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U.S. DEPARTMENT OF ENERGY
WASTE ISOLATION PILOT PLANT

PLANT BUILDINGS, FACILITIES, AND
MISCELLANEOUS EQUIPMENT

SYSTEM DESIGN DESCRIPTION (SDD)

SDD CF00-GC00

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For

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0	1/92	Sections 1.0, 2.0, 3.0, & 3.3	ECP 1-CF91-171 ECO NO. 5903
1	8/93	Revised Sect.1.0, 2.0, 3.3, & App Added Sect. 3.0, 4.0, 5.0, 6.0, 7.0	ECP 1-CF91-171 ECO NO. 6823
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14	05/12/06	Incorporating the card reader into the SDD		ECO 11455
15	10/26/06	Salt Pile Infiltration Controls		ECO 10716
16	03/05/07	Revise Figures G-3, G-4, CF-II-3, CF-II-4, CF-II-8, and GC-I-2.		ECO 11606
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22	09/24/09	Section GC-II-II 2.2.16, 3.2.16, 3.4.16, 3.5.16 Revise Figure G-3 and G-4	ECO 10981
23	11/09/09	Revise Figures G-3 and GC1-2	ECO 12321
24	05/19/10	Delete Door Interlock on CF II_62 Add Table to CF II-62 Figure CF-II-18 Table CF-II-8 Figure CF-II-13	ECO 12127 ECO 12178 ECO 12534
25	09/01/10	Section GC-I 2.2.4 Section GC-I 3.5.5 Section CF-II 7.3.1 & 7.4	ECO 12308 Addendum 1 ECO 12649

SUMMARY

The WIPP Plant Building, Facilities, and Miscellaneous Equipment System encompasses two major systems which are configured into two SDD parts as illustrated in Figure S-1, Figure S-2, and Figure S-3. These systems are:

- Part I: Confinement Facilities and special Structures (CF00)
- Part II: General Civil and Structural Facilities (GC00)

The Confinement Facility is limited to the Waste Handling Building (WHB) (CF02) as illustrated in Figure S-2. The WHB includes the following four major areas:

- Contact-Handling (CH) Waste Handling Area
- Remote Handling (RH) Waste Handling Area
- Hoist Tower Area
- Mechanical Equipment Room

The primary functions of the WHB and its associated features are:

- To receive and transfer waste packages from the incoming transporters to the Waste Shaft.

- To provide for a comprehensive confinement function under varying ambient conditions, and to prevent structural failure or damage during and following operational or natural phenomena events. **[TSR DF 6.1]**.

The Special Structures (CF01) is identified on Figure S-2. These structures are classified as "special" due to:

- Their physical proximity/interface with the WHB, and/or
- Their direct support of monitoring, maintenance, and filtration functions.

The General Civil and Structural System (GC00) consists of six subsystems as illustrated in Figure S-3. These subsystems are:

- Roads and Grounds (GC01)
- General Surface Facilities (GC02)
- Sanitary Sewage System (GC03)
- Fuel System (GC04)
- GC05 has been realigned as CF01, Special Facilities
- External Surface Facilities (GC06)
- Surface Miscellaneous Mobile and Lifting Equipment (GC07)

The General Civil and Structural system provides for a wide spectrum of different services and functions in support of the operation of the WIPP facility.

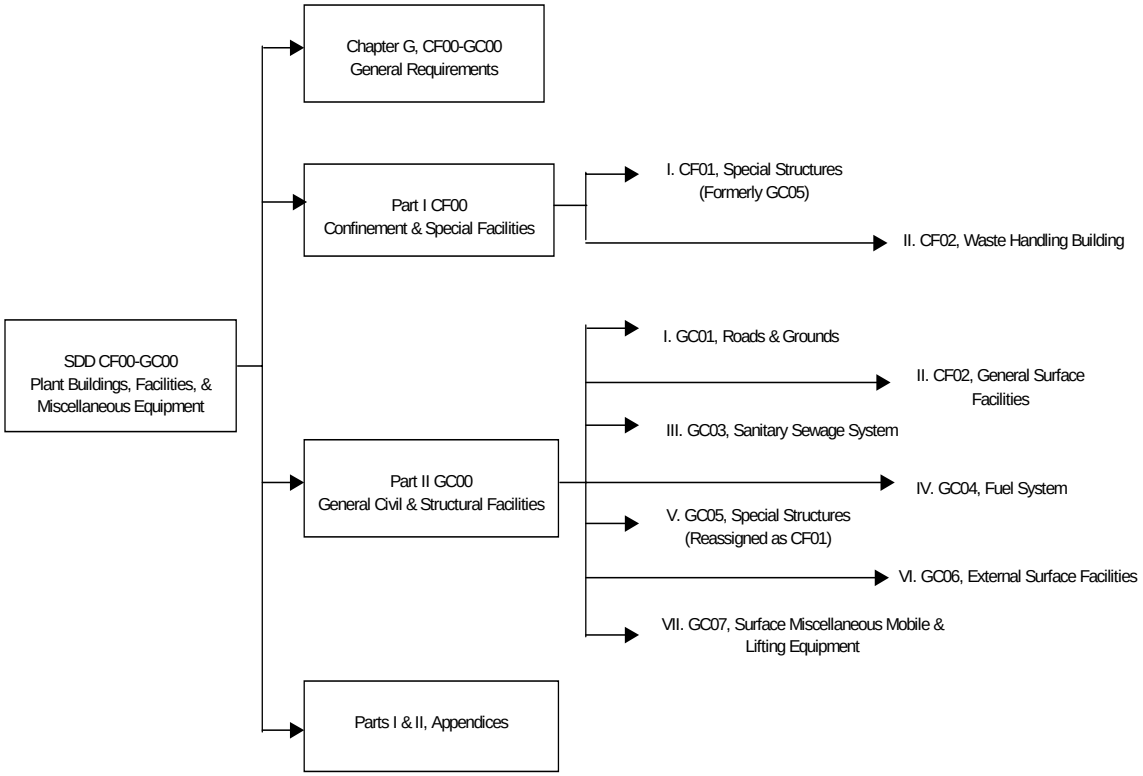

FIGURE S-1, Organization of SDD CF00-GC00
Plant Buildings, Facilities, & Miscellaneous Equipment

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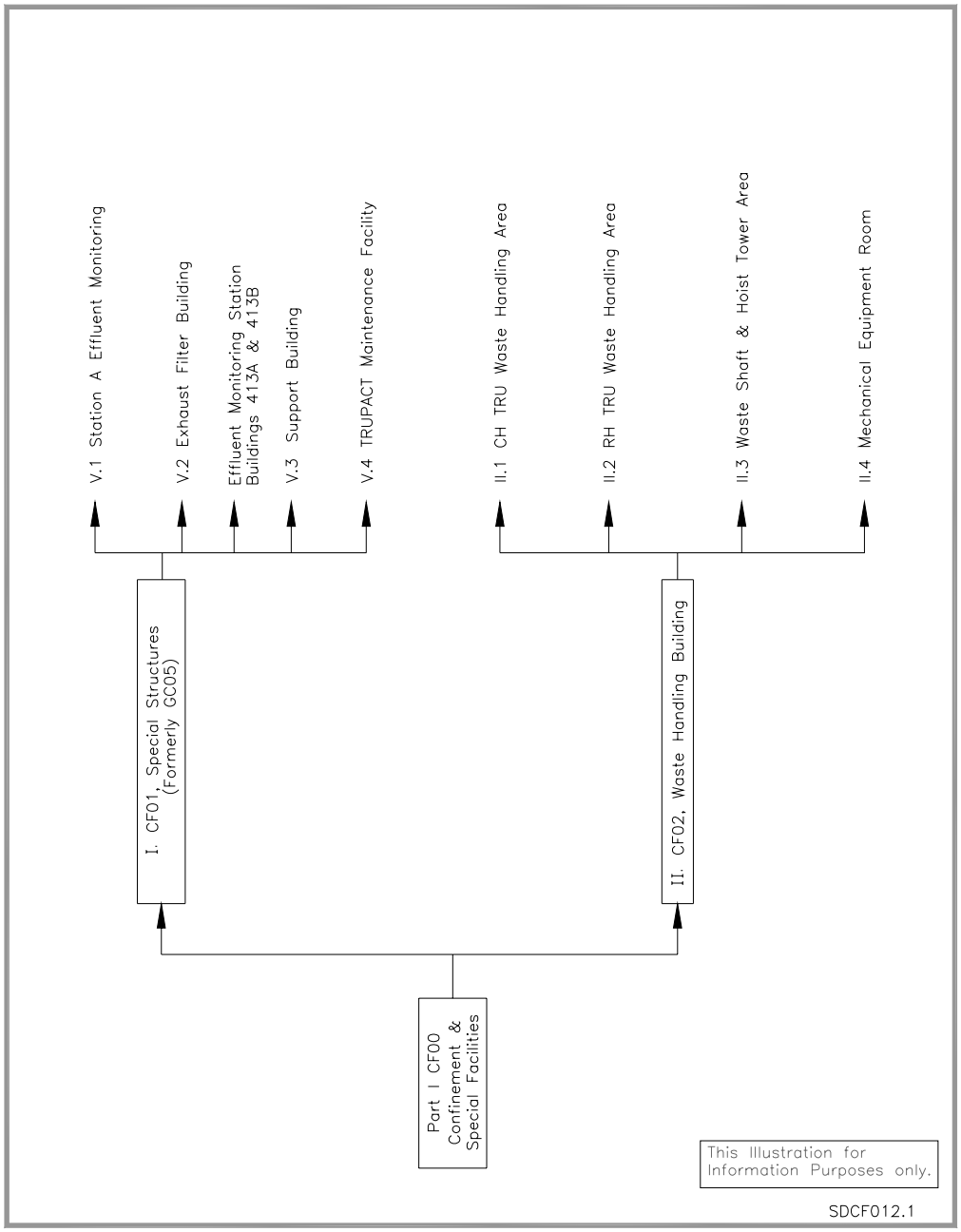
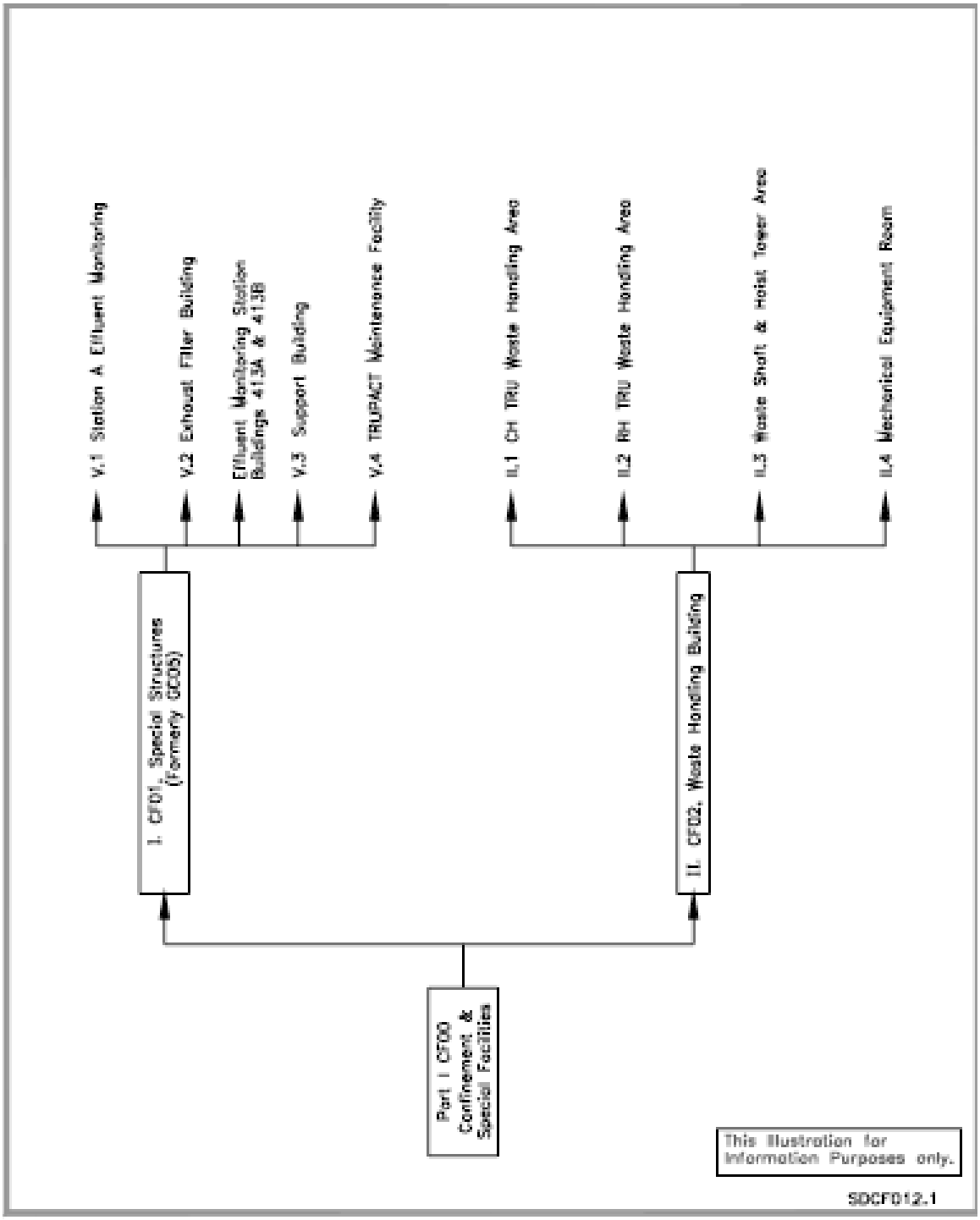


FIGURE S-2. Organization of SDD CF00 Confinement & Special Facilities



Figures S-3 – Organization of SDD GC00, General Civil and Structural Facilities

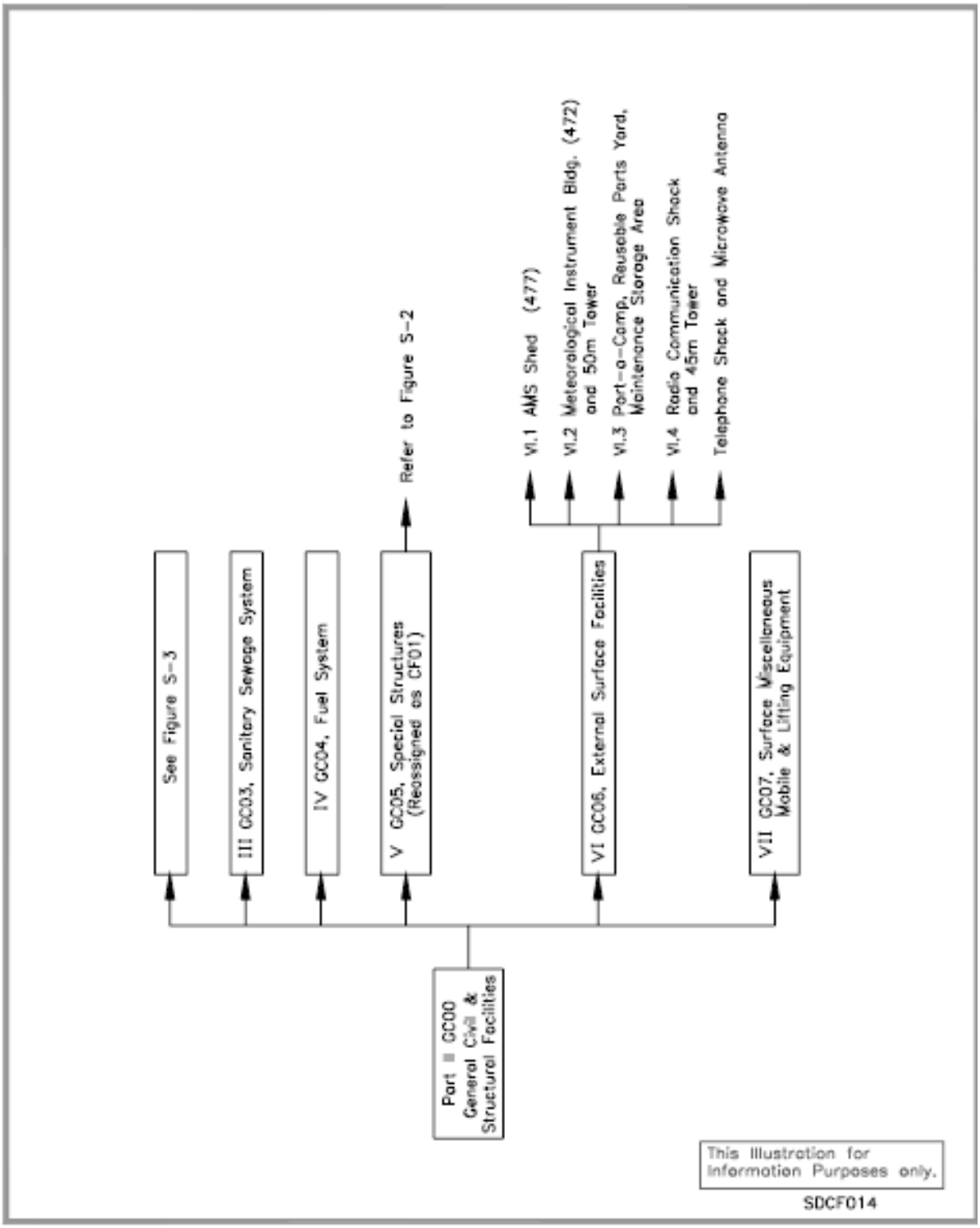


Figure S-4 – Organization of SDD GC00, General Civil and Structural Facilities

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CHAPTER G
CF00-CF00
GENERAL REQUIREMENTS

1.0 PRIMARY FUNCTIONS

The primary functions for each subsystem are presented in the Parts/Chapters of this two-part SDD (Part I, CF00 and Part II, GC00), and are identified in footnote G-1[1].

2.0 DESIGN REQUIREMENTS

The functional classifications are defined in the Documented Safety Analysis (DSA) and the General Plant Design Description (GPDD).

2.1 General

This System Design Description (SDD CF00-GC00) covers two (2) diverse systems (System CF00: Waste Handling Building and Special Structures, and the System GC00: General Civil and Structural), of which each in itself is a collection of different facilities, buildings, subsystems, and equipment.

2.2 Subsystem General Requirements

The Plant Buildings, Facilities, and Miscellaneous Equipment (SDD CF00-GC00) shall be designed in conformance with the applicable Revision of DOE Order 420.1, Facility Safety; and DOE Order 430.1, Life-Cycle Asset Management. As delineated in Section 2.11, the Revision of DOE Orders in effect at the time of the original design or later design change shall apply.

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[1] G-1

Part I, CF00. . . . . Confinement and Special Facilities
- CF01, Chapter I . . . . . Special Facilities, formerly GC05
- CF02, Chapter II . . . . . Waste Handling Building

Part II, GC00:. . . . . General Civil and Structural
- GC01, Chapter I. . . . . Roads and Grounds System
- GC02, Chapter II. . . . . General Surface Facilities System
- GC03, Chapter III. . . . . Sanitary Sewage System
- GC04, Chapter IV. . . . . Fuel System
- GC06, Chapter VI. . . . . External Surface Facilities System
- GC07, Chapter VII. . . . . Surface Miscellaneous Mobile and Lifting Equipment

2.3 Operation Requirements

The subsystem general requirements are presented in Section 2.2 in the Parts/Chapters of this SDD. The operational requirements are presented in Section 2.3 of the Parts/Chapters of this SDD (Part I, CF00 and Part II, GC00). Refer to Footnote G-1.

2.4 Structural Requirements

2.4.1 Functional Classification

NOTE

DOE O 420.1B and DOE-STD-3009 require a functional classification of Systems, Structures, and Components (SSCs) important to accidents analyzed in the DSA. Functional classification replaces design classification. The criteria for functional classification are described in Section 2.6 of the General Plant Design Description (GPDD).

The attendant structural design requirements shall then be established in accordance with the design provisions prescribed in Section 2.4.2 below.

2.4.2 Structural Design Requirements

The structural design requirements prescribed below apply to all WIPP buildings and facilities above ground. Structural design criteria are defined in terms of a) Design Loadings, and b) Loading Combinations. Sections 2.4.3.1 and 2.4.3.2 below define the required Design Loadings and Loading Combinations.

2.4.2.1 Design Loadings

A complete listing of different types of structural design loads is provided in Table G-1.

The complete Design Loads criteria are delineated in Table G-2.

