



# DESIGN CRITERIA DOCUMENTS

## COVER SHEET

INTERIM SOLID WASTE  
STAGING FACILITY  
FOR  
GPU SERVICE CORPORATION  
THREE MILE ISLAND-UNIT 2

JOB NO: 13587

DISCIPLINE: GENERAL

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DESIGN CRITERIA DOCUMENTS  
REVISION STATUS SHEET

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 THREE MILE ISLAND - UNIT 2

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DESIGN CRITERIA  
FOR  
INTERIM SOLID WASTE STAGING FACILITY

1.0 FUNCTION

The Interim Solid Waste Staging Facility (ISWSF) is to be used for the collection and temporary storage of low level solid or solidified waste packages. All waste packages in the ISWSF are assumed to be completely prepared for shipment. No operations except material handling are assumed for the ISWSF. The Interim Solid Waste Staging Facility will be sized to accommodate 6 months of waste generation from both Units 1 and 2 as shown in Table 5-1 without shipment for offsite disposal.

2.0 SCOPE

The Interim Solid Waste Staging Facility will be a simple facility consistent with its passive function. There will be a slab with curbs and a sump to contain any liquids released within the facility. A noncombustible roof will be supported on columns. Electric power will be supplied to the facility for lights and utility outlets. The facility will have one truck bay to facilitate loading waste packages onto trucks for shipment. There will be a fence completely surrounding the facility.

3.0 FACILITY DEFINITION

3.1 FUNCTION

The Interim Solid Waste Staging Facility provides a location for the collection of waste packages. It performs the passive functions of protecting waste packages from precipitation and providing a facility which eases loading of waste packages on trucks. The Interim Solid Waste Staging Facility performs no active functions.

3.2 MAJOR COMPONENTS LIST - SEE SECTION 2.0, SCOPE

3.3 INTERFACES

There are six interfaces associated with this facility.

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- (1) The facility must interface with the onsite material handling equipment which will be used to bring waste packages into the facility. Material handling into and within the ISWSF will be done with forklifts. There will be at least one ramp into the facility.

- (2) The ISWSF must interface with trucks and shipping casks used to transport waste packages offsite. There will be one truck bay adjacent to the ISWSF, which will allow loading of a standard flatbed trailer or enclosed van by a forklift. Ramps will exist over the curbs.
- (3) The ISWSF will be completely surrounded by an isolation fence. On the east side, the isolation fence is also the station fence.
- (4) An interface with an existing electrical system will be required to provide power for lights and utility outlets.
- (5) An interface will exist between the ISWSF and the existing plant to assure that fire protection and detection are adequate.
- (6) An interface with the existing plant public address system will be provided.

#### 4.0 FUNCTIONAL REQUIREMENTS

##### 4.1 ACCESSIBILITY

In addition to the access requirements identified in Section 3.3, Interfaces, there is a need for ready access within the Interim Solid Waste Staging Facility. Access within the facility is required to assure that material handling operations proceed quickly to assure operator exposures are ALARA. There may also be a need for temporary shield walls within the facility to achieve ALARA operator exposures.

##### 4.2 MAINTAINABILITY

This facility shall require no preventive maintenance for at least five years. The slab and columns shall be coated to the height necessary to allow decontamination of the surfaces.

##### 4.3 PERSONNEL

Personnel will be needed in the Interim Solid Waste Staging Facility to do material handling. The minimum number of operators needed to perform the activities will be assigned to assure that total exposure is ALARA. Only those personnel actively involved in the material handling activities should be inside the fence enclosing the ISWSF.

##### 4.4 SAFETY

Waste stored in the Interim Solid Waste Staging Facility will be in a nondispersible form, since it will be a solid and contained within a sealed container. Regulation 10 CFR 20.105 limits the radiation levels in unrestricted areas. Regulation 40 CFR 190 further limits the yearly radiation dose to any member of the public due to all fuel cycle activities, including direct radiation. Compliance with these regulations

will assure that the facility will not have an unacceptable impact on public health and safety.

