HFD-42065

SOLID RADIOACTIVE WASTE
SUBSYSTEM DESIGN DESCRIPTION

4 x 350 MW(t) MODULAR HTGR PLANT

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LIST OF ACRONYMS

ANS	American Nuclear Society
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
EPA	Environmental Protection Agency
ICD	Interface Control Document
NSRE	Non-Safety-Related Electrical
NSSS	Nuclear Steam Supply Systems
OBE	Operating Basis Earthquake
OPDS	Overall Plant Design Specification
PAG	Protective Action Guidelines
SDD	System Design Description
SSDD	Subsystem Design Description
SG	Steam Generator
UNC	Class Unclassified

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PREFACE

The objectives of the HTGR plant project are to produce safe, economical power. Supporting these objectives are four major goals and their associated plant states, identified as follows:

1. Maintain Safe Plant Operation
 - 1.1 Maintain Safe Energy Production
 - 1.2 Maintain Safe Plant Shutdown
 - 1.3 Maintain Safe Plant Refueling
 - 1.4 Maintain Safe Plant Startup/Shutdown
2. Maintain Plant Protection (in the event that plant operation cannot be maintained in the normal operating envelope)
 - 2.1 Protect the Capability to Maintain Safe Energy Production
 - 2.2 Protect the Capability to Maintain Safe Plant Shutdown
 - 2.3 Protect the Capability to Maintain Safe Plant Refueling
 - 2.4 Protect the Capability to Maintain Safe Plant Startup/Shutdown
3. Maintain Control of Radionuclide Release (in the low probability event of failure to maintain plant protection)
 - 3.1 Control Radiation
 - 3.2 Control Personnel Access
4. Maintain Emergency Preparedness (in the extremely low probability of failure to maintain control of release of radionuclides)

The Overall Plant Design Specification (OPDS) is the top-level technical document for the HTGR plant. The OPDS (based on owner requirements and regulatory requirements) establishes the overall performance, functional, institutional, interface, operational, safety, maintenance, inspection and decommissioning requirements for design of the plant.

In response to the OPDS a series of lower tier documents, System Design Descriptions (SDDs), Subsystems Design Descriptions (SSDDs), Equipment Specifications (E-Specs), and Interface Control Documents (ICDs) describe and control the individual designs. Traceability from plant-level requirements to equipment-level requirements is maintained throughout this hierarchy of design documents.

SUMMARY

The Solid Radioactive Waste Subsystem provides reliable processing of collected solid waste to meet the requirements of 10CFR20 and 10CFR61. The methods utilized are cement solidification for sludges, resins, liquids, and noncompactible waste, and compaction for dry compressible waste. The drums of processed waste will be stored until transported off-site for disposal at a licensed burial site.

SECTION 1

SUBSYSTEMS FUNCTIONS AND DESIGN REQUIREMENTS

1.1 SUBSYSTEM FUNCTIONS

The functions of the Solid Radioactive Waste Subsystem are to provide processing of collected solid waste, to safely control radiation within the plant, and to maintain plant operation.

The Solid Radioactive Waste System is designed to provide reliable collection, processing, packaging, and storage of radioactive waste to meet the requirements of 10CFR20 and 10CFR61.

1.2 SUBSYSTEM DESIGN REQUIREMENTS

1.2.1 Subsystem Configuration and Essential Features Requirements

Compaction shall be used to process dry active waste.

(2065.1201.001)

A resin transfer subsystem and holding tank shall be provided for Liquid Radioactive Waste Subsystem demineralizers.

(2065.1201.002)

Immobilization agent shall be cement.

(2065.1201.003)

Shielded and unshielded 55 gallon drum storage shall be provided.

(2065.1201.004)

1.2.2 Operation Requirements

The design shall provide for individual personnel access to normally accessible areas of the facility for 40 hours per week in the performance of their operational, maintenance, and testing duties while limiting the average long-term whole body radiation exposure from all sources to no more than 10 percent of 10CFR20 requirements for radiation workers, based upon the number of personnel assigned to the permanent plant staff.

(2065.1202.001)

Radiation levels from material collected shall be limited such that 10CFR20 occupational dose limits are met.

(2065.1202.002)

1.2.3 Structural Requirements

The Solid Radioactive Waste Subsystem shall be seismically designed to remain functional following an earthquake at a level equivalent to the Operating Basis Earthquake.