2.4.2.2 Loading Combinations Requirements

Loading Combinations criteria are established on the basis of Functional Class. For reinforced concrete, steel, and pre-engineered metal structures, Loading Combination criteria are delineated in the codes and standards which are identified in the following subsections, and in Section 2.11.

Table G-1, Structural Design Loads, Load Symbols, and Definitions

Symbols	Design Loads Definitions
D	Dead Load, or its related internal moments and forces.
L	Live Load, or its related internal moments and forces.
W	Wind Load, or its related internal moments and forces.
Wt	Total Tornado Load generated by the Design Basis Tornado (DBT), or its related internal moments and forces.
E	UBC seismic load, or its related internal moments and forces.
E'	Design Basis Earthquake (DBE) load, or its related internal moments and forces.
F	Lateral Pressure of liquids, or its related internal moments and forces.
H	Lateral Soil Pressure, or its related internal moments and forces.
T	Internal moments and forces caused by thermal effects.

Table G-2, Design Loads for Surface Structures

STRUCTURE	SEISMIC	TORNADO	SNOW (PSF)	WIND (MPH)
DSA Credited Safety Class SSC Design Feature Design Loads **[TSR DF 6.1, DSA DF 5.6.1, DSA SC SSC 4.3.1]**				
Waste Handling Building	DBE	DBT	27	110
Support Building	UBC(1)	N/A	N/A	N/A
Building 412	DBE	N/A	27	N/A
Balance of Plant SSC Design Loads				
Support Building	N/A	No (1)	10	99
Exhaust Filter Building	USB	No	10	99
Station A	DBE	DBT	27	110
AAIS and AAIT	DBE	DBT	27	110
Building 412	N/A	DBT	N/A	110
Warehouse/Shops Building	UBC	No	10	91
Water Pumphouse	UBC	No	10	91
C&SH Shaft Hoist House & Electrical Room (3)	UBC	No	10	91

Notes:

(1) The main lateral-force-resisting structural members of the Support Building (SB) shall be designed for DBE to prevent the SB from collapsing on the adjacent Waste Handling Building (WHB). **[DSA SC SSC 4.3.1]**

The main lateral-force-resisting structural members of the Support Building (SB) shall be designed for DBT to prevent the SB from collapsing on the adjacent Waste Handling Building (WHB).

(2) The structural portions of Building 412 are designed for DBE because of its interface with the WHB. **[DSA SC SSC 4.3.1]**

The structural portions of Building 412 are designed for DBT because of its interface with the WHB.

(3) Construction & Salt Handling Shaft Hoist House.

2.4.2.2.1 Confinement Structure Requirements

Confinement concrete structures shall be designed for the required strength "U" on the basis of the strength design method as prescribed in ACI 318-77.

The confinement steel structures shall be designed for the required strength "S" on the basis of the elastic working stress design method as prescribed in the AISC Manual of Steel Construction and the AISC standard S326-78.

Where the structural effects of differential settlement may be significant, such effects shall be included and reflected as part of the Dead Load (D) in the loading combinations. Estimation of equivalent loading of such effects shall be based on a realistic assessment of such effects occurring in service.

In a loading combination required to be considered, the co-efficient of a given load shall be taken as 0.9 if that load tends to reduce the effects of other concomitant loads.

2.4.2.2.2 Requirements for Other Structures

With the exception of pre-engineered metal building structures, the loading combinations criteria for other structures shall be those set forth in the Uniform Building Code (UBC), in accordance with the Occupancy Group and Construction Type established.

Pre-engineered metal buildings shall be designed in accordance with the Metal Building Systems Manual (MBMA).

Metal buildings and structures shall be designed for seismic load in accordance with the UBC provisions for Seismic Zone 1 and for a basic snow load of 10 psf.

In addition to Table G-2, Design Loads, a portion of the Exhaust Filter Building (EFB) (413) shall be designed to withstand the maximum differential pressures achievable by the operation of the VU00, Underground Ventilation system fans.

2.4.2.3 Foundations

All foundations shall be designed to limit the maximum soil pressures, due to unfactored loads, to within the allowable soil bearing values as calculated from the data documented in WIPP Soils Design Report, DR-22-V-01. The allowable soil bearing values shall be allowed to increase by 33% for load combinations involving UBC seismic load (E), or wind load (W), and by 50% for load combinations involving DBE seismic load (E'), or tornado load (Wt).

The minimum depth of footings measured from the base of the footing to the finished ground surface shall be 2 ft. Foundations bearing on the salt strata shall have adequate soil cover.

The assumption of a linear distribution of soil pressure shall be made for foundation design, except for flexible foundations for which the soil pressure based on the subgrade reaction theory shall be used.

2.4.2.4 Factors of Safety

2.4.2.4.1 Factor of Safety Against Overturning or Sliding

The factor of safety against overturning or sliding shall be as follows:

Factor of Safety	For Load Combinations of:
1.5	D + H + E
1.5	D + H + W
1.1	D + H+ E'
1.1	D + H + Wt

2.4.2.4.2 Factor of Safety against Floatation

The factor of safety against floatation, the ratio of Dead Load over hydrostatic Uplift, shall be 1.1.

2.4.2.4.3 Consideration of Other Downward Forces

For the calculations of factors of safety against overturning, sliding, or floatation, the downward force (which forms the up righting moment, resisting frictional shear or weighing-down force) to be considered shall be limited to Dead Load only as is prescribed above. Appropriate justifications shall be provided if any Live Load (L) component of downward forces is to be considered and included in the calculations of factors of safety.

2.4.2.5 Material Requirements

2.4.2.5.1 Concrete

Portland cement conforming to ASTM C150, Type II shall be used for surface structures. Concrete of 4,000 psi compressive strength (f_c') shall be used, with the only exception being the shaft lining. For shaft lining and shaft key, the concrete shall be of 5,000 psi compressive strength.

2.4.2.5.2 Concrete Blocks

The ultimate compressive strength of concrete block masonry units (f_m') shall be as follows:

- Solid units – 1,500 psi
- Hollow units – 1,350 psi

For particular structural and nonstructural purposes, blocks of different strengths and material may be used when applicable.

2.4.2.5.3 Reinforcing Steel

Reinforcing steel shall be ASTM A615, Grade 60, except for #3 reinforcing bars which may be Grade 40. Re-bars bending and splicing requirements shall be in accordance with ACI 318. For #14 and #18 re-bars, mechanical butt splicing shall be used. Welded wire fabric shall conform to ASTM A185. Welding on reinforcing steel shall conform to AWS D1.4.

2.4.2.5.4 Structural Steel

Structural steel shall be of ASTM A36. Bolts shall be of A307, Grade A. High strength bolts shall be of ASTM A325, Type 1. Welding of structural steel shall conform to AWS D1.1.

2.4.2.5.5 Stainless Steel

Type 304L stainless steel shapes and plates shall conform to ASTM A276 and ASTM A167, respectively. Stainless steel bolts shall be of ASTM A193, Grade B, Class 1.

2.4.2.5.6 Anchor Bolts

Anchor bolts shall be of ASTM A36 or A307, Grade B.

2.4.2.6 Natural Phenomena hazard Assessment

The design and evaluation of facilities to withstand natural phenomena (as identified in 2.4.2.7 and 2.4.2.8) shall be based on an assessment of the likelihood of future natural phenomena occurrences. The natural phenomena hazards assessment shall be conducted commensurate with a graded approach, and with the potential hazard of the facility. Reference Table G-2, Design Loads for Surface Structures.

The phenomena hazards assessment shall be reviewed and updated if there are significant changes in natural phenomena hazards assessment methodology or site-specific information.

A review of the natural phenomena hazards assessment shall be conducted at least every 10 years. If there are any significant changes in methods or data, recommendations to DOE on the need for updating the existing natural phenomena hazards assessments will be made.

2.4.2.7 Seismic Design Requirements

2.4.2.7.1 Seismic Loads

The WHB structure and structural components shall be designed for the Design Basis Earthquake (DBE).

The DBE is the most severe credible earthquake that could occur at the WIPP site and is conservatively selected as a peak design acceleration of 0.1 g, as given in Table G-2, and per DOE/WIPP-07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (DSA), Section 1.5.1.3, Design-basis Earthquake.

Other structures and structural components shall be designed for loads as required by the UBC, Seismic Zone 1.

2.4.2.7.2 Seismic Analysis Requirements

The Response Spectra method shall be used for the seismic analysis of the DBE. The responses of structures and structural components under the seismic loading of the DBE shall be analyzed using the technique as described in The Bechtel Topical Report, "Seismic Analyses of Structures and Equipment for Nuclear Power Plants" (BC-TOP-4-A, Rev. 3, Section 4.0), or other equally viable techniques and procedures. Reference Bechtel Seismic Evaluation Report for WIPP, WIPP 97-D-0510-01, Dated 12/08/78.

The DBE shall consist of the simultaneous actions of two (2) horizontal and one (1) vertical accelerations, each with maximum ground acceleration as given in Figures G-1 and G-2, respectively.

The soil-structure interaction shall be accounted for in accordance with the procedures as described in BC-TOP-4-A, Rev. 3 (Section 3.0), or other equally viable techniques and procedures.

The modal damping values to be used in the spectral response analyses shall be those recommended in the NRC Regulatory Guide 1.61, "Damping Values for Seismic Design of Nuclear Power Plants" as delineated in Table G-3.

The procedures for combining modal responses and spatial components shall be in accordance with the NRC's Regulatory Guide 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis."

2.4.2.7.3 Design Loading Combinations

Seismic loads shall be considered in the designs of WIPP structures, systems, and components in accordance with Section 2.4.2.2, "Loading Combinations Requirements."

Table G-3, Damping Values as a Percentage of Critical Damping

STRUCTURES OF COMPONENT	DAMPING VALUE (% of Critical Damping)
Welded Steel Structures	4
Bolted Steel Structures	7
Reinforced Concrete Structures	7
Equipment and Large-Diameter (>12 in.) Piping Systems	3
Small-diameter (= or < 12 in.) Piping System	2
Prestressed Concrete Structures	5

2.4.2.8 Tornado Design Requirements

The tornado wind load characteristics of the Design Basis Tornado (DBT) shall be those as delineated in Table G-4, on the basis of the recommendations in "A Site-Specific Study of Wind and Tornado Probabilities at the WIPP Site in Southeast New Mexico," MRP No. 155, Department of Geophysical Sciences, University of Chicago, February 1978 and its Supplement of August 1978, per the DSA Section 1.4.1.2, Tornadoes, and Section 1.5.2, Design-basis Tornado.

The methods for converting the tornado effects into forces and their distribution across the structures shall be in accordance with ANSI-A58.1-1972, ERDA (ALO) Guide for Calculation of Design Wind Pressures (Sections A & B), and Bechtel Topical Report, "Tornado and Extreme Wind Design Criteria for Nuclear Power Plants." (BC-TOP3-A, Rev. 3).

The Total Tornado Load (Wt) to be considered and included in the design loading combinations per Section 2.4.2.1, shall represent any one of the following tornado loads:

- Wt = Tornado Wind Load (Ww)
- Wt = Tornado Differential Pressure Load (WP)
- Wt = WW + 0.5 WP

For the design of a given structure or portions thereof, the Wt load to be used in the design loading combinations prescribed in Section 2.4.2.1 shall be the one that leads to the most critical results.

Table G-4, Design Basis Tornado Characteristics

Maximum Wind Speed	183 mph
Translational Velocity	41 mph
Tangential Velocity	124 mph
Pressure Drop	0.5 psi
Rate of Pressure Drop	0.09 psi/sec
Radius of Maximum Wind	325 ft
Return Period	One Million Years

2.4.2.9 Radiological Protection Shielding

The objective of the WIPP facility radiological protection program is to employ design and operational considerations that ensure and maintain radiation exposures as low as reasonably achievable (ALARA) to the general public and workers. This objective is consistent with the 10 CFR Part 835, Occupational Radiation Protection, and recommendations of NRC Regulatory Guides 8.8, "Information Relevant to Maintaining Occupational Radiation Exposure As Low As Is Reasonably Achievable," and 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposure As Low As Is Reasonably Achievable".

The WIPP facility shall be designed to limit the occupational critical organ and whole-body exposure during normal operations to an administratively selected limit of 1 rem/calendar year for operating personnel. To facilitate this, design radiation zones shall be defined based on the occupancy restrictions applied to each zone. This shall be done in conjunction with a program to control personnel access to, and occupancy of, radiation areas.

Personnel not authorized to receive occupational radiation exposure shall not be permitted to work in areas where their maximum whole-body occupational exposure can exceed a much lower administrative limit.

System CF00 contributes to that part of the total radiation protection program which requires radiation shield walls, doors and windows.

2.4.2.9.1 Shielding Design

The WIPP facility radiological shielding shall reduce personnel exposures from uncollided and scattered radiation to levels that are below the administrative whole-body annual dose limit for operation personnel in each radiation zone.

The design of shielding for WIPP shall consider radiation streaming, flexibility of the design, structural simplicity and ease of maintenance. Industry accepted computer codes shall be used for shielding design and analysis.

As a part of equipment and plant design, both normal and abnormal operating conditions shall be considered to maintain exposures ALARA. Where lower predicted exposures can be attained through facility layout or equipment location, such actions shall be taken.

Shielding materials shall be chosen on the bases of functional performance, cost, efficiency, and structural quality. The principal shielding materials used for walls, doors, hatches and plugs shall be ordinary concrete with rebar, lead, and steel. The principal shielding materials used for windows shall be leaded glass.

Penetrations through primary shielding shall be arranged so that there is not a direct (streaming) path from the radiation source through the shield. This may be achieved by the use of offset piping connections, stepped doors, hatches and plugs, shadow shields and labyrinths. Shielding of large diameter penetrations may require the use of additional shield material in the form of collars or grout.

The Hot Cell Complex shielding arrangement is analyzed in Radiological Control Position Paper 2001-03, *Shielding Analysis and Verification Process for the WIPP RH-TRU Waste Handling Process*, March 28, 2001, and Radiological Control Position Paper 2002-03, *Final Results of WIPP RH TRU Facility Penetration and Shielding Analysis*, July 04, 2002.

The integrity, design, and performance of concrete shielding shall be assured by adherence to the requirements and practices recommended in ANSI N 101.6-1972, " Concrete Radiation Shields." In addition, the concrete

radiation shields structural design analysis shall consider steady state and transient thermal loads.

2.4.2.9.2 Radiation Sources for Shielding Design

The Hot Cell shielding shall be designed for an internal gamma surface dose rate of 400,000 rem/hr, and for an internal neutron surface dose rate of 45 rem/hr. **[DSA SS SSC 4.4.4]**

The ability for the Hot Cell Complex structure to provide the required shielding is documented in CS-41-B-003, Rev. 0, Calculate required shield thicknesses in RH waste handling area, July 12, 1979.

For all other shielding, the basis for the shield design shall be the maximum values of gamma and neutron source expected in the space during the plant operations.

2.4.2.10 Fire Protection

Noncombustible or fire-resistive construction shall be used, where appropriate.

Complete fire-rated barriers that are commensurate with the fire hazard shall be provided to isolate hazardous occupancies, and to minimize fire spread and loss potential consistent with defined limits as established by DOE.

2.5 General Arrangement and Essential Features

The general arrangement and essential features information of each subsystem is presented in Section 2.5 of the Parts/Chapters of this two-part SDD (Part I, CF00 and Part II, GC00). Refer to Footnote G-1.

2.6 Maintenance Requirements

Maintenance of the surface buildings and structures shall be by contact methods.

The design of the WHB and EFB shall provide for the potential spill of radioactive materials, liquids and the necessary consequent decontamination of contaminated areas. The WHB and EFB shall be provided with nonpermeable floor surfaces to facilitate decontamination. Appropriate approved decontamination procedures shall be prepared and implemented following a contamination event. Decontamination of equipment not provided by system CF00 is the responsibility of the system under which the equipment is provided.

Periodic maintenance schedules, preventative maintenance instructions (PMI), and calibration procedures (where required) shall be prepared for all functional operating equipment such as the Surface Miscellaneous Mobile and Lifting Equipment, instruments, electrical and hydraulically operated components, Fuel Systems, and the Sanitary Sewage System. Manufacturer instructions shall be used to the maximum extent possible.

Maintenance of the on-site roads and grounds, north access road, storm drainage system, railroad track and bedding, and other facilities shall be in accordance with normal standard industrial plant maintenance practice. Maintenance of the railroad shall be done in accordance with the American Railway Engineering Association (AREA) Manual.

2.7 In-Service inspections

All surface buildings and structures shall be periodically inspected for development of any deteriorating conditions (painting, roofing, siding, interior, doors, damage, unsafe conditions) requiring maintenance to be performed.

The functional operating equipments (Surface Miscellaneous Mobile and Lifting Equipment, Fuel Systems, Sanitary Sewage System) shall be examined and inspected by the operators prior to use for any obvious deficiencies or conditions. The equipment shall be observed and monitored during startup and operation for adverse symptoms or developing malfunctions. Defects requiring maintenance shall be reported by the operators.

2.8 Instrumentation and Control

Refer to the following subsystems for special instrumentation and control requirements:

- Part I, CF02, Chapter II: Waste handling Building
- Part II, GC03, Chapter III: Sanitary Sewage System
- Part III, GC04, Chapter IV: Fuel System
- Part II, GC07, Chapter VII: Surface Miscellaneous Mobile and Lifting Equipment

2.9 Interfacing System Requirements

2.9.1 Interfacing Systems

The interfacing systems shall be divided into primary and secondary systems as defined below:

- Primary System

The primary system in the interface is the system that requires the functions and services or support provided by others at the specific interface so that the primary system can satisfy required design criteria.

- Secondary System

The secondary system in the interface is the system which provides the functions and services or support required by others at the specific interface so that the primary system can satisfy the required design criteria.

2.9.2 Primary System Interfaces

SDD CF00 is the primary system in interfaces with systems listed below. Appendix F-1 provides a brief description of each of the primary interfaces.

System	Title
CA00	Compressed Air System
CM00	Plant monitoring and Communications System
ED00	Electrical System
FP00	Fire Protections
HV00	Heating, ventilating, and Air Conditioning System
RM00	Radiation Monitoring
VU00	Underground Ventilation System
WD00	Water Distribution System

2.9.3 Secondary System Interfaces

SDD CF00 is the secondary system in interfaces with systems listed below. Appendix F-2 provides a brief description of each of the secondary interfaces.

System	Title
CA00	Compressed Air System
CM00	Plant monitoring and Communications System
ED00	Electrical System
EM00	Environmental Monitoring System
FP00	Fire Protections
HV00	Heating, Ventilating, and Air Conditioning System

PP00	Plant Protection System
RM00	Radiation Monitoring
UH00	Underground Hoist System
VU00	Underground Ventilation System
WD00	Water Distribution System
WH00	Waste Handling System

2.10 Quality Assurance Requirement

2.10.1 Quality Assurance requirements shall be established in accordance with Section 2.5, quality Assurance, of the GPDD.

2.11 Codes and Standards

2.11.1 Listed below are the codes, standards, regulatory requirements, and DOE Orders that were current at the time of project inception, to be applied to the design, construction, testing, and operation of the Plant Buildings, Facilities, and Miscellaneous Equipment.

2.11.2 Latest Codes and Standards, including UBC are to be applied for the design, construction, testing, and operation of new Plant Buildings, Facilities, and Miscellaneous Equipment. For those SSCs designated a functional classification of Safety Class or Safety Significant in the DSA, the design standards in the GPDD Appendix C shall apply.