The site's Radiation Protection Plan, which implements the requirements of 10 CFR 20.1(c), will assure that operator exposures associated with the Interim Solid Waste Staging Facility are ALARA.

A dose rate of 0.3 mr/hr for an occupancy of no more than 67 hours per year (see Regulatory Guide 1.109) is used at the site boundary (river shoreline) to assure compliance with 40 CFR 190. A dose rate of 0.6 mr/hr is used at the fence separating the ISWSF from areas surrounding it.

## 5.0 FACILITY DESIGN REQUIREMENTS

### 5.1 GENERAL REQUIREMENTS

The input to the Interim Solid Waste Staging Facility will be packages of solid or solidified wastes ready for shipment. The quantity and radiation levels of the wastes from both Units 1 and 2 are presented in Table 5-1. No activities on the waste packages other than handling will have to be performed in the ISWSF. All counting, swiping, decontamination, and weighing will be done prior to the transfer of packages to the ISWSF.

The Interim Solid Waste Staging Facility will allow separation of Unit 1 wastes from Unit 2 wastes.

### 5.2 CODES, STANDARDS, AND REGULATIONS

#### 5.2.1 Federal

5.2.1.1 10 CFR Part 20, "Standards for Protection Against Radiation"

5.2.1.2 40 CFR Part 190, "Uranium Fuel Cycle Standard"

5.2.1.3 United States Nuclear Regulatory Commission Regulatory Guide 1.109 - Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I (Rev. 1, October 1977)

#### 5.2.2 Industry

The facility will be designed in accordance with the applicable portions of the following industry and state codes:

5.2.2.1 American Institute of Steel Construction (AISC), "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings," November 1, 1978

5.2.2.2 American Iron and Steel Institute (AISI), "Specification for the Design of Cold-Formed Steel Structural Members," 1968 Edition, with commentary dated 1970 and supplement dated 1971

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5.2.2.3 American Concrete Institute (ACI), "Building Code Requirements for Reinforced Concrete, (ACI 318-77)

5.2.2.4 Building Officials and Code Administrators International, "The BOCA Basic Building Code," 1978

5.2.2.5 Metal Building Manufacturers Association, "Recommended Design Practices Manual," 1974

5.2.2.6 National Electric Code (NEC)

5.2.2.7 Pennsylvania Code for Fire and Panic.

### 5.3 INTERLOCKS AND ADMINISTRATIVE CONTROLS

Administrative controls will be required to assure that no waste package with radiation levels exceeding those shown in Table 5-1 are transferred to the ISWSF. These controls should also assure that the smearable contamination on each package's outer surface is below the regulatory limit for shipping. There will be no interlocks in this facility.

### 5.4 MATERIALS

The slab and curb of the ISWSF will be concrete finished with epoxy. The roof will be metal standing seam with factory-applied protective coating. Shield walls will be either poured or filled block concrete. All wall surfaces facing contaminated storage areas shall be finished with epoxy and the outside of the walls shall be painted with acrylic paint. Structural steel columns, where exposed to contaminated storage areas, shall be finished with epoxy. All other steel columns and roof framing shall receive standard shop-applied primer and field-applied protective finish. All fencing materials shall be galvanized.

### 5.5 LAYOUT REQUIREMENTS

#### 5.5.1 Location

The location and size of the ISWSF is determined by

- number of containers based upon 6 months storage (Table 5-1)
- space available
- configuration required for separation of Unit 1 and Unit 2 waste
- storage area requirements based upon pyramidal vertical stacking
- minimum clearance requirements to overhead power lines
- sufficient space for forklift operation

- required topography to facilitate incorporation of the truck bays
- shielding requirements to meet ALARA and boundary dose considerations.

The location of the ISWSF also governs the radiation level of packages which may be stored there without shielding. This is so since its location will establish the distance to the fence which must surround the facility.