(2065.1203.001)

1.2.4 Environmental Requirements

The Radioactive Solid Waste System shall be capable of operating within the normal design environmental conditions of temperature, pressure, humidity, and radiation for the design life of the equipment (see Table 1-1).

(2065.1204.001)

1.2.5 Instrumentation and Control Requirements

The Radioactive Solid Waste System shall be monitored and alarmed locally and at the control room to provide information on system status.

(2065.1205.001)

Computer inputs shall be provided to monitor critical parameters which are annunciated and to provide a hard copy of alarm messages for documentation of abnormal events.

(2065.1205.002)

The status of all major active system components shall be monitored and displayed.

(2065.1205.003)

Local control panels shall be provided.

(2065.1205.004)

1.2.6 Surveillance and In-Service Inspection Requirements

Not applicable

1.2.7 Availability Requirements

The Radioactive Solid Waste System design objectives shall be to achieve an expected unavailability of [TBD] (outage hours per year) to support the overall plant design equivalent availability of at least 80 percent for electrical generation.

(2065.1207.001)

The Radioactive Solid Waste System shall be designed so that the time to repair or replace a component or the subsystem shall minimize out-of-service time.

(2065.1207.002)

1.2.8 Maintenance Requirements

The Radioactive Solid Waste System shall be designed to facilitate hands-on, in-place, or on-line maintenance to the greatest degree practicable.

(2065.1208.001)

The use of standard "off-the-shelf" components and materials shall be used to reduce costs associated with required spare parts. Components shall be classified to reduce the number of different types, sizes, and temperature and pressure ratings.

(2065.1208.002)

The Radioactive Solid Waste System components shall be provided with periodic maintenance, consistent with the manufacturer's recommendations. In addition, adequate floor space and maintenance clearances shall be provided around these components to permit in-place maintenance, dismantling, and removal/replacement of equipment.

(2065.1208.003)

The numbers of inaccessible areas due to high radiation levels during reactor operation shall be minimized to facilitate routine operational and maintenance activities.

(2065.1208.004)

Whenever possible, Radioactive Solid Waste System components shall be located outside radiation zones or in low radiation areas making equipment available to plant maintenance personnel. Arrangement shall also consider the access path to, as well as location of, components.

(2065.1208.005)

1.2.9 Safety Requirements

Not applicable

1.2.10 Codes and Standards Requirements

The Radioactive Solid Waste System shall be designed and constructed in accordance with the Regulatory Requirements and Industry Codes and Standards listed in Table 1-2.

(2065.1210.001)

1.2.11 Quality Assurance Requirements

Items Designated Equipment Class Unclassified (UNC) or Electrical Class Non-Safety-Related Electrical (NSRE) are QAL II or QAL III, as described in Reference 7. QAL II items shall come under a quality assurance program which complies with selected basic requirements and supplements of NQA-1 and the four additional supplements specified in the OPDS. QAL III items shall come under a quality assurance program which complies with selected basic requirements of NQA-1 and the four additional supplements specified in the OPDS.

(2065.1211.001)

1.2.12 Construction Requirements

(TBD)

1.2.13 Decommissioning Requirements

(TBD)

1.2.14 Sampling Requirements

Provisions shall be made to allow representative grab sampling and analysis of wet solid radioactive wastes prior to solidification.

(2065.1214.001)

TABLE 1-1
ENVIRONMENTAL CONDITIONS

Environment	Specified	Qualified	Remarks
A. <u>Normal</u>	(TBD)	(TBD)	(TBD)
Temperature, °C (°F)			
Pressure, psia			
Humidity, %			
* Radiation, rads			
Heat rise, °C (°F)			
Activation			
energy, ev			
Aging, day 5/yr			
Operating cycles			
* 40 yrs total integrated dose (TID)			

TABLE 1-2

DESIGN CODES, STANDARDS, AND REQUIREMENTS

40CFR61	National Emissions Standards for Hazardous Air Pollutants; Standards for Radionuclides
10CFR20	Standards for Protection against Radiation.
ANSI/ANS 55.1	Solid Radioactive Waste Processing Systems for Light Water Reactor Plants.
40CFR190	Environmental Protection Agency Radiation Protection Standards for Nuclear Power Operations.
10CFR50	Domestic Licensing of Production and Utilization Facilities
49CFR171 through 179	Shipping of Radioactive Material Requirements

SECTION 2

DESIGN DESCRIPTION

2.1 SUMMARY DESCRIPTION

The Solid Radioactive Waste Subsystem is designed to provide holdup, solidification, packaging, and storage facilities for radioactive materials prior to their shipment offsite for ultimate disposal.