DOE Order 420.1	Facility Safety (The Revision of the DOE Order in effect at the time of a design, or design change shall apply.)
DOE Order 430.1	Life-Cycle Asset Management (The Revision of the DOE Order in effect at the time of a design, or design change shall apply.
DOE Order 433.1	Maintenance Management Program for DOE Nuclear Facilities
DOE Order 5400.5	Radiation Protection of the Public and the Environment
DOE Standard 1090	Hoisting and Rigging
10 CFR 830.120	Quality Assurance

30 CFR Part 57	MSHA Health and Safety Standards for Metal and Non-Metallic Underground Mines
29 CFR Part 1910	Occupational Safety and Health Standards
29 CFR Part 1926	Safety and Health Regulations for Constructions
40 CFR Part 401	Protection of the Environment, Uniform Building Code, 1982
UBC	Uniform Building Code, 1982
MMA-1981	Metal Building Systems Manual

WP 13-1, Washington TRU Solutions LLC Quality Assurance Program Description

New Mexico Mine Safety Code for All Mines, The State Inspector of Mines

State of New Mexico Waste Quality Control Commission Regulations

Standard Specifications for Road and Bridge Construction, New Mexico State Highway Department

Bechtel, Inc. Seismic evaluation Report – WIPP 97-D-510-01, dated 12/08/78

American Concrete Institute (ACI)

ACI 318-77	Building Code Requirements for Reinforced Concrete

American Institute of Steel Construction (AISC)

AISC M011-80	Manual of Steel Construction, Eighth Edition
AISC S326-78	Specification for the Design, Fabrication and Erection of Structural Steel for Buildings

American National Standards Institute (ANSI)

ANSI A58.1-1972	Minimum design Loads for Buildings and Other Structures
ANSI A92.5	Boom – Supported Elevating Work Platforms
ANSI C2-1993	National Electrical Safety Code
ANSI N101.6	Concrete Radiation Shields

American Welding Society (AWS)

AWS D1.1-1982	Structural Welding Code – Steel
AWS D1.4-1979	Structural Welding Code – Reinforcing Steel

American Society for Testing and Materials (ASTM)

ASTM A36-81	Standard Specification for Structural Steel
ASTM A167-81	Standard Specification for Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A185-79	Standard specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A193-81	Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A276-81	Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A307-80	Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
ASTM A325-81	Standard Specification for High-Strength Bolts for Structural Steel Joints

ASTM A615-82	Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C150-81	Standard Specification for Portland Cement

American Association of State Highway and Transportation Officials (AASHTO)

Geometric Design Guide for Local Roads and Streets, AASHTO

Standard Specifications for Highway Bridges, AASHTO

Standard Specifications for Transportation Materials and Methods of Sampling and Testing, AASHTO

American Society of Mechanical Engineers

ASME B56.1	Low Lift and High Lift Trucks
ASME B56.6	Rough Terrain Forklift Trucks
ASME B30	Series Cranes and Hoists

Asphalt Institute

Thickness Design, Asphalt Pavement Structures for Streets and Highways, MS-1

Construction Specifications for Asphalt Concrete, SS-1

National Fire Protection Association Standards (NFPA)

10	Standard for Portable Fire Extinguishers
17	Standard for Dry Chemical Extinguishing Systems
20	Standard for the Installation of Centrifugal Fire Pumps
30	Flammable and Combustible Liquids Code
70	National Electric Code

101	Code for Safety to Life from Fire in Buildings and Structures
220	Standard on Types of Building Construction
386	Standard for Portable Shipping Tanks for Flammable and Combustible Liquids
505	Fire Safety Standard for Powered Industrial Trucks Including Type Designating, Areas of Use, Maintenance, and Operation

SAE International

SAE J 321B	Tire Guards for Protection of Operator of Earthmoving Haulage Machines, Recommended Practice

Underwriters Laboratories, Inc

UL 583	UL Standard for Safety Electric – Battery – Powered Industrial Trucks

2.12 Reliability Assurance

All buildings, facilities, and equipment, with appropriate maintenance, shall have a design life of 25 years.

3.0 DESIGN DESCRIPTION

This section provides the general design description of the Plant Buildings, Facilities, and Miscellaneous Equipment System which includes the Waste Handling Building and Special Structures, and the General Civil and Structural Facilities.

This section also includes the arrangements, performance characteristics, instrumentation and control, and system interfaces for satisfying the functional and design requirements.

3.1 Summary

The Plant Buildings, Facilities, and Miscellaneous Equipment Systems consist of:

- The Confinement Facility (CF02) consists of the WHB. It is a large structure constructed of structural steel columns, trusses, and exterior steel wall panels forming a rigid frame. This structure provides the strength to withstand the site DBE/DBT. **[DSA SC SSC 4.3.1]** The Hot Cell portion of the RH-TRU waste handling area is constructed of reinforced concrete for shielding purposes. **[DSA SS SSC 4.4.4]**

  This building is divided into four major areas: the CH-TRU waste handling area, the RH-TRU waste handling area, the mechanical equipment rooms, and the Hoist Tower area.

  This building is the primary surface facility for handling and processing waste at the WIPP site while providing a confinement area to preclude the release of any radioactivity or contamination into the environment.

- The site Special Structures (CF01) are limited to those surface facilities which, because of their functions, and proximity to the WHB, are designed to more stringent requirements than those in GC02.

- The General Civil and Structural Facilities (GC01 and GC02) include the surface facilities within the property protection area other than the WHB and site Special Structures necessary to operate the site. These include the buildings and facilities shown in Figures G-3 and G-4.

- The Sanitary Sewage System (GC03) provides for the collection, treatment and disposal of solid and liquid effluent. The system consists of an on-site piping network, an off-site sewage lagoon, and interconnecting piping between the site and lagoon.

- The Fuel System (GC04) consists of two buried fuel tanks, two fuel dispensers, and a leak detection system. The Fuel System provides unleaded gasoline and diesel fuel for site usage.

- The external surface facilities (GC06) include those facilities on site but outside the property protection area.

- The Surface Miscellaneous Mobile and Lifting Equipment (GC07) includes electric golf carts, emergency vehicles, miscellaneous lifting and material handling equipment, miscellaneous cranes and construction equipment, and other surface miscellaneous equipment.

3.2 Detailed system Description

The detailed system descriptions for each subsystem are presented in Section 3.2 of the Parts/Chapters of this two-part SDD (Part I, CF00 and Part II, GC00). Refer to Footnote G-1.

3.3 System Performance Characteristics

The WIPP Plant Buildings, Facilities, and Miscellaneous Equipment System encompasses two major systems. They are: Waste Handling Building and Special Structures (CF00), and General Civil and Structural (GC00). These systems contain features the majority of which are "passive" features. Accordingly, their performance depends upon their structural integrity under different plant and environmental conditions.

3.3.1 Confinement and Special Structures (CF00)

Refer to Section 3.3 of Part I, Chapter I for the Special Structures (CF01) system performance characteristics.

Refer to Section 3.3 of Part I, Chapter II for Waste Handling Building (CF02) system performance characteristics.

3.3.2 General Civil and Structural (GC00)

Refer to Section 3.3, Part II, Chapter I, for GC01 system performance characteristics.

Refer to Section 3.3, Part II, Chapter II for GC02 system performance characteristics.

Refer to Section 3.3, Part II, Chapter III for GC03 system performance characteristics.

Refer to Section 3.3, Part II, Chapter IV for GC04 system performance characteristics.

Refer to Section 3.3, Part II, Chapter VI for GC06 system performance characteristics.

3.4 System Arrangement

The location of the permanent surface buildings, facilities and features in this system are shown on Figure G-3. The index of the items shown on Figure G-3 are listed on Figure G-4.

The system arrangement for each subsystem is presented in Section 3.4 of the Parts/Chapters of this two-part SDD (Part I, CF00 and Part II, GC00). Refer to Footnote G-1.

3.5 Component Design Description

The component design descriptions for each subsystem are presented in Section 3.5 of the Parts/Chapters of this two-part SDD (Part I, CF00 and Part II, GC00). Refer to Footnote G-1.

3.6 Instrumentation and Control

Major instrumentation and control is only associated with the following three sub-systems:

- Waste Handling Building (CF00): for the interlocking and control of doors in the Waste Handling Building (CF02). Refer to Section 3.6 of Part I, Chapter II.

- Sanitary Sewage System (GC03): for chemistry monitoring and pond level control. Refer to Section 3.6 of Part II, Chapter III.

- Fuel System (GC04): for diesel and gasoline engine fuel tank levels and leakage monitoring, and for pumping of both fuels. Refer to Section 3.6 of Part II, Chapter IV.

The other instrument and control equipment associated with Plant Buildings, Facilities, and Miscellaneous Equipment Systems are standard package units with no inter-system ties, and are covered adequately by vendor descriptions.

3.7 Fire Barriers

Several facilities of System CF00-GC00 have walls which are maintained as rated fire barriers. A listing of these fire barrier locations is provided in Table G-5.

Table G-5, Fire Barriers

Building	Location	Rating	Related Engineering Drawings
411	North Stairwell	1 Hr	41-E-003-014, 41-E-005-014 41-E-006-014, 41-E-012-014 41-E-013-014, 41-E-017-014 41-E-019-014, 41-E-031-014 41-E-040-014, 41-E-041-014 41-E-042-014, 41-E-063-014 41-E-064-014
	West Stairwell	1 Hr	
	Waste Hoist Control Room	1 HR	
	Elevator	1 Hr	
	North Exterior Wall, Column Line A from Column 1 to Column 8	2 HR	
413	Filter Chamber	1 Hr	41-E-008-019, 41-E110-019
451	Central Monitoring & Computer Rooms	2 HR	45-E-201-014, 45-E-203-014 45-E-205-014, 45-E-206-014 45-E-225-014, 45-E-226-014 45-E-227-014, 45-G-357-014 45-G-358-014
	North Stairwell	1 Hr	
	East Stairwell	1 Hr	
	Elevator	1 Hr	
	Electrical Equipment Room	1 Hr	
	HVAC Control Room	1 Hr	
	Exterior South Wall	1 Hr	
452	East Stairwell	1 Hr	CMA A-1, CMA A-2 CMA A-8
	Vehicle Bay/Building Wall	2 Hr	
	Electrical Equipment Room	1 Hr	
459	Center Dividing Wall	2 Hr	45-D-010-W
486	Engineering File room	2 HR	AC 9484 A-1, AC 9484 A-2, AC 9484 A-4, 45-B-009-W1, 45-B-009-W2
	5 Interior Support columns	1 Hr	
486	Corridor and Ceiling	1 Hr	AC 9492 A-1, AC 9492 A-6

3.8 System interfaces

The primary interfaces are those interfacing requirements from CF00-GC00 on other systems to perform their required functions.

The secondary interfaces are those requirements from other systems upon CF00-GC00 to perform their required functions.

3.8.1 Primary Interfaces

These interfaces relate to functions and services needed by the CF00-GC00 system from other systems to satisfy its requirements and perform its functions.

The Plant Building, Facilities, and Miscellaneous Equipment System is the primary system with the interfacing systems listed below.

- Fire Protection System (FP00)
- Surface VAC. System (HV00)
- Underground Ventilation System (VU00)
- Electrical System (ED00)
- Water Distribution System (WD00)
- Compressed Air System (CA00)
- Plant Monitoring and Communications System (CM00 - PP00)
- Radiation Monitoring System (RM00)

3.8.1.1 Primary Interface Requirements on System FP00

- Provide fire protection for the Waste Handling Building (CF02), Special Structures (CF01), and all the surface buildings and facilities of System GC00 in accordance with the requirements in SDD-FP00.

3.8.1.2 Primary Interface Requirements on System HV00

- Provide climatic conditioning during Normal Operation for the Waste Handling Building (CF02), Special Structures (CF01), and all the surface buildings and structures of System GC00.

- Provide for control and maintenance of pressures in the areas or rooms within the WHB at a negative pressure differential relative to the atmospheric pressure outside the WHB in areas where a potential for contamination exists, and provide for confinement during a design basis event.

- Provide for control and maintenance of differential pressures among the areas and/or rooms within the WHB during Normal Operation to maintain the required airflow directions to support ALARA compliance. Airflow within the WHB shall always be directed from the area of least potential for contamination to area of highest potential for contamination.

- Provide for environmental control during an emergency condition for the Central Monitoring Room (CMR) of the Support Building (SB) (CF01) to enable continuous personnel occupancy, including a slightly positive indoor pressure relative to outdoor.

- Provide for necessary filtration for ALARA compliance of exhaust air from all potentially contaminated areas within the EFB (CF01).

- Provide for control and maintenance of ambient pressures within the EFB (CF01) to ensure the required direction of airflow to support ALARA compliance.

3.8.1.3 Primary Interface Requirements on System VU00

- Provide for control and maintenance of a negative static pressure differential between the ventilated chambers of the underground facilities and the above-ground environment such that all air flow is from the above ground environment.

3.8.1.4 Primary Interface Requirements on System ED00

- Provide, as required, electrical power facilities to supply utilization equipment, wall receptacles, and lighting for the Special Structures (CF01), Waste Handling Building (CF02), and all the surface buildings of System GC00.

- Provide, as required, electrical power facilities to supply lighting for all on-site roads and parking areas (GC01), the Sanitary Sewage System (GC03), and surface Fuel System (GC04).

- Provide for lightning protection for the Special Structures (CF01), Waste Handling Building (CF02), and all the surface buildings and structures of System GC00.

3.8.1.5 Primary Interface Requirements on System WD00

- Provide water supply for drinking fountains and normal plant uses for the Special Structures (CF01), Waste Handling Building (CF00), and most of the surface buildings of System GC00.

- Provide water supply for normal plant uses for the Sanitary Sewage System (GC03), and the surface Fuel System (GC04).

3.8.1.6 Primary Interface Requirements on System CA00

- Provide utility air for normal plant uses for all the surface buildings and Fuel System.

3.8.1.7 Primary Interface Requirements on System CM00 - -PP00

- Provide telephone service, the PA and intercom systems, Central Monitoring System (CMS) monitoring, as required, for the Special Structures (CF01), Waste Handling Building (CF02), all the other surface buildings (GC00).

3.8.1.8 System RM00

- Provides a high radiation alarm signal for interlocking with entry doors where required for personnel safety.

3.8.2 Secondary Interfaces

The Plant Buildings, Facilities, and Miscellaneous Equipment System provides functions and services needed by other systems in order for them to meet their requirements. The following is a listing of the systems having interface requirements placed on CF00:

- Compressed Air System (CA00)
- Plant Monitoring and Communications System (CM00 – PP00)
- Electrical Distribution System (ED00)
- Fire Protection System (FP00)
- Surface VAC. System (HV00)
- Plant Protection System (PP00)
- Radiation Monitoring System (RM00)
- U/G Hoisting System (UH00)
- Underground Ventilation System (VU00)
- Water Distribution System (WD00)
- Waste Handling System (WH00)

4.0 OPERATION

This section describes the operating methods and requirements for start up operations, normal operations, infrequent operations and shutdown operations. In most cases, the buildings and facilities in this SDD are passive with any associated operations being described in the active interfacing systems SDD. However, certain portions of this SDD, as described below, are active subsystems with the appropriate start up, normal, infrequent, and shutdown operations.

The prerequisites and conditions of operation, and related applicability for each subsystem, are presented in Section 4.0 of the Parts/Chapters of this two-part SDD (Part I, CF00 and Part II, GC00). Refer to Footnote G-1.

5.0 SYSTEM LIMITATIONS, SET POINTS, AND PRECAUTIONS

This section describes the operating limits, alarms, interlocks, and precautions as related to the Plant Buildings, Facilities, and Miscellaneous Equipment System. Consideration is given to general personnel safety, equipment safety, performance, and overall system performance.

The system limitations, set points, and precautions for each subsystem are presented in Section 5.0 of the Parts/Chapters of this two-part SDD (Part I, CF00 and Part II, GC00). Refer to Footnote G-1.

6.0 OFF-NORMAL EVENTS AND RECOVERY

An off-normal event is defined as an abnormal system or plant condition which could either affect the safety of off-site or on-site personnel or a condition which could affect the integrity or proper functioning or operation of the system or plant or both. The effect of the events listed below will define whether it has the potential to effect safety and/or operation.

The off-normal events and recovery sequences for each subsystem are presented in Section 6.0 of the Parts/Chapters of this two-part SDD (Part I, CF00 and Part II, GC00). Refer to Footnote G-1.

7.0 MAINTENANCE

This section is devoted to those features of the Plant Buildings, Facilities, and Miscellaneous Equipment System that enable and enhance maintenance of the system. Guidelines are provided for performing maintenance, in-service inspection, and surveillance.

All system and component activities shall be performed in accordance with and consistent with the WIPP site Safety Manual requirements and the Washington Maintenance Operations Instruction Manual, WP 10-2. The Maintenance Operations Instruction Manual provides general policy and objectives for establishment of programs for the management and performance of cost-effective maintenance and repair of DOE property.

The above is the guiding requirement and basis for the material in the following paragraphs on maintenance.

7.1 Maintenance Approach

The maintenance program shall ensure that the property is maintained in a manner which promotes operational safety, work health, environmental protection and compliance, property preservation, and cost effectiveness while meeting the programmatic mission.

In carrying out this program, a graded approach shall be taken by line management in the development and implementation of the maintenance program. By a graded approach, it is intended that the depth of detail required and the magnitude of resources expended for a particular maintenance function be commensurate with the functions importance to safe and reliable operation, environmental compliance, safeguards and security,

programmatic mission, facility preservation, and/or other facility specific requirements.

This graded approach to maintenance shall be utilized and shall consider the following order of precedence:

A. In general, all maintenance on the buildings, facilities, equipment shall be performed using "contact maintenance" techniques. Contact maintenance involves direct personnel contact with the equipment vs. the use of remote manipulators or robots. In general, no radiation levels of a magnitude that would require remote maintenance are expected to be incurred. However, before performing such maintenance actions, Health Physics should be contacted for radiological evaluation.

B. Perform maintenance activities with no significant reduction of operating efficiency. The following order of precedence applies:

   1. Repair, service, and adjust in place. This approach provides for maintenance without shutdown of the buildings, facilities, or equipment.

   2. Utilizing redundant equipment. When appropriate, remove the defective unit from service, repair, service, and adjust in place.

   3. Replace the component with a spare unit. This maintenance approach will require the utilization of redundant components and systems such that one of the redundant units or systems may be isolated and removed from service and replaced with a spare unit without interrupting the operation of the system. The defective unit would then be repaired and placed in spare parts storage for the next replacement.

C. Shut down the system for maintenance activities only for those few components that necessitates shutdown of the system or facility to perform the maintenance. Repair, service, and adjust the defective component in place, if possible, or replace the unit with a spare unit depending upon the time constraints.

   Regardless of what maintenance is performed, inspections, tests, and other verifications must be made to ensure the building, facility, or equipment is restored to service in an acceptable condition.

   If parts have been replaced or repaired during maintenance, the building, facility, or equipment should undergo non-destructive and functional tests to verify that performance and operability requirements are met.

After maintenance, restore the building, facility, or equipment to the design operating condition that existed prior to the start of maintenance.

The sections of maintenance and in-service inspection which follow on subsequent pages require certain frequencies for performing the required operations. Where it can be justified by maintenance record, trending and other records required by a graded approach to the Conduct of Maintenance, the frequencies for performing maintenance and in-service inspection may be adjusted.

Based upon these justifications, the operations required may be conducted either more or less frequently than specified by the equipment manufacturer. However, where these designated frequencies are specified in a National Code, government regulations, or DOE orders, the frequency of conducting the required operation shall not be decreased.

Certain test and calibration equipment requires trained and certified maintenance personnel that are familiar with the test equipment, and the equipment it is to be used on.

Supports for hoisting and rigging equipment shall comply with the requirements of state and federal agencies. Refer to DOE-STD-1090.

7.2 Corrective Maintenance

Corrective maintenance is performed on a component or a system found to be defective during inspection or pre-operational checks, to restore the building, facility, or equipment to a condition suitable to perform its required functions in a reliable manner.

The following discussions describe certain corrective maintenance requirements. Since it is impractical to list all possible corrective maintenance items, only certain potential but expected failure as a result of normal operations are listed.

7.2.1 Buildings and Facilities, General

Most of the buildings and facilities are constructed of prefabricated structural steel or panels that are painted. All of these the surfaces should be periodically inspected for signs of paint chipping, peeling, cracking or where the surface has been damaged by accidental heavy contact. Unless there is significant damage, any dents or scratches should be repaired and repainted. If experience shows that due to unusual operations or traffic, there is a likelihood of repeated damage, it may be necessary to install guard rails or posts, etc.

7.3 Preventive Maintenance

Preventive maintenance consists of performing those actions and services necessary to keep components working without breakdown. Preventive maintenance is generally scheduled to be performed at specific time intervals. It is not performed on equipment that can be more economically replaced rather than be serviced.

Preventive maintenance for most of the buildings and facilities will be limited to such items as lubrication and adjustment of door hinges, latches, electric motor operated overhead doors etc. The additions to this general preventive maintenance are itemized in the following paragraphs.

7.4 In-Service Inspection

In-Service Inspection requirements for Systems CF00 and GC00 are presented on a subsystem specific basis in the respective subsystem chapter. Refer to Footnote G-1.