### 5.5.2 Shielding

Concrete partitions will be used to reduce the exposure to the personnel in the unshielded areas and meet the site boundary and unrestricted boundary levels. Shielding partitions are of sufficient height so that no direct radiation is emitted from shielded areas.

## 5.6 STRUCTURAL REQUIREMENTS

5.6.1 The facility shall consist of an open-sided metal building designed to satisfy the following requirements:

- a. The roof live load (snow load) shall be 30 psf applied to the horizontal projection of the roof area.
- b. The wind load shall be applied and proportioned as horizontal and uplift forces in accordance with Section 4 of Metal Building Manufacturers Association (MBMA), "Recommended Design Practices Manual" and shall be 20 psf.
- c. Seismic loads shall be determined in accordance with the BOCA Basic Building Code for Seismic Zone 1.
- d. The combinations of loads and allowable stresses to be considered in the design of all members of the structure shall be in accordance with Section 7 of the MBMA, "Recommended Design Practices Manual."

5.6.2 The floor slab shall be designed for a live load of 1000 psf.

The wheel loads for the fork lift will also be considered in the slab design.

## 5.7 ELECTRICAL REQUIREMENTS

Electrical power will be provided to supply lighting and receptacle loads. The power will be derived from the 13.2 kV overhead lines on the east side of the site. A 120/208 volt service will be provided from a panelboard within the facility. Outlets will be provided for portable sump pumps. A lighting level of 10 FC will be provided. All electrical systems and metal structures will be grounded. The plant public address



system will be extended to serve the facility. In the event that fire detection is included in the facility, an alarm circuit will be routed up to the fire protection console in the main control room.

#### 5.8 FIRE PROTECTION REQUIREMENTS

A fire hazards analysis will be performed. If required, fire detection will be by a combination of thermal and smoke (obscuration type) detectors. If provided, the alarms will tie into the control room and will be monitored at all times. Fire extinguishing will be by a firehose from fire hydrant house FS-U-19, located approximately 250 feet from the facility.

Table 5-1  
DESIGN STORAGE REQUIREMENTS

Unit	Quantity (per month)	Container/ Trash Type	Radiation Level
1	3	55 gal drum/compacted trash	up to 50 mr/hr
*1	19	55 gal drum/compacted trash	50 to 100 mr/hr
*1	15	55 gal drum/compacted trash	100 to 200 mr/hr
*1	4	55 gal drum/compacted trash	200 - 400 mr/hr
*1	1	4'x4'x7' box/compacted trash	up to 200 mr/hr
*1	10	50 ft <sup>3</sup> liners/solidified evaporator bottoms	200 - 500 mr/hr
2	9	55 gal drum/solidified radioc waste	up to 100 mr/hr
2	25	55 gal drum/compacted trash	0 to 1 mr/hr
2	10	55 gal drum/compacted trash	1 to 2 mr/hr
2	17	55 gal drum/compacted trash	2 to 5 mr/hr
2	14	55 gal drum/compacted trash	5 - 20 mr/hr
2	8	55 gal drum/compacted trash	20 - 100 mr/hr
*2	4	55 gal drum/compacted trash	100 - 500 mr/hr
*2	1	55 gal drum/compacted trash	500 - 1000 mr/hr
*2	1	55 gal drum/compacted trash	1000 - 2000 mr/hr
2	4	4'x4'x7' LSA boxes	0 - 1 mr/hr
2	4	4'x4'x7' LSA boxes	1 - 2 mr/hr
2	5	4'x4'x7' LSA boxes	2 - 10 mr/hr
2	5	4'x4'x7' LSA boxes	10 - 20 mr/hr
2	4	4'x4'x7' LSA boxes	20 - 100 mr/hr
2	1	4'x4'x7' LSA boxes	100 - 200 mr/hr
*2	1	4'x4'x7' LSA boxes	200 - 500 mr/hr

\* This waste will be stored in shielded areas.