The following design requirements shall be used in the procurement specification for the drum inspection systems to be used for the automated storage building and the long-term drum storage buildings.

A. The drum inspection system shall:

1. Not have any impact on the SWOC pallet design as described in Section 3.1.2
2. Have its own lighting system, such that ambient lighting will have little effect on the inspection
3. Be able to have a clear view of one side of a drum within the aisle width provided
4. Be able to read bar codes that are affixed to each drum
5. Record and save for operator viewing and report the results of the inspection (each drum must be inspected every week including the containment system where it is provided in the storage racks and the facility flooring)
6. Be adequate to view drums stacked in manual and/or automated storage configurations
7. Operate mostly independent of an operator, except in cases of non-standard (off-normal) circumstances.

B. The resolution of the images that are acquired shall be such that an operator viewing the results of the system can easily locate and identify the following:

1. Rust spots/streaks
2. Corrosion spots
3. Blistered paint
4. Drums displaced from expected location relative to an adjacent drum
5. Bulges or dents
6. Tilted drums
7. Missing drums
8. Missing barcodes
9. Condition of the containment system

10. Condition of the facility flooring.

C. Refer to WHC-SD-W306-SDRD-001 Rev.0, Supplemental Design Requirements Document Solid Waste Operations Complex, (Ocampo 1994) for the drum inspection system integration interfaces to the Project W-112 Plant Control System (PCS) and Data Management System (DMS).

4.2.2 Automated Guided Vehicles

The following design requirements shall be used in the procurement specification of automated guided vehicles to be used in the transfer corridor.

4.2.2.1 Building Requirements

A. Any change in elevation will be continuous and limited to not more than a 5% slope to accommodate automated guided vehicles (AGVs).

B. The floor surface should be of industrial grade with resistance to abrasion and wear and will be of a type that will allow operation of AGVs.

C. Floor flatness should be as required for the selected AGVs.

D. Doorways and aisle space should be wide enough to maintain the minmum safe spacing specified for the AGVs moving with a load. At least 18 inches should be maintained between the AGVs and any other object in its travel path.

4.2.2.2 Interface requirements

A. The AGVs selected shall be compatible for use with the WRAP 1 and WRAP 2A pick up and drop points at the transfer corridor. Design modifications to existing WRAP 1 and WRAP 2A pick up and drop points shall be incorporated in the Project W-112 design scope.

B. The transfer corridor shall be designed to provide access of maintenance personnel without disrupting vehicular flow. This access is not for general foot traffic, it is only for access to repair equipment or respond to unexpected occurrences.

C. The AGVs shall have an "user friendly" control system with a capability for manual overrides when necessary.

D. The number of AGVs to be provided shall be able to deliver and pick up the required daily number of containers flowrates in the transfer corridor.

E. Refer to WHC-SD-W306-SDRD-001 Rev.0, Supplemental Design Requirements Document Solid Waste Operations Complex, (Ocampo 1994) for the AGVs system integration interfaces to the Project W-112 Plant Control System (PCS) and Data Management System (DMS).

4.2.2.3 Guidance System

A. The AGVs guidance system or combination guidanced systems must be easily maintainable and its operation not affected due to dust, dirt and a climate temperature range of 0°F to 104°F.

B. If changes in the AGVs travel path are required, the additional period of time required for the new travel path for personnel to spend in restricted areas due to ALARA concerns must be minimized. Initial travel path should involve minimization of exposure to personnel also.

4.2.2.4 Vehicle Safety Requirements

The AGVS shall be provided with the following safety requirements.

1. Flashing lights or an audible warning system to warn of the vehicles approach.

2. Manual emergency stops provided in an easily accessible location.

3. Collision avoidance system to detect objects or personnel in its travel path and will stop upon detection of an obstruction.

4. The vehicle will be capable of restraining its load.

4.2.2.5 Vehicle Maintenance Requirements

A. Each vehicle shall have a retrieval method, without disassembly, from its normal operating location without increased exposure of personnel to radiation.

B. A dedicated maintenance work area(s) shall be provided for troubleshooting, repair and performance testing of the vehicles.

C. Special tools, test equipment, diagnostic software, and test track shall be provided in the vehicle maintenance area.

D. A single battery charger shall be provided for each vehicle.

5.0 REFERENCES

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