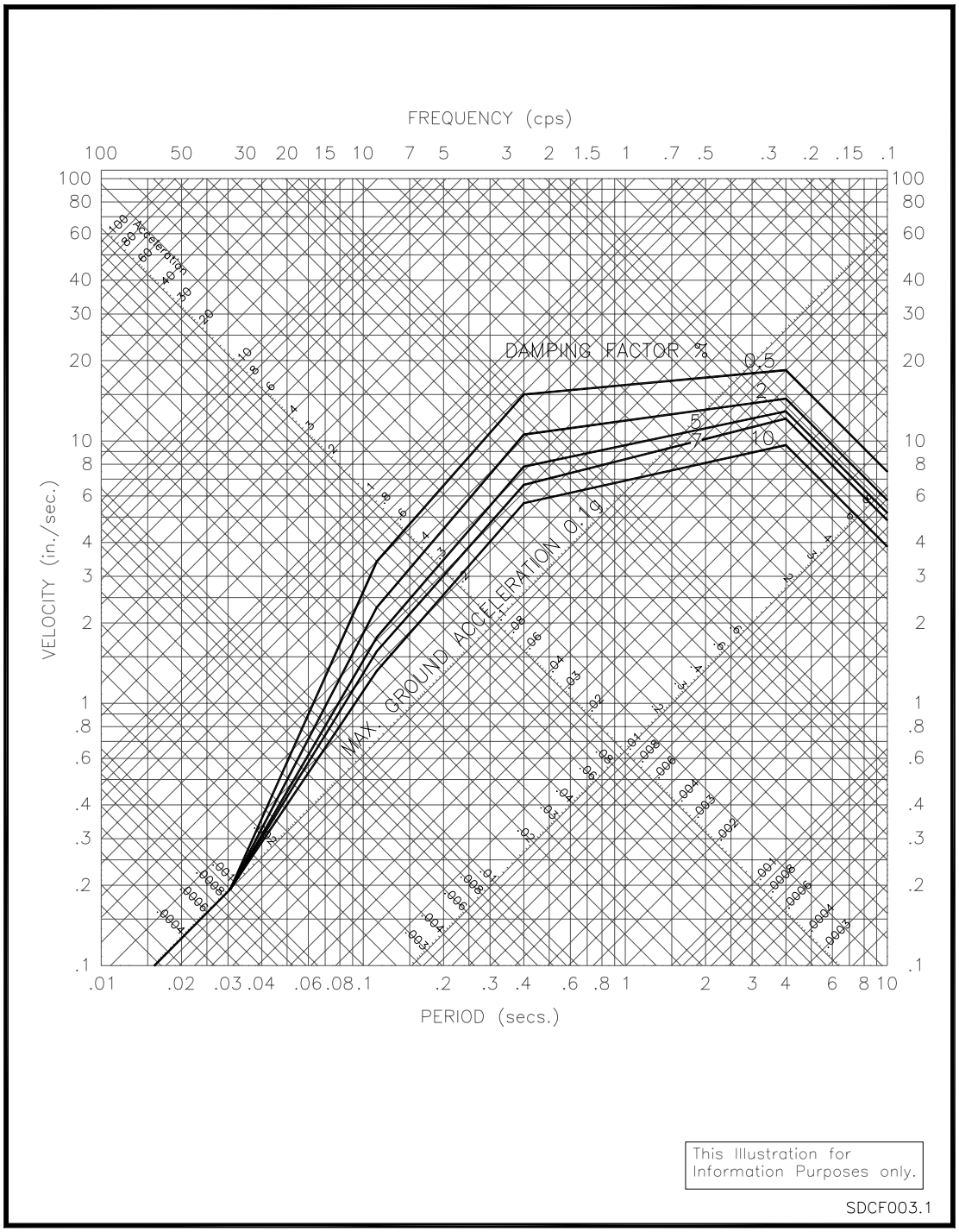

FIGURE G–1. Horizontal Design Response Spectra

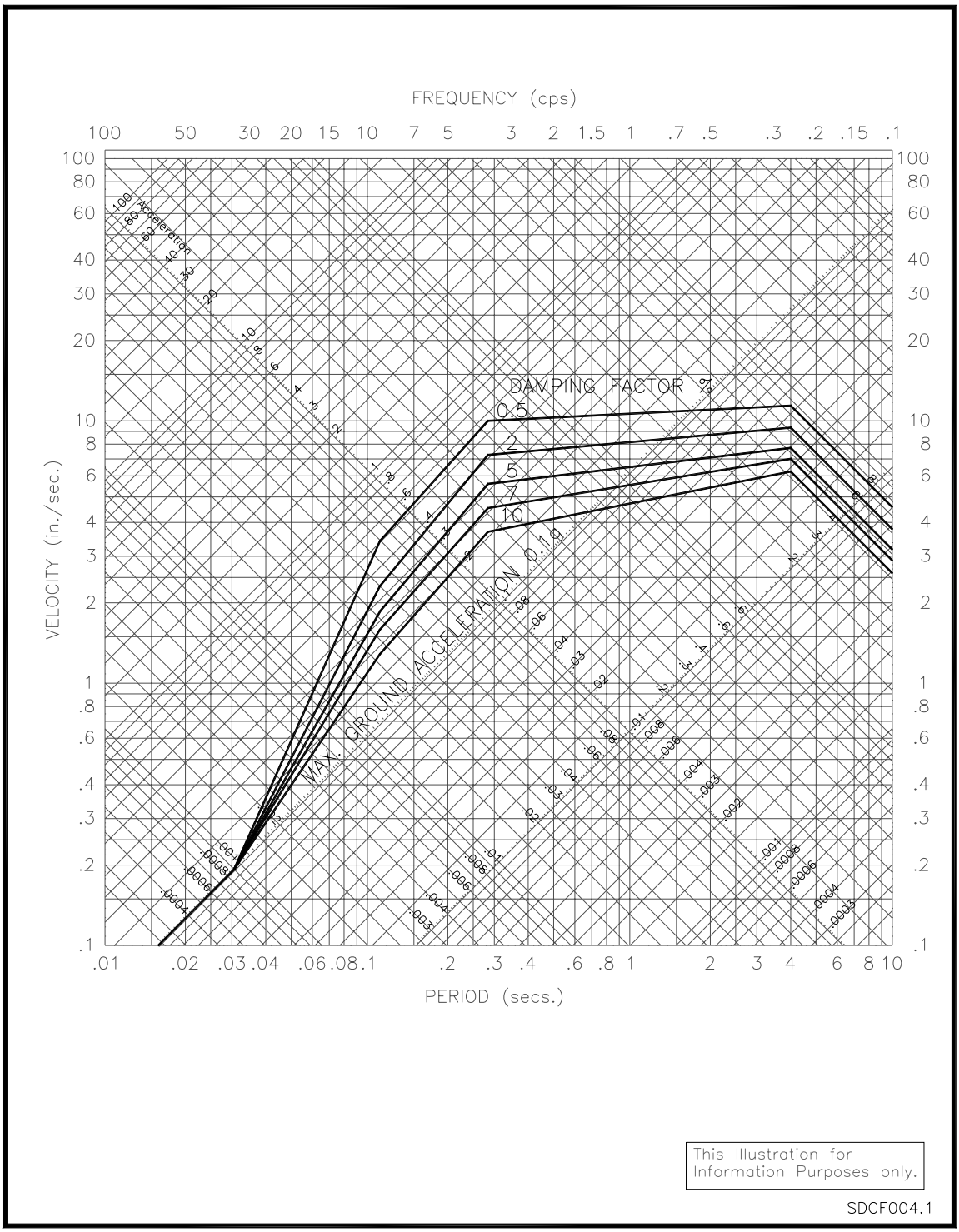

FIGURE G–2. Vertical Design Response Spectra

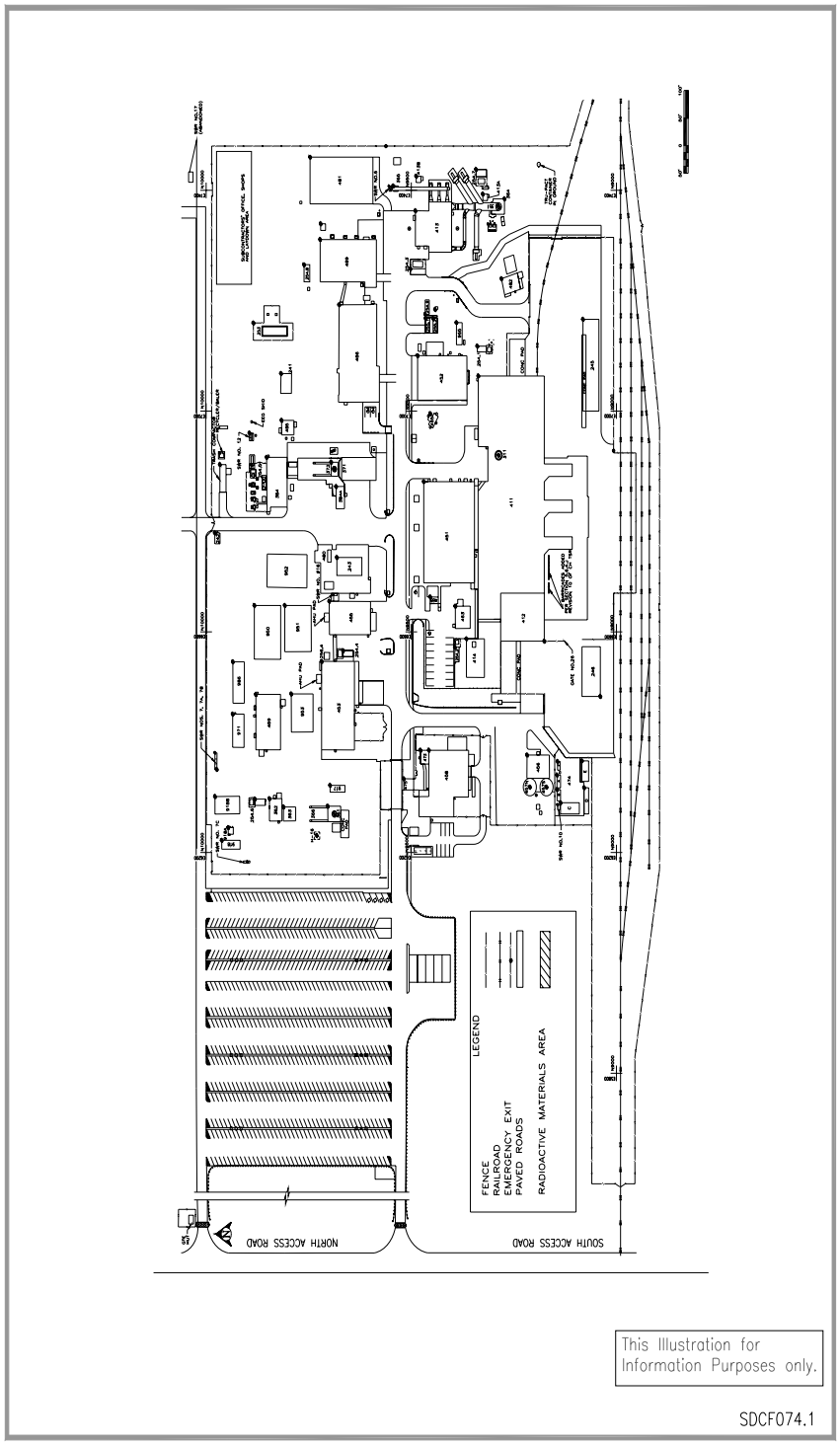

Figure G-3, Permanent Surface Facilities

FACILITIES, USAGE AND STRUCTURE NUMBERS

FACILITY DESCRIPTION	USAGE	STRUCTURE NO.
EQUIPMENT SHED	BUILDING	241
GUARD SHACK	BUILDING	242
SALT HAULING TRUCKS SHELTER	BUILDING	243
TRUPAC TRAILER SHED	BUILDING	245
MgO STORAGE SHELTER	BUILDING	246
13.8KV SWITCHGEAR 25P-SWG15/1	FACILITY	253
AREA SUBSTATION NO.1 25P-SW15.1	FACILITY	254.1
AREA SUBSTATION NO.2 25P-SW15.2	FACILITY	254.2
AREA SUBSTATION NO.3 25P-SW15.3	FACILITY	254.3
AREA SUBSTATION NO.4 25P-SW15.4	FACILITY	254.4
AREA SUBSTATION NO.5 25P-SW15.5	FACILITY	254.5
AREA SUBSTATION NO.6 25P-SW15.6	FACILITY	254.6
AREA SUBSTATION NO.7 25P-SW15.7	FACILITY	254.7
AREA SUBSTATION NO.8 25P-SW15.8	FACILITY	254.8
480V SWITCHGEAR (25P-SWG04/9)	FACITLY	254.9
EMERGENCY GENERATOR #1 25-PE 503	FACILITY	255.1
EMERGENCY GENERATOR #2 25-PE 504	FACILITY	255.2
WASTE SHAFT	FACILITY	311
EXHAUST SHAFT	FACILITY	351
AIR INTAKE SHAFT	FACILITY	361
AIR INTAKE SHAFT/WINCH HOUSE	FACILITY	362
EFFLUENT MONITORING INSTRUMENT SHED - "A"	FACILITY	364
EFFLUENT MONITORING INSTRUMENT SHED - "B"	FACILITY	365
SALT HANDLING SHAFT	FACILITY	371
SALT HANDLING SHAFT HEADFRAME	FACILITY	372
SALT HANDLING SHAFT HOISTHOUSE	FACILITY	384
UNDERGROUND SERVICES OFFICE	FACILITY	384A
WASTE HANDLING BUILDING	BUILDING	411
TRUPACT MAINTENANCE FACILITY	BUILDING	412
EXHAUST SHAFT FILTER BUILDING	BUILDING	413
MONITORING ROOM "A"	BUILDING	413A
MONITORING ROOM "B"	BUILDING	413B
WATER CHILLER FACILITY	FACILITY	414
SUPPORT BUILDING - OFFICES, ETC.	BUILDING	451
SAFETY & EMERGENCY SERVICES FACILITIES	BUILDING	452
WAREHOUSE BUILDING	BUILDING	453
AUXILIARY WAREHOUSE BUILDING - MAINTENANCE	BUILDING	455
WATER PUMPHOUSE	BUILDING	456
WATER TANKS	FACILITY	457
GUARD AND SECURITY BUILDING	BUILDING	458
CORE STORAGE BUILDING	BUILDING	459
SOUTH COMPRESSOR BUILDING	BUILDING	463
AUXILIARY AIR INTAKE STRUCTURE AND TUNNEL	FACILITY	465
TELEPHONE HUT	BUILDING	468
ARMORY BUILDING - ARMORY AND LOCK SHOP	BUILDING	473
HAZARDOUS WASTE STORAGE AREA	FACILITY	474
GATEHOUSE - MAIN SITE ENTRANCE/EXIT	BUILDING	475
VEHICLE FUEL STATION	FACILITY	480
WAREHOUSE ANNEX	BUILDING	481
ELECTRICAL CALIBRATION SHOP	BUILDING	482
NORTH COMPRESSOR BUILDING	BUILDING	485
ENGINEERING BUILDING - OFFICES	BUILDING	486
TRAINING BUILDING	BUILDING	489
VOC AIR MONITORING STATION	BUILDING	918A

This Illustration for Information Purposes only.

SDCF020.5

Figure G-4, Index of Permanent Surface Facilities

PART I, CHAPTER I

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Chapter CF-1

Subsystem CF01, Special Structures

1.0 PRIMARY FUNCTIONS

The primary functions provided by Special Structures (CF01) are:

- Support Building for housing office space, change rooms, laboratories, CMR, and operational support activities.
- Exhaust Filter Building for housing the High Efficiency Particulate Air (HEPA) filtration equipment of the U/G Ventilation System (VU00).
- TRUPACT Maintenance Facility (TMF) for storage and maintenance of health physics equipment and operational support activities.
- Station A, Effluent Monitoring Instrument Station, for housing the Effluent Monitoring subsystem (EM01) of the Radiation Monitoring System (RM00).
- Monitoring Rooms A & B for housing system CM00 Local Processing Units (LPUs).
- Auxiliary Air Intake Structure and Auxiliary Air Intake Tunnel (AAAIS & AAIT) for providing make-up air in the Waste Hoist Tower.

2.0 DESIGN REQUIREMENTS

2.1 General

Refer to Section 2.1 of Chapter G.

2.2 Subsystem General Requirements

The Special Structures consist of the following:

- Exhaust Filter Building (413)
- Effluent Monitoring Instrument Shed, Station A (364)
- Support Building (451)
- TRUPACT Maintenance Facility (412)
- Monitoring Rooms (413A & 413B)

- Auxiliary Air Intake Structure and Auxiliary air Intake Tunnel (AAIS & AAIT 465)

2.2.1 Exhaust Filter Building (413)

The EFB shall provide the following three functional areas:

- Filter chamber consisting of inlet/outlet plenums and a filter room which shall be designed to contain two sets of HEPA filters and associated equipment provided by system VU00 used to filter the U/G ventilation air, in the unlikely event that radioactivity is present, prior to exhausting it to the atmosphere.

- Exhaust equipment room which shall be designed to contain two sets of HEPA filters and associated equipment provided by system HV00 used to filter the EFB air, in the unlikely event that radioactivity is present, prior to exhausting it to the atmosphere.

- Mechanical room which shall be designed to contain the EFB HVAC equipment and the electrical equipment used to operate the U/G Ventilation System (VU00).

Air locks shall be provided for the filter chamber and the exhaust equipment room so that access is only through an airlock.

The filter chamber, exhaust equipment room, and mechanical room shall be arranged to maintain separation of air supplies and to ensure the required direction of airflow be maintained by System VU00.

Concrete plenums shall be provided in the filter chamber for both the filter intake and discharge sides. Air tight seals shall be provided between the inlet and outlet plenum concrete walls and the HEPA filter ducting. The seals shall be sufficiently compliant as to accommodate thermal expansion.

Both the filter chamber and the exhaust equipment room shall be designed to provide space for testing and maintenance, including ready access to the HEPA filters to allow in-place testing and replacement.

2.2.2 Effluent Monitoring Instrument Shed, Station A (364)

The Station A structure shall provide space to house the Effluent Monitoring equipment (EM01) of system RM00 and VOC Monitoring equipment (VOC-1) of system EM00. Station A shall be arranged so that the housed equipment is located directly over the U/G Exhaust Shaft in order to minimize exhaust air sampling tubing runs.

Station A shall be designed to withstand the effects of either the DBE/DBT events, which ever produces the largest loads.

Station A shall be insulated and cooled by ventilation and air conditioning equipment provided by system HV00 to protect and ensure that the systems RM00 and EM00 equipments meet their performance requirements. The ambient temperature within the Station A room housing the equipment shall be maintained in accordance with the requirements stated in SDD HV00.

2.2.3 Support Building (451)

The SB shall be designed as an UBC Occupancy Group A-3/B-2, Construction Type II, two story building.

The SB shall provide office spaces, change rooms, and other facilities for various administrations, laboratory, and operational support activities.

A CMR shall be provided on the second floor of the SB. This room shall provide the space for the CMS equipment of SDD CM00 that is to be located in the CMR. A raised floor system for cable routing shall be provided for this room.

A Computer Room shall be provided to house the business and scientific computer systems to be used at the WIPP. This room shall be located on the second floor of the SB, and shall be provided with a raised floor system for routing of cables.

2.2.4 TRUPACT Maintenance Facility (412)

The TMF shall be designed as an UBC Occupancy Group B-2, Construction Type II building.

The building shall provide space for the maintenance of health physics equipment, and operational support activities.

A two-hour fire rated wall shall be provided for the interface between the WHB and the TMF.

Building 412 shall provide structural support and rails for a 25-ton overhead bridge crane.

2.2.5 Monitoring Rooms (413A & 413B)

Each monitoring room is basically cubic in shape cast in-place reinforced concrete designed to withstand a DBE/DBT.

2.2.6 Auxiliary Air Intake Structure and Tunnel (465)

The AAIS structure shall facilitate intake of fresh air as needed to supplement the air flow down the Waste Shaft from leakage into the tower area. The facility is not housing any instrumentation. The AAIS is designed to withstand a DBE/DBT.

2.3 Operation

The buildings and structures are effectively passive and require no operating procedures.

2.4 Structural Requirements

Refer to Section 2.4.2 of Chapter G for the CF01 (GC05)-specific and general structural design requirements.

2.5 General Arrangement and Essential Features

The Special Structures: EFB (413), the Monitoring Rooms (413A & 413B), Effluent Monitoring Instrument Sheds, and Station A (364) shall be located near the U/G Exhaust Shaft (351). The SB (451) and the Auxiliary Air Intake Shaft (465) shall be located near the WHB (411).

2.6 Maintenance Requirements

Refer to Section 2.6 of Chapter G.

2.7 In-Service Inspections

Refer to Section 2.7 of Chapter G.

2.8 Instrumentation and Control

There are no general or special instrumentation and control requirements.