Materials handled as solid wastes include high conductivity waste solutions from decontamination and other operations, highly tritiated liquids, spent resin from radioactive process demineralizers, spent filter cartridges, high temperature filter units, low level compressible wastes (i.e., rags, paper, clothing, etc), HEPA and charcoal filtration units, and miscellaneous solid materials that become radioactive or contain radiation resulting from wastes generated during plant operation and maintenance.

The system consists of a ventilated storage room for dry and compressible wastes, a dry waste compactor, a resin transfer tank and pump, drum roller for mixing liquid wastes and resins with cement, and an industrial robot for cutting up large noncompatible waste items.

A shielded storage area is provided for ten 55-gallon drums and a nonshielded area for sixty-five 55-gallon drums. Figure 2-1 shows the system configuration.

2.2 SUBSYSTEM CONFIGURATION

The Solid Radioactive Waste Subsystem collects, processes, packages, and stores radioactive waste to meet the requirements of 10CFR20 and 10CFR61.

The Solid Radioactive Waste Subsystem consists of two processing paths. For low level compressible dry waste (i.e., rags, paper, clothing, etc), the compaction device is designed for volume reductions of 50 to 85 percent and will include a ventilated shroud for aerosol dust control. Wet wastes such as high conductivity decontamination solutions, highly tritiated liquids, or spent resins and noncompactible wastes, such as contaminated tools, incore devices, or small contaminated components, will be immobilized with cement.

2.3 SUBSYSTEM PERFORMANCE CHARACTERISTICS

The Solid Radioactive Waste Subsystem is designed to be functional during all modes of normal plant operation.

2.3.1 Subsystem Operating Modes

Sufficient storage area and tankage is available in the Radwaste Management Building to allow for accumulation of waste during the potentially high waste-producing operations of decontamination, maintenance, or refueling.

The spent resin transfer portion of the subsystem is designed to transfer resin from the radioactive liquids waste demineralizers, using waste water for

fluidization and flushing. The subsystem provides unlimited water flush capability by recirculating the resin transfer water; therefore, makeup water and liquid radwaste quantities are minimized.

The spent resin hold tank provides several functions in the resin transfer and disposal process by providing a source of water used to flush the demineralizer resin beds and performing a phase separator function in accumulating resin. Separation is accomplished by an underdrain system within the spent resin hold tank that retains resin but allows the spent resin transfer and dewatering pump to drain water for continued resin dewatering.

When a sufficient amount of resin has been transferred to the hold tank or a volume of liquid waste requiring solidification has accumulated, the tank is dewatered via the underdrain system and the spent resin transfer pump. The discharged liquid is transferred to the Radioactive Liquid Waste System for processing. High conductivity or highly tritiated liquid waste will be added to the tank to allow discharge of resin slurry to the solidification process. If additional water is required for the process, other liquid wastes are utilized. The solidification equipment mixes the liquid wastes and resin beads with a sodium silicate solution, if process solidification tests show a need, and injects the mixtures into a 55-gallon drum containing cement where the wastes are mixed and solidified.

The solidification subsystem fill port mechanism provides a seal at the waste drum/fill port interface to minimize drum, equipment, and area contamination while filling the drum. The seal allows vapors, gases, and displaced air to be vented into the filtered vent system rather than into the building atmosphere.

To ensure that no free liquid will be present in the drum and that solidification occurs, specific procedures will be followed. The pH and major chemical constituents of the waste will be determined and the pH adjusted, if necessary, prior to transfer from the Radioactive Liquid Waste System. The ratio of cement-to-waste-to-sodium silicate solution (if required) will be established, based on the chemical constituents and sample tests or previously determined solidification characteristics of the various waste types.

A waste compactor provides a reliable and economical means of processing radioactive compressible wastes. Material such as rags, plastic sheets, and papers is placed in standard 55-gallon steel drums and compacted. The operation is repeated until the drum is full; then the drum is sealed and stored until it is shipped offsite. Airborne contamination is minimized by directing displaced air via an exhaust shroud and filter to the vent system.