2.9 Interfacing System Requirements

Refer to Section 2.9 of Chapter G for the interfacing system requirements.

2.10 Quality Assurance Requirements

Refer to Section 2.10 of Chapter G for the general quality assurance requirements.

2.11 Codes and Standards

Refer to Section 2.11 of Chapter G for the governing codes and standards.

2.12 Reliability Assurance

Refer to Section 2.12 of Chapter G for the general reliability assurance requirements.

3.0 DESIGN DESCRIPTION

3.1 Summary

Refer to Section 3.1 of Chapter G for summary design descriptions.

3.2 Detailed System Description

The Special Structures consist of those surface structures which, because of their special functions, are designed and constructed to more stringent requirements than those listed in GC02 and GC06.

3.2.1 Support Building (451)

The SB (451) provides general support services for most facilities and activities on the site. It provides office space for administration, operation control, technical support and underground personnel support functions

3.2.2 TRUPACT Maintenance Facility (412)

Building 412 now provides space for a radiation maintenance shop and waste handling administrative offices. It was originally intended as the TRUPACT II Maintenance Facility.

3.2.3 Exhaust Filter Building (413)

The EFB is comprised of five principal functional areas. Each of these functional areas are contained within individual rooms as indicated in Table CF I-1 (and illustrated on Figure CF I-7). Each of these functional areas is discussed in the following sections.

3.2.3.1 Inlet Plenum

The Inlet Plenum distributes the inlet air coming from the U/G Exhaust Shaft to the two HEPA filters. The air enters the south wall through an opening which is connected to the Exhaust Shaft Filter duct and exits through two openings connected to the HEPA filter ducts.

Table CF-I-1, Exhaust Filter Building Functional Areas

- Inlet Plenum
- Filter Chamber
- Inlet Access Corridor
- Filter Chamber Room
- Outlet Access Corridor
- Outlet Plenum
- Mechanical
- Mechanical Room
- Exhaust Equipment Room
- Air Lock

3.2.3.2 Filter Chamber

The Filter Chamber houses the two HEPA filtration units of the U/G Ventilation System (VU00), the inlet and outlet flow control dampers, the associated ducting, and other related equipment. The Filter Chamber is subdivided into three functional areas: A) the Inlet Access Corridor, B) the Filter Chamber Room, and C) the Outlet Access Corridor.

The Inlet and Outlet Access Corridors serve three functions. The first is to provide atmospheric controlled areas within the EFB in which to perform maintenance and in-service inspection of the flow control dampers. The second is to provide additional protection for the inadvertent release of unfiltered air from the Filter Chamber Room during filter replacement operations. The third function is to provide a controlled atmosphere in which to open or close the manually operated HEPA Isolation Dampers.

The Filter Chamber Room houses the two HEPA filters. Space is provided to facilitate filter replacement, in-service inspection, maintenance and testing operations.

3.2.3.3 Outlet Plenum

The Outlet Plenum functions in two different operating modes of the U/G Ventilation System. The first is for the filtration operation and the second is for the filter by-pass operation. For the filter mode the Outlet Plenum functions to collect the air coming from the two HEPA filters and discharging it to one of three exhaust fan inlet ducts. For the filter by-pass mode the Outlet Plenum functions to collect the air coming from the Exhaust Shaft duct and discharging it to the three exhaust fan ducts.

3.2.3.4 Mechanical Areas

The Mechanical Areas function to house the building HVAC System including the building HEPA units (HV04), the Compressed Air Supply and Dryer system (CA00), various electrical controls and instrumentation. The area is subdivided into a Mechanical Room and an Exhaust Equipment Room by a gypsum wallboard partition in order to separate the building air inlet from the filtered exhaust air outlet, and to maintain the Mechanical Equipment Room at a pressure higher than the Exhaust Equipment Room for leakage control.

3.2.3.4.1 Mechanical Room

The Mechanical Room houses most of the non-filter equipment required for the operation of the systems within the building. Included among these are: The two HVAC units, the compressed air dryers, the building LPU, the local controls for the filter fans and dampers, and various electrical panels and switch gear cabinets.

3.2.3.4.2 Exhaust Equipment Room

The Exhaust Equipment Room provides a low leakage enclosure to contain the HEPA filters for the EFB ventilation system and associated equipment and instrumentation. The pressure in this room is controlled to assure that any leakage from adjacent areas is into the room. The exhaust from this room is through the building HEPA filters.

3.2.3.5 Air Lock

The function of the Air Lock is to help assure that all air leakage within the Effluent Filter Building is in the direction of always going through the building HEPA filters before being exhausted to atmosphere. This room is controlled at the highest pressure within the Effluent Filter Building so that air leakage from this area is into the Exhaust Equipment Room and/or the Inlet Access Corridor. To assure that the various rooms within the building are maintained at the correct pressure value so that air flow is in the proper direction, it is necessary that only one set of doors are open at a time.

3.2.3.6 Exhaust Filter Building Air Pressure Control

The pressure in the various rooms of the EFB is controlled by the Building 413 HVAC System (HV04). A simplified schematic of this system, along with the approximate room pressures, is shown on Figure CF I-1. The pressures are maintained such that all leakage of potentially contaminated air is in the direction of passing through the building HEPA filters prior to being exhausted to the outside atmosphere. For the building exhaust filtration system to operate properly, the doors in the Exhaust Equipment Room, the Air Lock, the Inlet Access Corridor, and the Filter Room must be normally closed.

3.2.4 Effluent Monitoring Instrument Shed, Station A (364)

The function of the Effluent Monitoring Instrument Shed, Station A is to provide housing for the instrumentation used to detect radioactivity in the air exhausting from the underground Exhaust Shaft.

3.2.5 Monitoring Rooms (413A & 413B)

The function of the Monitoring Rooms (413A & 413B) is to house LPUs which collect data from the instrumentation located in the Station A & B Instrument Sheds and the mass flow monitors located in the Exhaust Shafts. The signals are subsequently transmitted to the CMS. In addition, the Monitoring Room 413A houses the seismic monitoring panel which also connects to the LPU.

3.2.6 Auxiliary Air Intake Structure and Tunnel (465)

The building contains air inlet louvers on three sides. There is a personnel door (tornado hardened) on the fourth side, which provides access to the AAIS. The three sides with louvers have "wind wall" extensions. On the east side, there is a pneumatically operable damper with a tornado damper behind it. The north and west sides each have pressure release dampers.

3.3 System Performance Characteristics

The CF01 subsystems are passive. The subject facilities shall maintain configurational integrity under normal operating and environmental conditions, and requirements as set forth in Section 1.0 and Section 2.0 of Chapter G and Part I, Chapter I.

3.4 System Arrangement

3.4.1 Support Building (451)

The SB is located on the south side of the main east to west road, and north of the WHB. This building is a two-story building about 124 ft by 184 ft long, as shown on Figures CF I-2, CF I-3, CF I-4, CF I-5.

The main access corridor, located on the south side of the SB, shares a common wall with the WHB. The corridor is about 120 ft long and about 10 ft wide. There are multiple access doors from the corridor to both the WHB and to the laboratories within the SB. In addition, there are access doors at each end of the corridor. Skylights are mounted into the roof.

3.4.2 TRUPACT Maintenance Facility (412)

The 412 building is located adjacent to and west of the WHB with interconnecting doors and walls with the WHB.

3.4.3 Exhaust Filter Building (413)

The EFB (413), the Effluent Monitoring Instrument Shed, Station A (364), and the Monitoring Rooms (413A & 413B) are grouped near one another in the south-east corner of the site, and near the Exhaust Shaft (351). The general arrangement of these buildings is shown on Figure CF I-6.

3.4.4 Auxiliary Air Intake Structure and Tunnel (465)

The AAIS shall be about 25' x 12', and 10' high concrete structure located 100' north from the WHB. The facility shall be designed to withstand the effects of either DBE/DBT.

3.5 Component Design Description

3.5.1 Support Building (451)

The SB elevations are shown on Figure CF I-2 and CF I-3. The internal permanent room arrangement for the first floor is shown on Figure CF I-4. The second floor arrangement is shown on Figure CF I-5. Additional modular offices have been added, as required.

The SB provides for the following areas and functions:

- Lobby area
- Management and technical areas
- Conference rooms

- Document control room
- Mail room
- Technical library
- Central monitoring room
- Computer room
- Equipment rooms
- Change, locker, and toilet rooms
- Laboratories

The CMR houses the process, radiation, fire, security, and environmental computer input/output devices including display board, alarms, and operator console.

The computer room contains the central computer.

In the administration area, space is provided for administrative and technical offices, a presentation and conference room, reproduction/mail/storage rooms, and a master record center.

The main access corridor provides multiple access doors into the SB and to the CH-TRU WHB area.

On the roof of the SB, there are mounting provisions for the SB HVAC equipment.

The SB has a steel frame superstructure. The exterior consists of sandwich panel siding. Due to its proximity to the WHB, the main lateral-force-resisting structural members of the SB are designed for DBT loads.

The main lateral-force-resisting structural members of the SB are designed to withstand the DBE to prevent these structures from collapsing on the adjacent WHB. **[DSA SC SSC 4.3.1]**

The ability for the SB structure to withstand a DBE is documented in the following analysis:

- CS-45-D-481, Seismic Analysis of Support Building, Rev. 0, November 30, 1983

Supports for the automatic wet pipe sprinkler are provided throughout the building. In addition, space for portable fire extinguishers is provided.

3.5.2 TRUPACT Maintenance Facility (412)

This building is constructed of structural steel columns and trusses which form a rigid frame to which tornado resistant insulated metal siding is

attached. The building is about 87 ft by 105 ft and about 45 ft high, with essentially common walls on the east and north side with the WHB.

Due to its original purpose and its proximity to the WHB, it has been designed for loads listed in Table G-2. The main lateral-force-resisting structural members of the TMF are designed to withstand the DBE to prevent these structures from collapsing on the adjacent WHB. **[DSA SC SSC 4.3.1]** The TMF roof design and construction prevents building collapse from snow/ice loading on the roof and impacting waste containers outside closed shipping containers (in the WHB). **[TSR DF 6.1]**

The ability for the TMF (Building 412) structure to withstand a DBE is documented in the following analyses:

- CS-41-D-851, TRUPACT Maintenance Facility Horizontal Seismic Analysis, Rev. 0, April 13, 1984.
- CS-41-D-852, Seismic Analysis – Vertical TRUPACT Maintenance Facility, Rev. 0, April 18, 1984.

The ability for the TMF to withstand a snow/ice loading on the roof of 27 lbs/ft^2 is documented in the following analyses:

- CS-41-D-124, Analysis & Design of Waste Handling Building Main Columns, Rev. 0, November 18, 1983.
- URS Letter of Transmittal: Roof Study for Additional Loads, March 20, 2006.

The roof is sloped downward about 26" from north to south and is constructed as built up roofing material over metal deck and concrete.

One of the features of this building is the provision of supports for the 25-ton overhead bridge crane with lift clearances for lifting assemblies from the floor onto platform trucks. Large open areas are provided inside with crane coverage over a large area.

Storage areas and office enclosures are located at several locations in the building. On the north wall, a steel-framed stairway leads up to an entrance door to the WHB roof over the Overpack and Repair Room (OP&RR) for access to the HVAC equipment mounted there.

A 14' by 12' vertical lift door along with a personnel door is located on the south side of the building. Other personnel doors are located on the north and west side of the building. These doors are tornado hardened.

Space and supports for the wet-pipe automatic sprinkler and portable fire extinguishers are provided.

3.5.3 Exhaust Filter Building (413)

The EFB is comprised of five principal functional areas. Each of these functional areas is contained within individual rooms as illustrated on Figure CF I-1. Each of these functional areas is described in the following sections.

3.5.3.1 Inlet Plenum

The Inlet Plenum consists of a room with inside dimensions of 10'-0" wide, 53'-7" long, and between 15'-3" and 15'-9" tall. All four side walls are constructed of heavily reinforced concrete 12" thick. The ceiling is heavily reinforced concrete 15" thick and the floor slab is 6" thick reinforced concrete. The walls around the inlet duct in the south wall, the two exit duct openings, and an access door in the east wall have additional reinforcing to strengthen the walls in those areas.

The reinforced concrete plenum structure is designed to withstand the DBE/DBT, and the differential pressure developed by the exhaust fans.

The inlet duct (from the U/G Exhaust Shaft), and the two discharge ducts (to the HEPA filters) are bolted to steel framing around the openings. Gaskets are used to assure a leak tight connection. The access door is triple locked shut, and has seals to minimize leakage. The interior of the Inlet Plenum is painted to provide a surface that is suitable for preventing radioactive particles, in the unlikely event that they may be present, from penetrating the surface, and to allow clean-up of the surfaces.

3.5.3.2 Filter Chamber

The Filter Chamber is located between the Inlet and Outlet access corridors, and shares the walls common between them. The overall outside dimensions of this area is 55'-7" wide by 62'-7" long. It contains a reinforced concrete floor 6" thick which is increased to 1'-6" thick in the areas where the HEPA filters are mounted. The south wall of this area is constructed of prefabricated metal siding. The north wall and the walls between the Filter Chamber Room and the two Access Corridors are constructed of gypsum wallboard. All surfaces within this area are painted to minimize the absorption of radioactive particles and to facilitate cleaning in the unlikely event that radioactive particles may be present.

3.5.3.3 Outlet Plenum

The Plenum consists of a room with inside dimensions of 15'-0" wide, 53'-7" long, and between 15'-0" and 15'-9" tall. All four side walls are constructed of heavily reinforced concrete 12" thick. The ceiling is heavily reinforced concrete 15" thick and the floor slab is 6" thick reinforced concrete. The walls around the two inlet ducts and an access door in the west wall, one inlet duct in the south wall, and three exit ducts in the east wall have additional reinforcing to strengthen the walls in those areas. The reinforced concrete plenum structure is designed to withstand the DBE/DBT, and the differential pressure developed by the exhaust fans.

The inlet duct from the U/G Exhaust Shaft, the two inlet ducts from the HEPA filters, and the three discharge ducts to the exhaust fans are bolted to steel framing around the openings. Gaskets are used to assure a leak tight connection. The access door is triple locked shut and has seals to minimize leakage. The interior of the Outlet Plenum is painted to provide a surface that is suitable for preventing radioactive particles from penetrating the surface and to allow clean-up of the surfaces.

3.5.3.4 Mechanical Areas

3.5.3.4.1 Mechanical Room

The Mechanical Room is approximately 31' x 31'. The north and east outside walls are constructed of prefabricated metal siding. The south and west inside walls are constructed of gypsum wallboard. The floor is reinforced concrete 6" thick which is increased locally in the areas where the HVAC units are mounted. The pressure in this room is controlled to be above atmospheric, and above the adjacent rooms in the building in order to assure that any leakage flow is in the required direction.

3.5.3.4.2 Exhaust Equipment Room

The Exhaust Equipment Room is approximately 31' x 31'. The north and west outside walls are constructed of prefabricated metal siding; the south and east inside walls are constructed of gypsum wallboard. Contained within this room is the Air Lock. The floor is constructed of reinforced concrete 6" thick which is increased in thickness to in the areas where the HEPA filters are mounted.

3.5.3.5 Air Lock

The Air Lock is a separate enclosure, about 10' x 13', located in the south-west corner of the Exhaust Equipment Room. It is constructed of gypsum wallboard. The Air Lock contains three sets of doors; one double door to the

outside, one double door to the Inlet Access Corridor, and a single door to the Exhaust Equipment Room.

3.5.4 Effluent Monitoring Instrument Shed, Station A (364)

The Effluent Monitoring Instrument Shed, Station A is about 20' wide, 18' long and 10' tall. The structure is mounted on steel beams above the Exhaust Shaft (351) as shown on Figure CF I-8. The shed is constructed of steel columns and trusses which form a rigid structure to which insulated metal siding is attached. The shed is designed for the DBE/DBT.

A four foot square inspection shaft is connected from the center of the shed floor to the Exhaust Shaft elbow. Four sampler ports are also connected from the shed floor to the Exhaust Shaft. The roof of the shed is constructed of steel plate which provides support for an "A-frame" hoist for use in Exhaust Shaft inspection and a cantilevered swinging arm hoist frame for use in moving equipment to the shed roof.

Contained within the shed are three Exhaust Shaft monitoring stations two of which are connected to two Continuous Air Monitors (CAMs), a redundant sampler station and various recorders, power supplies, etc., used to monitor for radioactivity in the air being exhausted from the underground. The third station is a Fixed Air Sampler (FAS). These are described in SDD-RM00.

The temperature and humidity of the atmosphere within the shed are controlled by a HVAC System (HV04) located on a ground level concrete pad to the east of the shed.

3.5.5 Monitoring Rooms (413A & 413B)

The Station A & B Monitoring Rooms are located as indicated on Figure CF I-6. The Rooms are approximately cubic in shape with the actual dimensions as listed in Table CF I-2.

The Rooms are constructed of heavily reinforced concrete in order to accommodate the DBE/DBT. Both Rooms are equipped with HVAC systems (HV04) which control the room temperature and humidity as required for operation of the LPUs.

3.5.6 Auxiliary Air Intake Structure and Tunnel (465)

The superstructure is constructed from heavily reinforced concrete and concrete units with cavities filled with concrete and reinforcing bars.

3.6 Instrumentation and Control

There are no instrumentation and control requirements for the special facilities identified under Subsystem CF01.

3.7 System Interfaces

Refer to Section 3.7 of Chapter G which documents the subsystem primary and secondary interfaces.

4.0 OPERATION

None required.

5.0 SYSTEM LIMITATIONS, SET POINTS AND PRECAUTIONS

None required.

6.0 OFF-NORMAL EVENTS AND RECOVERY

In addition to those events described in Section 6.0 (Part I, Chapter II), the following specific off-normal event may occur:

- Exhaust Filter Building HEPA filter or duct failure

  In the event of failure of HEPA filter shells or the associated ducting within the EFB, any handling of radioactive waste containers underground including emplacement that potentially may result in release of radioactive particles underground should be interrupted until the filter system is repaired.

Table CF I-2, Effluent Monitoring Equipment Rooms Dimension

	STATION A	STATION B
Width Outside	11'-8"	11'-8"
Length Outside	11'-8"	11'-8"
Height Outside	12'-0"	11'-0"
Wall Thickness	10"	10"
Ceiling Thickness	12"	12"
Floor Thickness	8"	6" & 12"

7.0 MAINTENANCE

7.1 Maintenance Approach

Refer to Section 7.1 of Chapter G for information regarding the general maintenance approach.

7.2 Corrective Maintenance

See Section 7.2 of Chapter G.

7.3 Preventive Maintenance

- Exhaust Filter Building

Contact maintenance shall be used for the EFB. Space is provided for clean-up, maintenance, and replacement of components. The use of water should be minimized, and if water is used for contamination cleanup, the wiping cloths used for clean up should be disposed of as contaminated trash. Any water discharged by the fire suppression system in potentially contaminated areas (HEPA filter area) should be collected and sampled before disposition.