Drums with high activity levels are stored in a shielded area prior to shipping, while low activity drums are stored in the shipping area.

2.3.2 Subsystem Steady-State Performance

The design for operation of the Solid Radioactive Waste System is based upon receipt of radioactive contaminated dry waste or spent resins, sludges, or decontamination liquids on a batch basis. The system is designed to process dry wastes by compaction, or encapsulation if uncompressible, and to encapsulate wet wastes in a solidification agent matrix.

2.3.3 Subsystem Response to Plant Transients

2.3.3.1 AOO Performance

Table 4-1 includes the annual volume inputs to the Radioactive Solid Waste System as part of the normal system inputs for equipment sizing and storage requirements for those anticipated operational occurrences (AOO), i.e., events which have an expected frequency of greater than once in the 40-year life of the plant, which, as a consequence, cause additional solid waste to be generated.

2.3.3.2 DBE Performance

The Solid Radioactive Waste System is not designed to mitigate the consequences of Design Basis Events (DBEs); however, the Solid Radioactive Waste System will remain functional and will be available for processing solid waste generated as a consequence of DBEs, except for solid waste which involves plant external events such as loss of electric power or the SSE which will cause the Solid Radioactive Waste System to be inoperative.

2.3.4 Subsystem Failure Modes and Effects

In the Solid Radioactive Waste Subsystem, failure of the dry waste compactor would have no effect on plant operation as sufficient area is available in the Radwaste Management Building to store the bagged waste until repairs could be effected.

Failure of the drum roller does not impact plant operation due to availability of adequate tank storage for wet wastes until repairs or replacement can be effected. Testing of the drum roller's operability is required prior to starting drumming operations.

Failure of the resin transfer pump does not impact plant operation due to availability of alternate demineralizer for waste processing. Adequate tankage is also available in the Liquid Radioactive Waste Subsystem until repairs can be effected.

Failure of the underdrain system by plugging will not impact plant operation. If backflushing does not clear the screens, the resin hold tank will have to be emptied prior to effecting repairs. Additional low activity liquid would be solidified as a result.

Failure of the resin hold tank would not impact plant operation since the resulting liquid spill is collected within a diked area surrounding the tank, although there would be a small addition to the offsite dose via the gaseous release path. Since tritium vapor is expected to be the major contributor to the release, it is not anticipated that the dose rates specified in 10CFR20 for unrestricted areas or the 10CFR50, Appendix I limits for unanticipated events would be approached.

2.4 SUBSYSTEM ARRANGEMENT

The Solid Radioactive Waste Subsystem is located within the Radwaste Management Building. The building is arranged on grade elevation with the spent resin

hold tank located in a diked area sized to catch the contents in the event of tank failures. The components of the subsystem are located in a seismically designed building. The Solid Radioactive Waste Subsystem is seismically designed to remain functional following an earthquake at a level equivalent to the Operating Basis Earthquake (OBE). The subsystem is arranged to minimize long runs of concentrated waste piping to facilitate material handling flow patterns and to minimize radiation exposure of operating personnel.

The subsystem arrangements for the Radioactive Waste Management Building are depicted in the general arrangement drawings, Figures 2-2, 2-3, and 2-4.

2.5 INSTRUMENTATION AND CONTROLS

Solid Radioactive Waste Subsystem instrumentation and controls include:

1. Tank level instrumentation to determine liquid level and the resin/liquid interface.
2. Area radiation monitors for monitoring activity/radiation levels at the drumming station and contact dose rate on the drums.