7.4 In-Service Inspection

No In-Service Inspection is identified for the Special Structures. Documentation of the status of any deterioration for all facilities shall be made with emphasis on the following:

- DBE/DBT building structures
- EFB-413
- TMF-412
- SB-451
- AAIS &AAIT-465

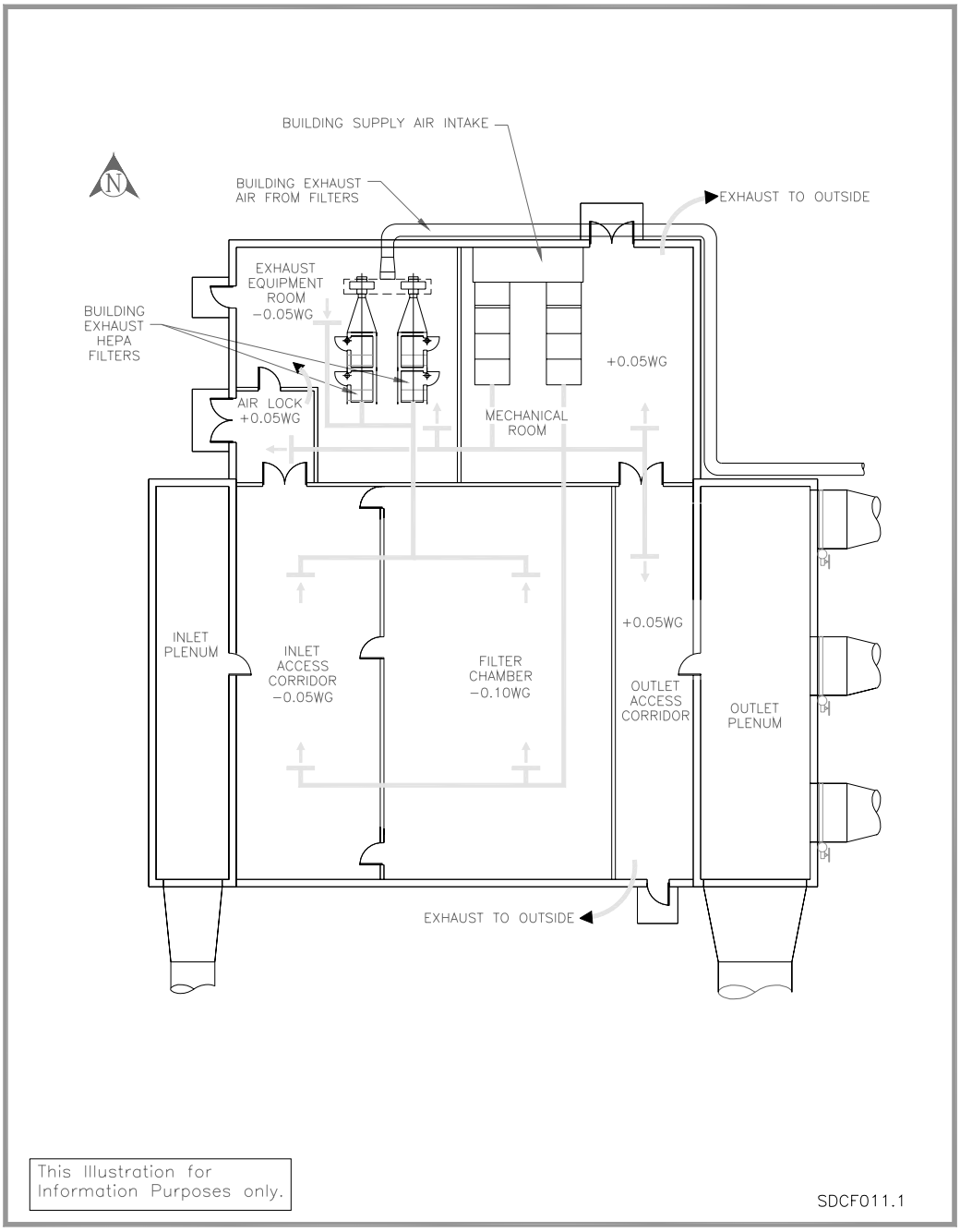

FIGURE CFI-1 Exhaust Filter Building Pressure/Flow Schematic

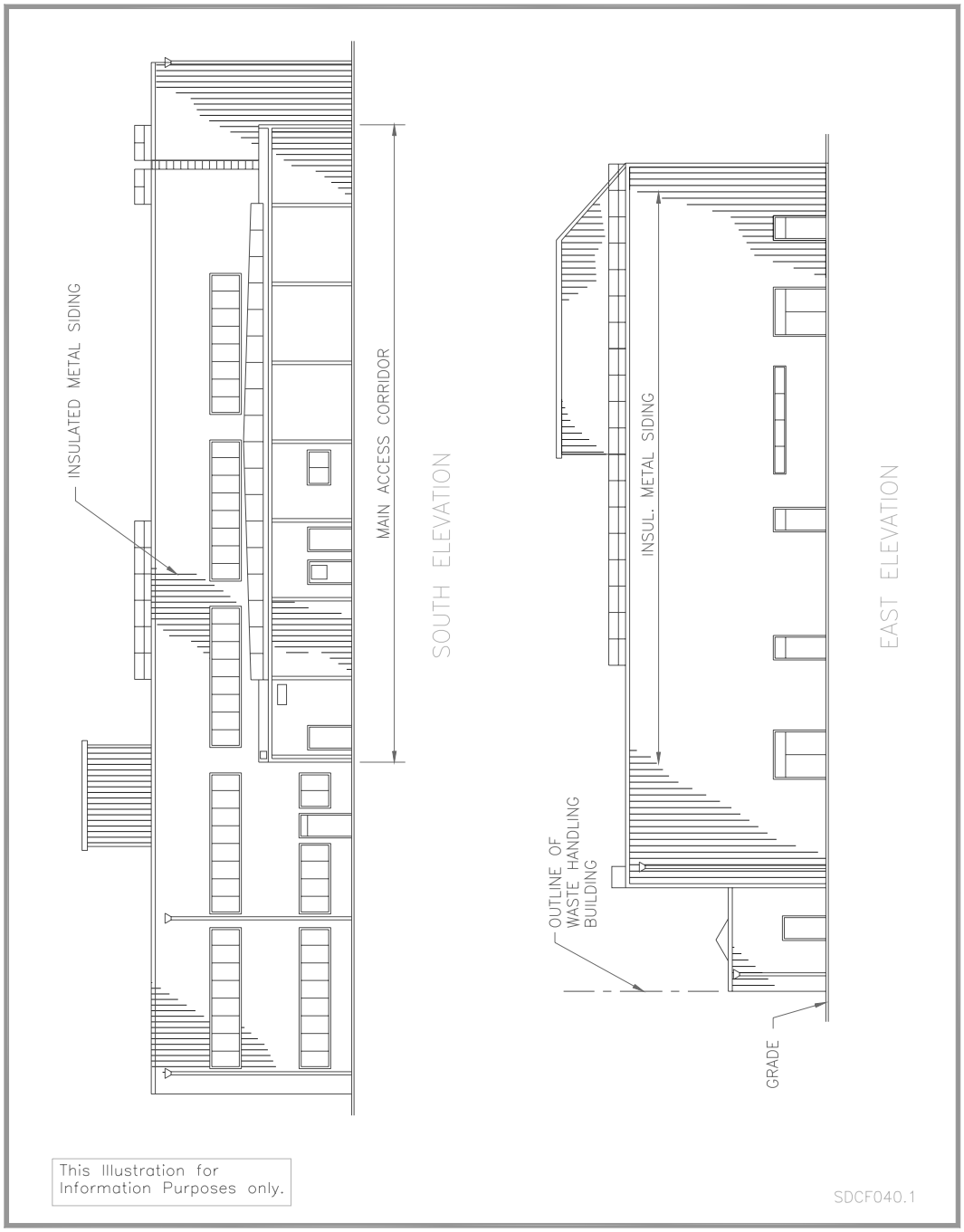

FIGURE CFI-2 Support Building (Elevations)

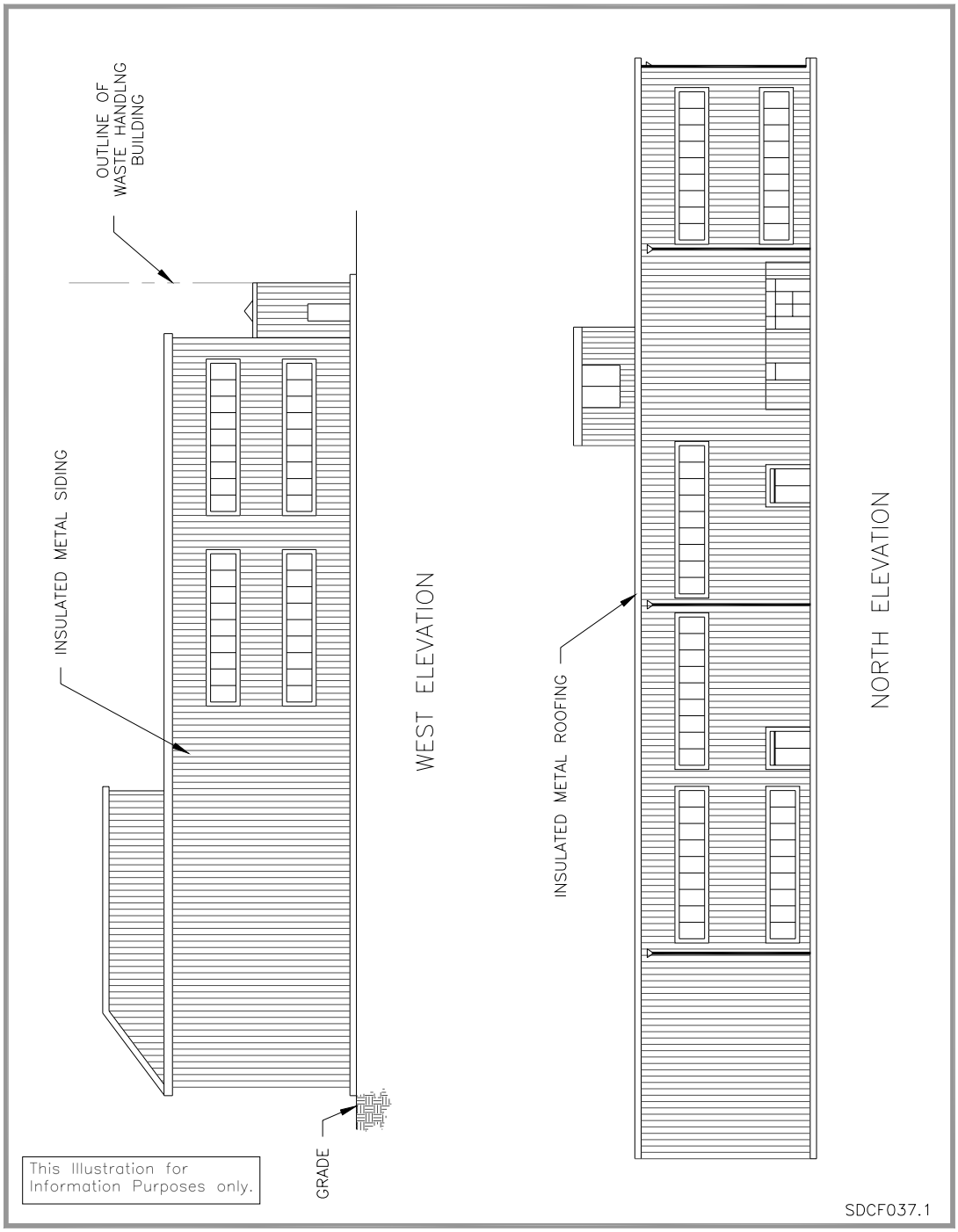

FIGURE CFI-3 Support Building (Elevations)

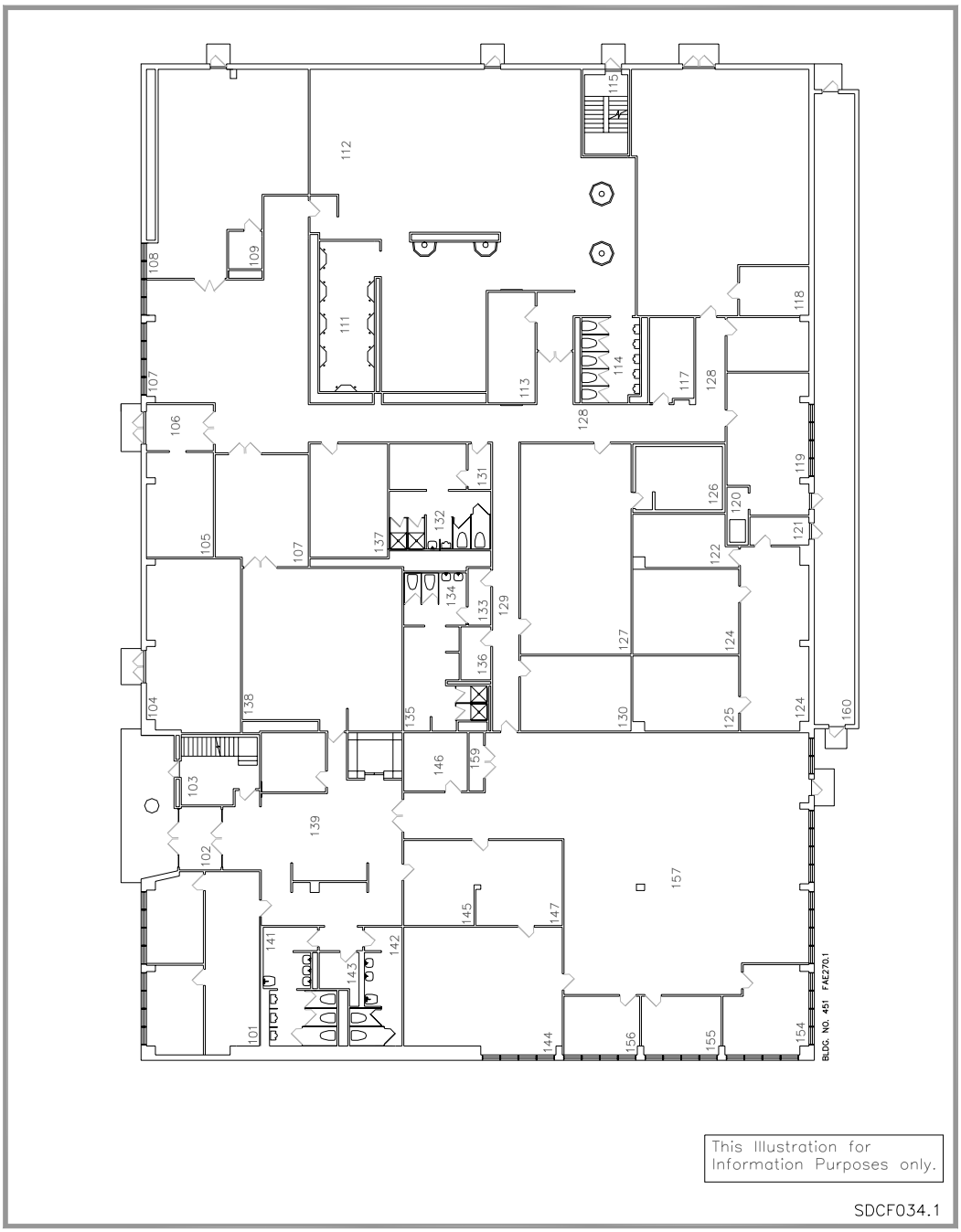

FIGURE CFI-4 Support Building (1st Floor Plan)

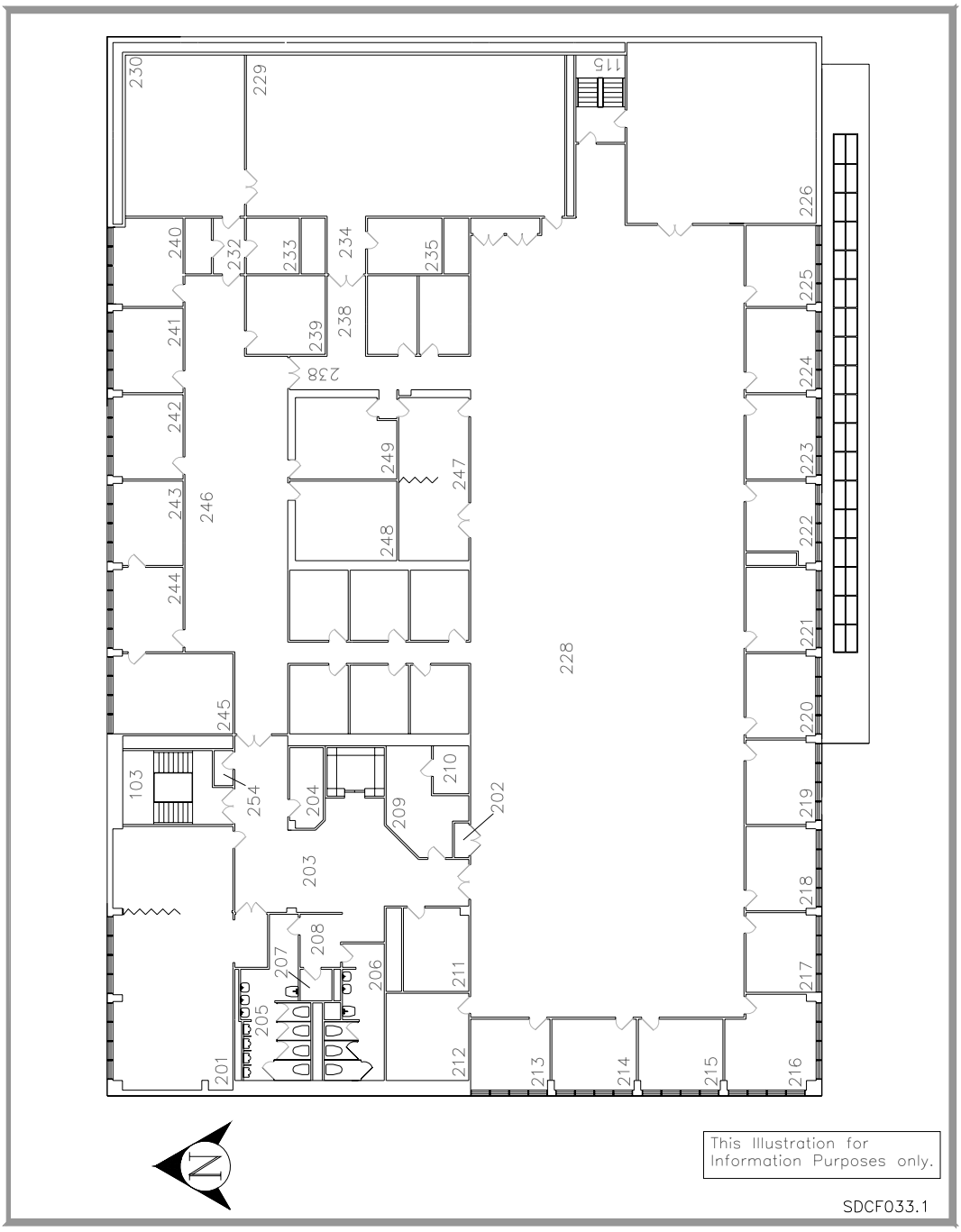

FIGURE CFI-5 Support Building (2nd Floor Plan)

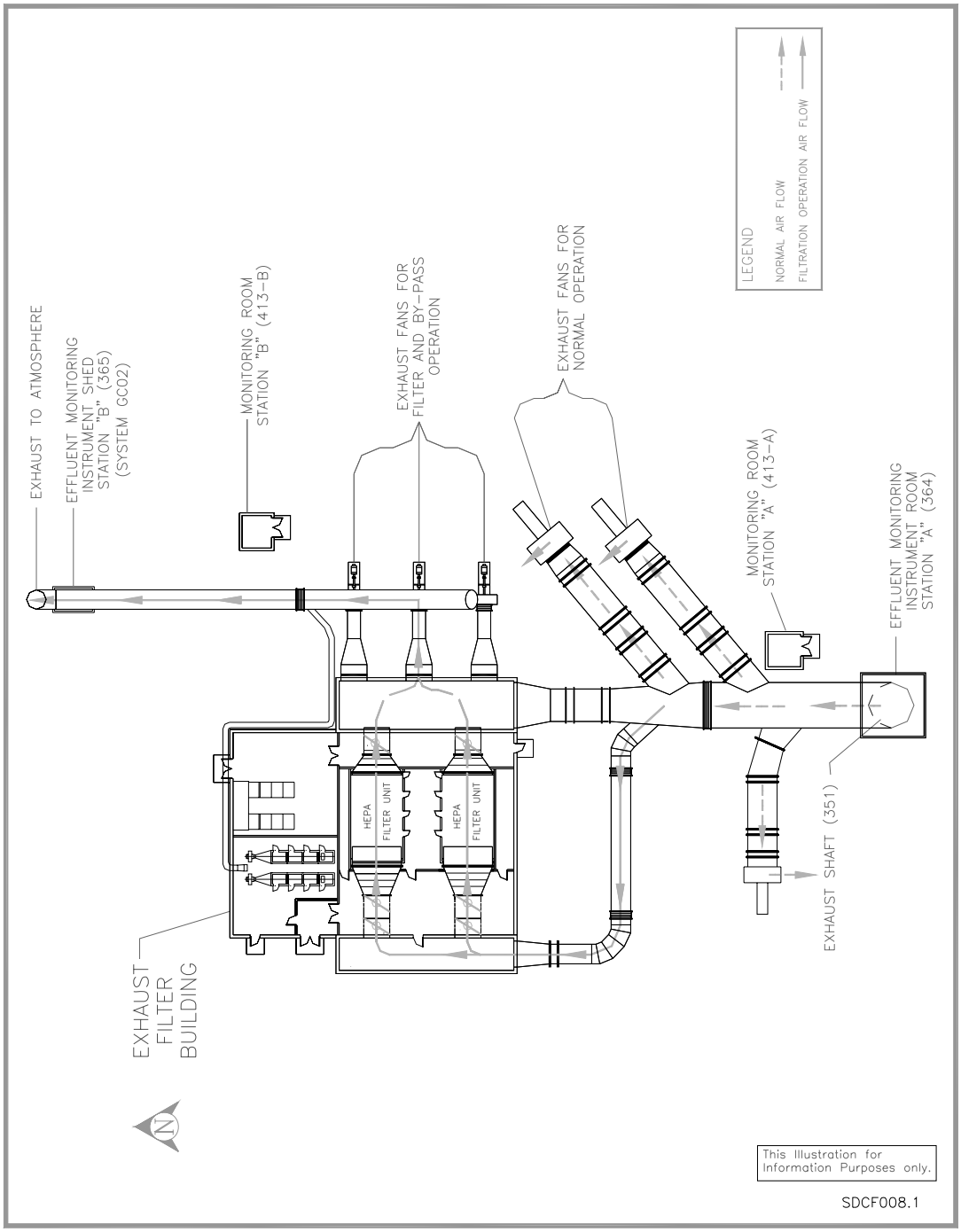

FIGURE CFI-6 Special Structures (GC05)