14884-PID-31-30

SPENT RESIN SLURRY

HIGH CONDUCTIVITY LIQ WASTE

DRY WASTE

DECONTAMINATION MATL

SPENT FILTER ELEMENTS

SPENT
RESIN
TANK

SPENT RESIN
TRANSFER PUMP

TO LIQUID WASTE
SPENT RESIN TRANSFER

BAG
STORAGE
AREA

DRUM
PREPARATION
AREA

FILTER ELEMENT

FILTER ELEMENT LAYDOWN AREA

ISSUE 4	DESCRIPTION	CHECKED	ISSUE 3	DESCRIPTION	CHECKED	ISSUE 2
		CORRECT			CORRECT	
		APPR DATE			APPR DATE

NOTE:
1. ALL COMPONENTS ARE IN SHIELDED AREA

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FIGURE 2-1

FLOW DIAGRAM SOLID RADIOACTIVE WASTE SYSTEM

SMALL HTGR PROGRAM
GAS-COOLED REACTOR ASSOCIATES

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

DRAWING NUMBER 14884-PID-31-3.0

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PLAN EL 0'

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		APPR DATE			APPR DATE		
			JOB CHARGE 14884 36		4/22/84	JOB CHARGE

EQUIPMENT LIST

1. WASTE GAS SURGE TANK
2. WASTE GAS VACUUM TANK
3. WASTE GAS EXHAUST BLOWER
4. WASTE GAS FILTER
5. DIAPHRAGM COMPRESSOR
6. MOISTURE DRAIN TANK
7. LIQUID RADWASTE RECEIVER TANK
8. LIQUID RADWASTE RECEIVER TANK PUMP
9. LIQUID WASTE TEST TANK
10. LIQUID WASTE TEST TANK PUMP
11. SPENT RESIN TANK
12. SPENT RESIN TRANSFER PUMP
13. HIGH CONDUCTIVITY RADWASTE TANK
14. HIGH CONDUCTIVITY RADWASTE TANK PUMP
15. FILTER/DEMINERALIZER
16. MIXER
17. COMPACTOR
18. MOTOR CONTROL CENTER

NOTES:

1. SCALE: $\frac{1}{8}'' = 1'-0''$

REFERENCE DRAWINGS

1. GENERAL ARRANGEMENT RADIOACTIVE WASTE MANAGEMENT BLDG - PLAN EL 20'-0" DM-209B
2. GENERAL ARRANGEMENT RADIOACTIVE WASTE MANAGEMENT BLDG - SECTIONS 1-1 & 2-2 DM-209C
3. PLOT PLAN DM-201E

GRAPHIC SCALE

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FIGURE 2-2

NOT TO BE USED FOR CONSTRUCTION

GENERAL ARRANGEMENT RADIOACTIVE WASTE MANAGEMENT BLDG-PLAN EL 0'-6''

SMALL HTGR PROGRAM
GAS-COOLED REACTOR ASSOCIATES

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON MASS

DRAWING
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					JMC	
	APPR	JOB CHARGE 14884-18	DATE		APPR	DATE
	DEM				DEM	
	WCC				WCC	

14884-DM-209B-2

PLAN EL 20'-0"

ISSUE 4	DESCRIPTION	CHECKED	ISSUE 3	DESCRIPTION	CHECKED	ISSUE 2	DESCRIPTION
		CORRECT			CORRECT		REDRAWN SUPERSEDES DF
		APPR DATE			APPR DATE		JOB CHARGE

NOTES:

1. SCALE: $\frac{1"}{8} = 1' - 0"$

2. NOTES AND REFERENCES

DM-209A

GRAPHIC SCALE

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FIGURE 2-3

NOT TO BE USED FOR CONSTRUCTION

GENERAL ARRANGEMENT
RADIOACTIVE WASTE
MANAGEMENT BLDG-PLAN EL 20'-0"

SMALL HTGR PROGRAM
GAS-COOLED REACTOR ASSOCIATES

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON MASS

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14884-DM-209C-1

1-1
(DM-209A, H-3)
(DM-209B, H-3)

2-2
(DM-209A, H-6)
(DM-209B, H-6)

ISSUE 4	DESCRIPTION	CHECKED	ISSUE 3	DESCRIPTION	CHECKED	ISSUE 2
		CORRECT			CORRECT	
		APPR DATE			APPR DATE

EQUIPMENT LIST:

1. WASTE GAS SURGE TANK
2. WASTE GAS VACUUM TANK
3. WASTE GAS EXHAUST BLOWER
4. WASTE GAS FILTER
6. MOISTURE DRAIN TANK
7. LIQUID RADWASTE RECEIVER TANK
8. LIQUID RADWASTE RECEIVER TANK PUMP
15. FILTER/DEMINERALIZER
18. MOTOR CONTROL CENTER

NOTES:

1. SCALE: $\frac{1}{8}'' = 1'-0''$
2. GENERAL NOTES & REFERENCE DRAWINGS DM-209A

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GRAPHIC SCALE

FIGURE 2-4

NOT TO BE USED FOR CONSTRUCTION

GENERAL ARRANGEMENT RADIOACTIVE WASTE MANAGEMENT BLDG-SECTIONS

SMALL HTGR PROGRAM
GAS-COOLED REACTOR ASSOCIATES

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MA

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SECTION 4

SUBSYSTEM AND COMPONENT INTERFACES

4.1 SUBSYSTEM INTERFACE REQUIREMENTS

4.1.1 Interface Requirements Imposed On/By Other Systems

Estimated waste inputs are presented in Table 4-1. Interfaces, at the system level, are presented in Table 4-2.

4.1.2 Interface Requirements Imposed on Subsystems Within the System

(TBD)

4.2 COMPONENT BOUNDARY DEFINITIONS

(TBD)

TABLE 4-1

ESTIMATED ANNUAL INPUTS TO THE SOLID RADIOACTIVE WASTE SYSTEM

Source	Quantity Per Module	Activity Per Module Per Occurrence
Spent Reflector Blocks	Each of 67 reflector blocks, at each 18-month refueling/module. Each block is hexagonal in cross section, nominally 35.6 cm across flats x 78.7 cm high (14" x 31")	5.56×10^{-1} Ci Cs-134 1.93×10^{-1} Ci Cs-137 1.83×10^{-1} Ci Ba-137m
Spent Control Rods	TBD	TBD
In-Vessel Thermocouples	TBD	TBD
Startup Detectors	TBD	TBD
Neutron Detectors	TBD	TBD
High Temperature Filter	Filter assembly is 20.3 cm dia x 122 cm high (8" dia x 48") 10 yr/module	9.33 Ci Cs-137 8.87 Ci Ba-137m
High Temperature Adsorbers	Adsorber assembly is 61 cm dia x 91.4 cm high (24" dia x 3' high) 10 yr/module	9.33 Ci Cs-137 8.67 Ci Ba-137m
Miscellaneous Small Components	TBD	TBD
Moisture Monitor Filters	TBD	TBD
Spent Resin/Filter Cartridges	200 cartridges/yr	TBD
Day Trash	425 M ³ /yr at 96 kg/M ³ (12 ft ³ /yr at 6 lb/ft ³)	TBD
LWS Liquids	TBD	TBD
LWS Resins	TBD	TBD

TABLE 4-2

SOLID RADIOACTIVE WASTE SUBSYSTEM INTERFACE REQUIREMENTS

Interfacing Systems (with Subsystem/Identification)	Nature of Interface	Interfacing Component	Interface Requirements
Reactor Core Assembly	Limit spent reflector blocks	Container holding SRB	Receive and ship packaged SRBs
Neutron and Region Flow Control	Limit buildup or radioactivity	Worn components or control elements	Receive and ship radioactive contaminated parts
Core Service Tools	Limit buildup of radioactivity	Broken and used material/parts	Receive and ship radioactive contaminated debris
Helium Purification Filter and Absorber Elements	Limit buildup of radioactive waste	Spent filter and absorber elements	Receive and ship elements
Service Facility	Limit buildup of radioactive waste	Small NSSS components packaged in containers	Receive and ship components
Moisture Monitor	Limit buildup of radioactive waste	Moisture monitor filter units	Receive and ship units
Miscellaneous	Limit buildup of radioactive waste	Low level compressible waste (rags, paper, clothing, etc) in containers	Receive and ship material
Liquid Radwaste	Limit buildup of radioactive waste	Resin slurry, high conductivity/activity in pipes. Decontamination and filter units in containers	Receive and ship in containers

TABLE 4-2 (continued)

Interfacing Systems (with Subsystem/Identification)	Nature of Interface	Interfacing Component	Interface Requirements
Gaseous Radwaste	Limit radioactivity in filters	Spent filter units	Receive and ship elements
HVAC	Limit radioactivity in filters and adsorber elements	HEPA filters and adsorber units	Receive and ship units
Shutdown Cooling Water	Limit radioactivity in filters	Spent filter cartridges	Receive and ship elements
Essential Cooling Water	Limit radioactivity in filters	Spent filter cartridges	Receive and ship cartridges

SECTION 9

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