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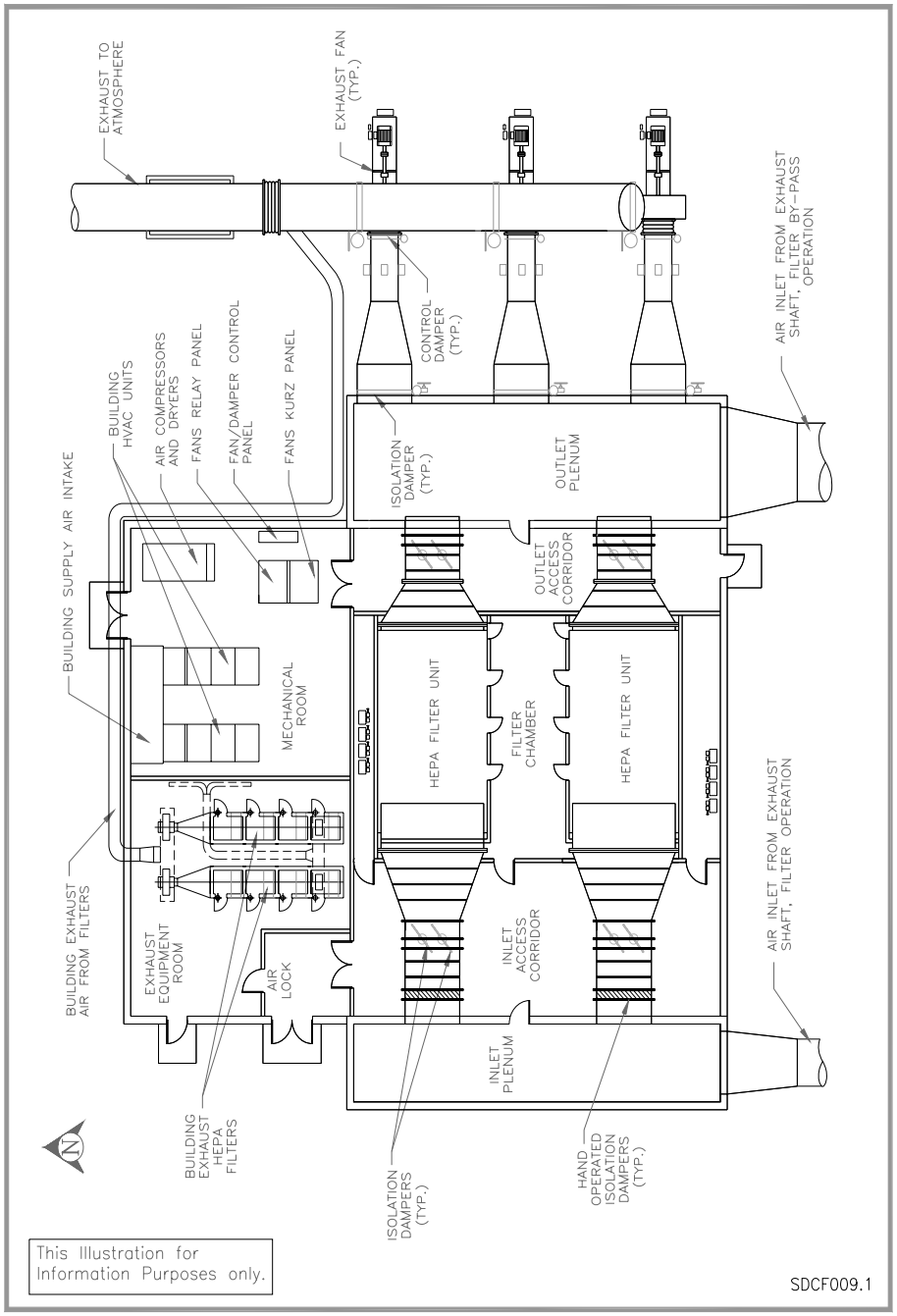

FIGURE CFI-7 Exhaust Filter Building (413)

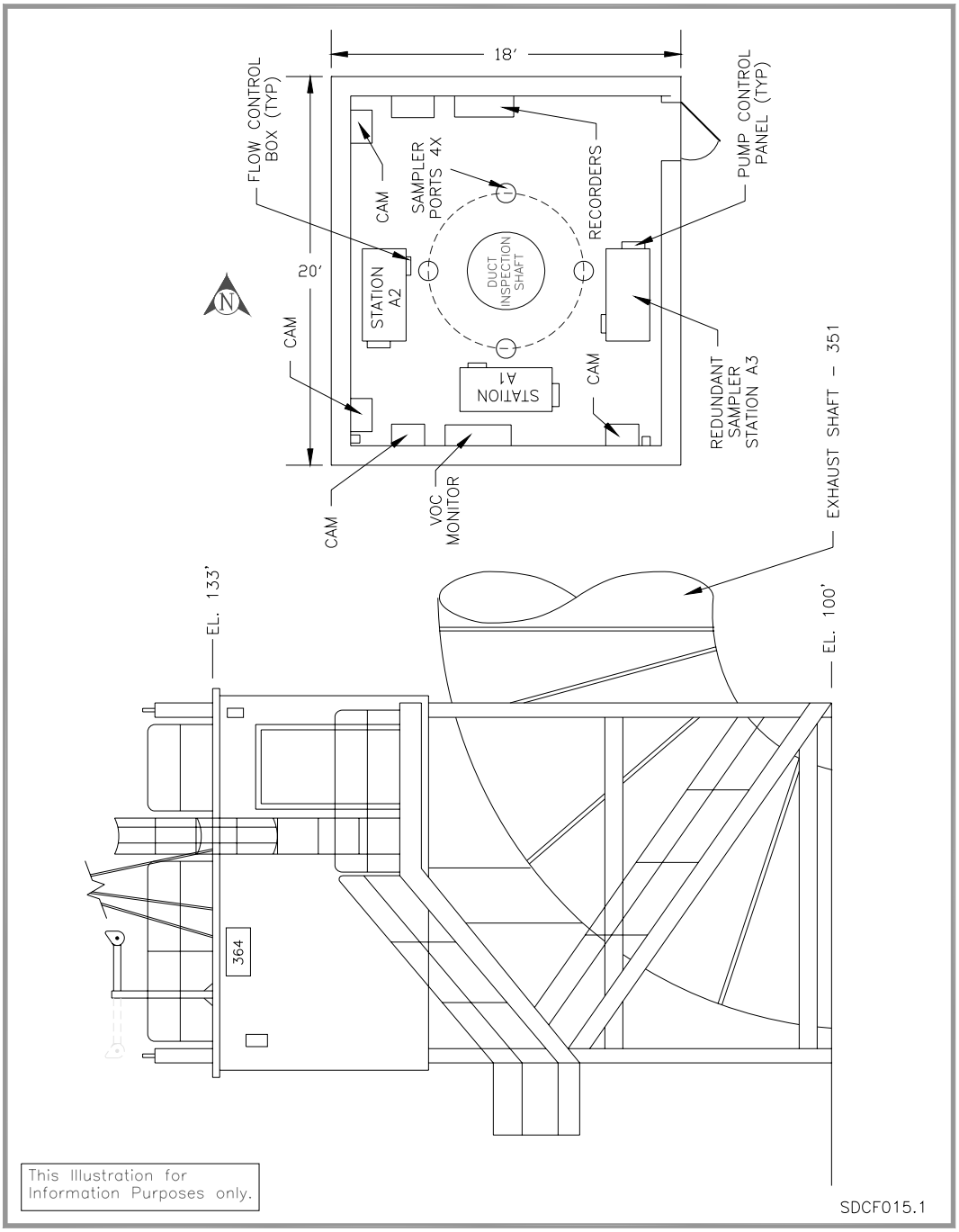

FIGURE CFI-8 Effluent Monitoring Instrument Shed Station A

Part I, Chapter II

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Chapter CF II-I

Subsystem CF02, Waste Handling Building

1.0 PRIMARY FUNCTIONS

The primary function of the WHB (CF02) is to provide spaces and facilities for the surface handling of CH Wastes and RH Wastes, include the following:

A confinement capability with supporting functions provided by systems HV00 and RM00 to control the release of potential radioactive contaminants to the outside environment.

- To prevent structural failure or damage during and following operational or natural phenomena events. **[TSR DF 6.1]**

- Entrances to permit entry and receipt of transporters of CH Waste and RH Waste.

- Structural support for the Waste Handling System (WH00) overhead cranes.

- Space and access for unloading the shipping packages, unloading and inspecting CH Waste packages, overpacking and repairing damaged waste packages, and transferring the waste packages to the Waste Hoist conveyance for delivery underground.

- Space and access for unloading the Shipping Casks of RH Waste, processing the Shipping Casks, removing the RH Waste canisters from the Shipping Casks, preparing the waste canisters for storage, loading the waste canisters into the Facility Cask, and transferring the Facility Cask to the Waste Hoist conveyance for delivery underground.

- Space and access for collection and handling of site-derived liquid and solid radwaste.

- Space for mechanical equipment in Mechanical Equipment Rooms (ventilation equipment of system HV00).

- Space and support for the Waste Shaft Hoist.

2.0 DESIGN REQUIREMENTS

2.1 General

Refer to Chapter G for CF02 General Design Requirements.

2.2 Subsystem Design Requirements

The WHB shall be designed to withstand the 0.1g DBE, the DBT with 183 mph wind and a translational velocity of 41 mph, a maximum rotational velocity radius of 325 ft, a pressure drop of 0.5 psig, and a pressure drop rate of 0.09 psig/sec., and straight-line wind of 110 mph at 30 ft above ground such that the building structure does not collapse and damage waste containers. **[DSA SC SSC 4.3.1]**

The WHB roof shall be designed to withstand a 27 lb/ft^2 snow load, and the WHB will not collapse under the design roof load. **[DSA SC SSC 4.3.1]**

The WHB shall be designed to provide a passive confinement function for release of radioactive particulate materials. **[TSR DF 6.1]** The WHB shall be designed and arranged to act as a Radioactive Material Area (RMA) when the WHB Doors, ventilation system of SDD HV00, and radiation monitors of SDD RM00 are properly configured for handling radioactive waste.

The WHB shall be designed as a UBC Occupancy Group B-2, Construction Type II Building.

The WHB shall meet NFPA 220 Type II construction such that fires outside the building or within the building do not propagate and damage waste containers outside of closed shipping casks. **[DSA SC SSC 4.3.1]**

The WHB shall be provided with an Ordinary Hazard Group 2 wet pipe sprinkler system except for the RH Waste Area Hot Cell, Cask Unloading Room, Canister Transfer Cell, and the Canister Shuttle Car Room by the Fire Protection System FP00.

Methods to collect and dispose of sprinkler water within the building shall be provided. Methods to prevent sprinkler water flooding shall be provided to prevent the flow of potentially contaminated water from one part of the facility to another.

WHB exits shall be provided in accordance with NFPA 101, Code for Safety to Life from Fire in Buildings and Structures.

The WHB shall be designed to prevent unauthorized entry through other openings in the building such as vents.

The WHB shall be designed to handle rail cars and truck transporters containing either CH Waste or RH Waste. The transporters containing shipping packages shall be off loaded outdoors and the shipping packages shall be directed to the CH Waste Unloading Area inside the WHB. The transporters containing RH Waste Shipping Casks shall be directed to the RH Waste Unloading Area inside the WHB where the cask is off loaded.

The WHB ventilation system (HV00) shall be designed to provide the WHB room pressures necessary to support the WHB in performing its confinement function. The room pressures shall be selected in accordance with the requirements in SDD-HV00.

The WHB shall be designed to handle the following maximum quantities of waste simultaneously:

- RH Waste 10,000 ft^3/yr
- CH Waste 500,000 ft^3/yr

The WHB shall provide space to handle and process CH and RH Waste using the Waste Handling equipment provided by the Waste Handling System (WH00).

The WHB shall provide the following four major functional areas:

- CH Waste Handling Area
- RH Waste Handling Area
- Waste Hoist Tower
- Mechanical Equipment Room

Specific design requirements for these four areas are provided in the following subsections.

2.2.1 CH-TRU Waste handling Area

The CH Waste Handling Area shall be designed to provide outdoor and indoor facilities for the personnel and equipment required to transfer CH Waste from incoming transporters to the Waste Hoist system, and handling site generated solid and liquid radwaste.

This area shall include the following:

- Shipping Package Off Loading/Loading Area
- CH Bay (formerly designated The Inventory and Preparation Area)
- Shielded Storage Area
- Overpack and Repair Room
- Site Derived Waste Area
- Battery Recharge Area
- Cage Loading Room

2.2.1.1 Shipping Package Off Loading/Loading Area

An area shall be provided outdoors for Off loading and loading shipping packages from, and onto trailers. The area shall contain sufficient space to accommodate three tractor trailers using a 13-ton forklift truck to remove or load the shipping packages from or onto the transporters.

2.2.1.2 CH Bay

The floor area of the CH Bay shall be an open area providing maximum free space in order to allow movement of loaded forklift trucks throughout the CH Bay and entry into adjoining areas (such as the Cage Loading Room, shielded storage area, and OP&RR).

Air Locks shall be provided and used in conjunction with the ventilation system of HV00 to maintain the CH Waste Receiving Area (CH Bay) at a lower pressure than the outside atmospheric pressure to prevent free movement of the building air to the outside environment. Tornado Resistant Doors shall be installed at the primary confinement wall interface of each airlock.

The Shipping Package entry Air Locks shall be provided with sufficient space to permit cleaning the surface of a shipping package in the Air Lock, if necessary.

2.2.1.3 Shielded Storage Area

A locked Shielded Storage Area shall be provided for the temporary storage of up to 72 drums or 12 modular steel boxes (standard waste boxes of system

WH00) with a dose rate of 100 to 200 mrem/hr. See Section 2.4.2.9 of Chapter G for shielding requirements.

Access control provisions for entering the Shielded Storage Area shall be in accordance with 10 CFR Part 20.203.C.(2).

2.2.1.4 Overpack and Repair Room (OP&RR)

The area designated as the OP&RR shall provide space for equipment provided by system WH00. This area will continue to be called the OP&RR, but it shall not be used for TRU mixed waste management in any instances. If local decontamination activities are opted for, the work will be conducted at the location where the contamination was found. Structural support for an overhead crane shall also be provided by system WH00.

The OP&RR shall be separated from adjacent areas by Air Locks. The Air Locks shall be used in conjunction with the ventilation system of HV00 to maintain the OP&RR at a lower pressure than the CH Bay and other adjacent areas.

2.2.1.5 Site Derived Waste

Space shall be provided to collect, concentrate, package, and temporarily store Site Derived Waste. See subsystem WH04 of system WH00 for Site Derived Waste requirements.

2.2.1.6 Battery Recharge Area

An area for recharging the batteries of the forklift trucks shall be provided in the CH Bay. The battery recharging station shall have capability to recharge the batteries of 7 forklift trucks in parallel, and shall have an area of approximately 2,500 sq. ft. The batteries will not normally be removed from the forklift trucks for the recharging operation.

2.2.1.7 Cage Loading Room

The Cage Loading Room (also called Conveyance Loading Room) shall provide space, and two embedded rail tracks, for the Conveyance Loading Car of system WH00 so that it can be moved on the two rail tracks from the Cage Loading Room onto the Waste Shaft conveyance platform.

Air Locks shall be provided for the Cage Loading Room, and used in conjunction with the ventilation system of HV00 to maintain the Cage Loading Room at a lower pressure than the CH Bay so as to control potential radioactive releases.

2.2.2 RH-TRU Waste Handling Area

Restoration and reactivation of the RH systems is planned for the future to accommodate disposal of RH Waste.

The RH Waste Handling Area shall be designed to provide the space and facilities for the personnel and equipment to transfer RH Waste from incoming transporters (truck or rail) into the RH Receiving Bay and through the Hot Cell Complex, repackage the waste canisters into a Facility Cask, and move the Facility Cask to the Waste Hoist system for eventual emplacement in the underground. This area shall include the following:

- RH Bay (Road Cask Receiving and Preparation Areas)
- Cask Unloading Room
- Hot Cell
- Canister Transfer Airlock Room
- Transfer Cell
- Cask Loading Room
- Operating Gallery
- Manipulator Repair Room
- Crane Maintenance Room
- Filter Gallery

2.2.2.1 RH Bay

The RH Bay Receiving Area shall be designed for rail or truck transporters to be unloaded, and/or loaded at the same location. The railroad entrance door shall be tornado resistant. The RH Bay shall be designed to provide space for the RH Bay Waste Handling equipment provided by subsystem WH03 of system WH00, to remove transportation casks from their transporters and prepare the cask for subsequent waste transfer.

The Cask Receiving Area shall be sized to accommodate the largest rail transporter without its prime mover plus 6 ft of clearance (87 ft minimum). The overhead clearance for upturning the Road Cask shall be a minimum of 35 ft. This area shall provide sufficient floor lay down space for temporarily placing the cask tie-down, other shipping accessories, and support stands provided by subsystem WH03 for components that have to be removed from the Road Cask when it is unloaded from the transporter. For design

purposes, approximately 1,000 sq. ft. of space shall be provided for lay down space, and 4 ft of working space provided at all points around the transporter.

The RH Bay shall provide the structural supports required for the RH Bay 140-ton overhead crane furnished by system WH03. This crane shall move on overhead rails the entire length of the RH Bay.

Rails and space shall also be provided for the subsystem WH03 self-propelled Road Cask Transfer Car and its controls on which the Road Cask is placed by the 140-ton crane. The Road Cask is then prepared and readied for transfer into the shielded Cask Unloading Room of the Hot Cell Complex.

Rails and space shall also be provided in the RH Bay for the subsystem WH03 self-propelled Facility Cask Transfer Car which can be directed to move into the RH Bay from the Cask Loading Room for maintenance of the shielded Facility Cask or the Transfer Car if required.

2.2.2.2 Cask Unloading Room

A shielded Cask Unloading Room with a Shield Door and its controls shall be provided. Rails shall be provided in the floor of the Cask Unloading Room for transferring the Road Cask on the self-propelled Road Cask Transfer Car into the Cask Unloading Room. Approximately 5 ft of access space shall be provided between the Road Cask Transfer Car and the parallel walls of the Cask Unloading Room.

The Shield Door shall be designed with the capability of protecting personnel in the RH Bay from radiation when the RH Waste container is removed from the Road Cask and transferred through a ceiling shield plug opening from the Cask Unloading Room into the Hot Cell using the Hot Cell 15-ton bridge crane provided by system WH00. See Section 2.4.2.9 of Chapter G for shielding requirements. A shielded opening is provided in the floor of the Cask Unloading Room such that a 72-B shipping cask or shielded insert of equivalent size can be lowered from the Cask Unloading Room in the Transfer Cell Shuttle Car.

A motor operated shield valve is provided in the floor of the Cask Unloading Room to cover the port. The Cask Unloading Room walls provide support for a 25-ton crane used for moving a 72-B shipping cask between the Road Cask Transfer Car and the Canister Transfer Cell Shuttle Car, and an Air Lock provided for personnel access into the Cask Unloading Room when the Shield Door is closed. The Air Locks in conjunction with the ventilation system of HV00 shall be used to maintain the Cask Unloading Room air pressure lower than the RH Bay atmospheric pressure but higher than the Hot Cell pressure.

Provisions shall be made for radiation monitors, provided by system RM00, to be mounted near the personnel Air Lock Door entrance area on the inner wall of the Cask Unloading Room.

2.2.2.3 Hot Cell

A Hot Cell shall be provided and located on the second floor of the RH Waste Area of the WHB (above the Cask Unloading Room, Canister Shuttle Car Room, and Cask Loading Room). The Hot Cell is a shielded room where RH Waste containers removed from the 10-160B Road Cask are inspected, canisterized, and lowered through the Canister Transfer to the Shuttle Car in the Canister Transfer Cell. Overpack canisters will also be handled and processed in the same path. The Hot Cell shall be designed to accommodate the Hot Cell equipment provided by system WH00. A floor space area of approximately 2,400 sq. ft. shall be provided in the Hot Cell Room. See Section 2.4.2.9 of Chapter G for shielding requirements.

An Air Lock shall be provided for personnel access to the Hot Cell.

Shielded viewing windows shall be provided to accommodate the Hot Cell operation from the Operating Gallery as specified in system WH05. The shielded viewing windows shall be arranged to assure nearly 100% visual observation of all areas within the Hot Cell. Provision shall be made for through the wall master slave manipulators from the Operating Gallery side as required by system WH05. In addition, provision shall be made in the Operating Gallery wall side of the Hot Cell for installing the shielded transfer drawer and glove box of system WH05 to transfer small items and swipes into, or out of the Hot Cell.

Shield plugs shall be provided in the Hot Cell floor over the Cask Unloading Room through which the waste containers and 10-160B Road Cask lid can be removed or reinserted into, or onto the 10-160B Road Cask as required by system WH00. In addition, an opening shall be placed in the floor over the Canister Transfer Air Lock Room through which an inspected RH Waste canister can be lowered into the Transfer Cell Shuttle Car when the floor shield valve of system WH00 is open. A hatch shall be provided in the roof of the Hot Cell to permit insertion or removal of large Hot Cell equipment in the WHB Hot Cell.

The Hot Cell shall provide the structural supports required for the Hot Cell 15-ton bridge crane and the power manipulator furnished by system WH00. Crane override ports shall be provided in the walls of the Hot Cell to accommodate reach rods to manually operate and position the load hook of the crane when necessary as required by system WH05.

2.2.2.4 Canister Transfer Air Lock Room

A Canister Transfer Air Lock Room shall be designed and provided for transferring an inspected RH Waste canister from the Hot Cell into the Transfer Cell Shuttle Car located in a shielded room under the Hot Cell but below the floor level of the RH Bay as required by system WH00. The RH Waste canister is lowered or lifted by the Hot Cell 15-ton bridge crane into or from the canister Shuttle Car provided by system WH00. See Section 2.4.2.9, Chapter G for shielding requirements.

2.2.2.5 Transfer Cell

A shielded Transfer Cell shall be provided with space and provision for rails on which the Shuttle Car of system WH00 operates. Provision shall be made for a through-the-wall drive system provided by system WH00 that positions the Shuttle Car for receiving a RH Waste canister from the Hot Cell or a 72-B cask or shielded insert from the Cask Unloading Room and moves the Shuttle Car so the waste canister can be removed into the Cask Loading Room for direct loading into a Facility Cask provided by system WH00. A ceiling opening to the Canister Transfer Cell shall be provided that is used in conjunction with a shield valve powered open and closed by an actuator furnished by system WH00 so that the waste canister can be lifted from the Shuttle Car into a Facility Cask in the Cask Loading Room. See Section 2.4.2.9, Chapter G for shielding requirements.

An Air Lock shall be provided for personnel access into the Transfer Cell.

2.2.2.6 Cask Loading Room

A Cask Loading Room shall be provided with space to accommodate the cask loading equipment of system WH00 (includes self-propelled Facility Cask Transfer Car on rails, ceiling mounted rotating fixture, 6.25-ton hoist, and Facility Cask Transfer Car turntable).

A shielded control booth with a shield viewing window is provided for the Cask Loading Room operator control console of subsystem WH03 to protect operating personnel from potential radiation exposure when the RH-TRU waste canister is lifted from the Shuttle Car into the Facility Cask. See Section 2.4.2.9 of Chapter G for shielding requirements.

Rails shall be provided to permit the self-propelled Facility Cask Transfer Car of system WH00 to move the Facility Cask from the Cask Loading Room to the Waste Shaft conveyance for emplacement in the underground. Space shall be provided to install the turntable of system WH00 in the Cask Loading Room that is used to permit moving the Facility Cask Transfer Car on rails

into the RH Bay for maintenance and handling by the 140-ton overhead crane.

2.2.2.7 Operating Gallery

Operating Gallery space shall be provided outside of the Hot Cell to place the operator control consoles and panels, and other equipment (master slave manipulators, transfer drawer and glove box, scissors lift platform, etc.) as required by system WH00. The operating consoles and equipment of system WH00 shall be arranged to permit the Hot Cell Facility to be viewed through the viewing windows by the operators during operations. The various supporting equipment to be located in the Operating Gallery shall be arranged and installed in accordance with system WH00.

The Operating Gallery shall provide adequate space to remove the master slave manipulators for maintenance and move them to the Manipulator Repair Room.

2.2.2.8 Manipulator Repair room

A Manipulator Repair Room shall be provided with sufficient space to house the manipulator repair equipment of system WH00 and service both the master slave and power manipulators. The Manipulator Repair Room shall be located on the west side of the Hot Cell and Operating Gallery.

The Manipulator Repair Room shall be sized to permit repairing two master slave manipulators at the same time. Space shall also be provided for temporary shielding or containment devices.

2.2.2.9 Crane Maintenance Room

A Crane Maintenance Room shall be provided and located above the Manipulator Repair Room on the west side of the Hot Cell. The Crane Maintenance Room shall be provided with a Shield Door through which the Hot Cell bridge crane can enter in order that the crane maintenance work can be performed on the 15-ton bridge crane by maintenance personnel in a radiologically shielded area isolated from the Hot Cell. The bridge crane sweep and Shield Door winch are provided by system WH00. See Section 2.4.2.9 in Chapter G for shielding requirements.

2.2.2.10 Filter Gallery

A Filter Gallery shall be provided to house the HEPA filtration equipment of the HV00 Hot Cell Complex ventilation system. This gallery shall be an enclosed area isolated from personnel occupied rooms or areas. Air Locks shall be provided for personnel access to the Filter Gallery.

The filters shall normally be removed by contact methods. Space shall be provided to use portable radiation shielding during filter removal and maintenance, if it becomes necessary.

2.2.3 Waste Hoist Tower

A Waste Hoist Tower shall be provided for the Waste Hoist system UH00 and located in the WHB between the CH Bay and the RH Bay directly over the Waste Shaft. The Waste Hoist Tower shall provide space for the Waste Hoist system of UH00 and structural support, and guidance for the Waste Hoist conveyance and counterweight.

The tower shall be fully enclosed and accessible only through Air Locks. The Waste Hoist Tower shall include the following:

- Shaft Entry Room
- Hoist Tower Guidance Frame
- Safety Catch Gear Support
- Crash Beam Structural Support
- Hoist Machinery Room
- Deflection Sheave Structural Support
- HVAC Supply Equipment Area
- Personnel Service elevator

2.2.3.1 Shaft Entry Room

A Shaft Entry Room for entering and loading the Waste Shaft hoist conveyance shall be provided. The Shaft Entry Room shall be provided with doors on the east and west side of the Waste Shaft that are interlocked so that only the east or west set of doors can be opened at the same time. These doors shall control air flow from the CH and RH Waste Handling Areas to the Shaft Entry Room and prevent air flow between the CH and RH Waste Handling Areas.

Access to the west side of the Shaft Entry Room shall be from the Cage Loading Room for transferring CH Waste to, and from, the underground on the Waste Shaft hoist conveyance. Access to the east side shall be from the Cask Loading Room for transferring RH Waste to, and from, the underground.

In addition, Personnel Entry Doors shall be provided to permit personnel to enter the Shaft Entry Room.

2.2.3.2 Hoist Tower Guidance Frame

A Hoist Tower Guidance Frame shall be provided for structural support of the Waste Hoist system UH00 conveyance and counterweight fixed guides, wood over travel arresters, and safety catch gear.

The frame shall extend from the ground level entry to the underside of the crash beams. Reactions from the fixed guides, arresters, and safety catch gear loading shall be resisted by the Hoist Tower Guidance Frame. An access platform shall be provided and located to facilitate maintenance of the safety catch gear.

The structural supports for the fixed guides of the system UH00 Waste Shaft Hoist stabilize the conveyance and counterweight at the grade and storage levels.

2.2.3.3 Safety Catch Gear Support

Safety Catch Gear Support shall be provided for structural support to the conveyance and counterweight over travel arresters. The Safety Catch Gear Support shall be supported by the Hoist Tower Guidance Frame. The Safety Catch Gear Support shall be designed to maintain its integrity after an accidental impact of the Waste Hoist conveyance in the Hoist Tower (independent from the crash beams). The Live Load transmitted to the safety catch gear shall be limited to 2g. For the conveyance catch gear, maximum reactions shall be based on the assumption that only two diagonal catch gears are effective. For the counterweight catch gear, maximum reactions shall be based on the assumption that only one catch gear is initially effective, providing a 2g reaction.

2.2.3.4 Crash Beam Structural Support

Structural supports shall be provided in the Hoist Tower for the over travel crash beams of the system UH00 Waste Hoist system. The structural supports shall be designed on the assumption that the crash beams system resists forces developed when the conveyance or counterweight hits the crash beam with a force equivalent to the breaking strength of the head ropes. Column struts between the crash beam level and the hoist floor level shall balance the instantaneous tension developed in the head ropes. Hoist Tower columns and Hoist support beams shall be checked for the loadings at the supports from the crash beams. In the shaft sump, crash beams stop the conveyance or counter weight that has traveled through the wood arresters.

2.2.3.5 Hoist Machinery Room

A Hoist Machinery Room shall be provided in the Hoist Tower above the Waste Shaft with space to perform maintenance of the Waste Hoist of system UH00. The room shall provide structural support and rails for a 30-ton overhead crane provided by system UH00 for movement of the Waste Hoist equipment. The crane shall have an overhead clearance of 17 ft to the crane hook. Capability shall be provided to allow equipment removed from the Waste Hoist system of UH00 to be moved to the ground level and out the WHB.

2.2.3.6 Deflection Sheave Structural Support

Structural support shall be provided for the system UH00 Waste Shaft Hoist deflection sheave and guide rope anchors. The deflection sheave and guide rope reactions shall be based on loadings and weights established in system UH00.

2.2.3.7 HVAC Supply Equipment Area

Space and a concrete slab with a steel support shall be provided on the roof of the WHB outside the Hoist Tower for placing HVAC equipment of system HV00 that serves the RH Area.

2.2.3.8 Personnel Service Elevator

A service elevator shall be provided for the Waste Hoist Tower to provide access to each floor.

2.2.4 Mechanical Equipment Room

A Mechanical Equipment Room shall be provided on the second floor of the WHB over the CH Waste Handling Area to provide space for mounting HVAC equipment and controls of system HV00. Sufficient space shall be included around the various HVAC equipments in the Mechanical Equipment Room to allow contact maintenance, as well as disassembly and removal of the components and equipments.

2.2.5 Air Locks

Air Locks shall be provided between all interior rooms of the WHB for which a Differential Pressure is required to be maintained for acceptable control of air flow. Air Locks shall be provided between the interior and exterior of the WHB except for the following:

- Emergency Escape Doors

- Railroad Doors

2.2.5.1 Emergency Escape Doors

The Emergency Escape Doors shall not be used for normal egress.

2.2.5.2 Railroad Door

The Railroad Door shall only be opened if all of the following conditions exist:

- No radioactive materials are present in RH Bay that can be released to the atmosphere.
- Doors between the RH and CH Waste Handling Areas are closed.
- The shield valve in the floor of the Cask Unloading Room is closed, and the Hot Cell shield plugs are installed.
- Hot Cell Complex doors in the RH Bay are closed when waste containers are being removed from a transportation cask.
- Weather conditions are not likely to generate a tornado.

2.2.5.3 Air Lock Door Interlocks

The doors of select Air Locks as indicated on engineering drawings shall be equipped with electric interlocks to prevent more than one Air Lock Door to an area to be opened at the same time except electric interlocks are not required if:

- Administrative control is established to assure that no more than one Air Lock Door to an area can be opened at the same time.
- It can be demonstrated that, if two or more Air Lock Doors of an area are opened at the same time, the atmospheric pressure and air flow between the adjoining areas or rooms still meet the requirements for radioactive material confinement.

If interlocks are provided, they shall be equipped with an override to provide a personnel escape route in the event of an emergency. In the event of a electric power outage or failure, the Air Lock Door electric interlocks shall continue to function using a UPS (uninterruptible power supply), backup diesel electric power, or local batteries. No electrical failure shall prevent personnel emergency egress.

2.2.6 Radiation Door Interlocks

Selected doors as indicated on engineering drawings, providing access to areas in the Hot Cell Complex that may normally have high radiation levels shall be equipped with high radiation alarm signals from system RM00. These doors shall be provided with an alarm light that would be active when the door is an actual access point to the RH Waste. Each of the door lights will be interfaced with the appropriate gamma area radiation monitor (ARM). A key-operated door lock releases to provide access into the alarmed area by qualified and authorized personnel.

2.2.6.1 Hot Cell Main Shield door

Opening of the Main Shield Door, Door #162, to the Cask Unloading Room shall be inhibited on receipt of a high radiation alarm signal from the Cask Unloading Room and by an interlock with the Hot Cell shield plugs in the ceiling of the Cask Unloading Room. If the shield plugs are removed, the door will not open. System RM00 provides the high radiation alarm signal.

2.2.6.2 Crane Maintenance Room Personnel Door

Opening of the inner crane maintenance Air Lock Door, Door #402, shall be inhibited on receipt of a high radiation alarm signal from the Crane Maintenance Room. System RM00 provides this signal.

2.2.6.3 Canister Transfer Room Personnel Door

Opening of the Canister Transfer Room Air Lock Door, Door #71, shall be inhibited on receipt of a high radiation alarm signal from the RH Canister Transfer Room. System RM00 provides this signal.

2.3 Operation

2.3.1 Safety Class Requirements

The WHB shall be designed to withstand the 0.1g DBE, the DBT with 183 mph wind (translational velocity of 41 mph, a maximum rotational velocity radius of 325 ft, a pressure drop of 0.5 psig, and a pressure drop rate of 0.09 psig/sec.), and straight-line wind of 110 mph at 30 ft above ground, such that the building structure does not collapse and damage waste containers. **[DSA SC SSC 4.3.1]**

The WHB roof shall be designed to withstand a 27 lb/ft^2 snow load, and the WHB will not collapse under the design roof load. **[DSA SC SSC 4.3.1]**

The WHB shall meet NFPA 220 Type II construction such that fires outside the building or within the building do not propagate and damage waste containers outside of closed shipping casks. **[DSA SC SSC 4.3.1]**

The WHB shall be designed to provide a passive confinement function for release of radioactive particulate materials. When the ventilation is not operating as in a loss of power event, the WHB would impede any released radioactive material from being released into the environment since the air current in the WHB would be reduced to the air in-leakage and personnel opening and closing doors as they exit the facility. **[TSR DF 6.1]**

The design and construction of the Hot Cell Complex shielding shall provide for an internal gamma surface dose rate of 400,000 rem/hr and for an internal neutron surface dose rate of 45 rem/hr. The concrete shield valves, shield door, and viewing windows of the Hot Cell Complex are noncombustible. The construction materials and construction of the upper hot cell is required to protect workers within the operating gallery from events occurring within the upper hot cell. **[DSA SS SSC 4.4.4]**

The Waste Hoist load-bearing components shall be designed to support the WASTE hoist load and load bearing components under maximum loading condition. **[TSR DF 6.14]**

2.3.2 Facilities Requiring Operating Procedures

The buildings and structures are effectively passive and require no operating procedures. The following functional operating type equipments shall be provided with operating procedures:

- Cask Unloading Room Shield Door
- Cask Loading Room Shield Doors
- Hot Cell Main Shield Door
- Cage Loading Room Doors
- Shaft Entry Room Doors
- RH Bay Yard Doors
- CH Bay to Overpack and Repair Room doors
- Air Lock Door Interlocks

2.4 Structural Requirements

Refer to Section 2.4.2 of Chapter G for the CF02 (WHB) specific and general structural design requirements.

2.5 General arrangement and Essential Features

The WHB shall be configured so that it can contain a Radioactive Materials Area (RMA) within the protected area of the building to facilitate the receipt and throughput of incoming waste shipments. Areas within the WHB that contain or could contain radioactive materials are designated RMA. Access to the RMA shall be controlled through control points located at the normal exits of the WHB.

Facilities provided for the handling of the CH and site generated waste shall be in a separate area from those provided for RH Waste Handling.

The Hoist Tower portion of the RMA shall be contiguous with the Waste Shaft. The Waste Shaft shall be located between the RH and CH Waste Handling Areas. The exterior of the Waste Shaft Area shall provide adequate free space for the transfer of the largest underground equipment into the building.

2.6 Maintenance Requirements

Refer to Section 2.6 of Chapter G.

2.7 In-Service Inspections

Refer to Section 2.7 of Chapter G.

2.8 Instrumentation and Control

Instrumentation and control shall be provided as listed below:

- RH Bay Yard Doors

Control equipment, actuators, and a operator control panel shall be provided to open and shut the two RH Bay Doors to the yard.

- Cask Unloading Room Shielded Door

Control equipment, air bearing system on which the Shield Door slide, and an operator control panel shall be provided to open and shut the Shielded Door of the Cask Unloading Room located in the RH Bay of the WHB.

- Cask Loading Room Doors

Control equipment, actuators, and operator controls shall be provided to open and shut the two Cask Loading Room Doors that open to the RH Bay.

- Shaft Entry Room Doors

Control equipment, actuators, vacuum breaker, and operator controls shall be provided to open and shut the two Shaft Entry Room Doors to the Cage Loading Room and the two Shaft Entry Doors to the Cask Loading Room.

- Cage Loading Room Door

Control equipment and operator controls shall be provided to open and shut the Cage Loading Room Rollup Door between the CH Bay and the Cage Loading Room.

- CH Bay to OP&RR Doors

Control equipment and operator controls shall be provided to open and shut the two Air Lock Rollup Doors between the CH Bay and the OP&RR.

- Air Locks

Controls shall be provided for the Air Lock Doors which have electric interlocks to ensure the proper operation of the WHB Air Lock Doors for normal operation and upon a loss of power event. Appropriate electric power supplies (UPS, batteries, or backup diesel electric power) shall be provided for assuring proper Air Lock Door operation during a loss of normal power event.

2.9 Interfacing System Requirements

Refer to Section 2.9 of Chapter G for the interfacing system requirements.

2.10 Quality Assurance Requirements

Refer to Section 2.10 of Chapter G for the general quality assurance requirements.

2.11 Codes and Standards

Refer to Section 2.11 of Chapter G for the governing codes and standards.

2.12 Reliability Assurance

Refer to Section 2.12 of Chapter G for the general reliability assurance requirements.

3.0 DESIGN DESCRIPTION

3.1 Summary

Refer to Section 3.1 of Chapter G for summary design descriptions.

3.2 Detailed System Description

The WHB is the primary surface Waste Handling Operating Area at the WIPP facility, with the primary function to receive, unload, and transfer waste packages from the incoming rail and truck transporters to the Waste Shaft.

The building is contiguous with the Waste Shaft to permit direct transfer to underground storage once the waste containers have been properly unloaded and prepared for transport. The rooms and areas in the WHB were designed and constructed to provide sequential paths from waste receipt to transfer down the Waste Shaft. One path is for Transuranic Waste that is less than 200 mrem, and a separate path for waste that must be processed remotely (over 200 mrem, but less than 1000 rem).

3.2.1 Waste Handling Building, CH-TRU Area

The CH Area of the WHB provides the space and the enclosures to house the equipment and services necessary for surface handling of CH-TRU waste.

The CH-TRU WHB is shown isometrically in Figure CF-II-1. The Waste Handling equipment is described in SDD WH00, and it is also described briefly here to explain the functions of this building area.

Shipping packages containing the CH-TRU waste drums are received on trucks which park in the Radiological Controlled Area south of the WHB. The shipping packages are removed from the trucks using forklifts to bring them through one of the three Air Lock entrances on the south side of the building to one of the TRUDOCK preparation stands.

3.2.1.1 CH Bay

The CH Bay is a low bay area which includes space and equipment for receiving seven-packs of drums, overpacked drums, standard waste box (SWB), and overpacked SWBs.

Two TRUDOCK preparation stands are located in the central area where they can be serviced by an overhead crane and the shipping package can be unloaded.

A battery charging station for forklifts is provided along the north wall in this area. Space is provided for a number of waste shipping containers to be stored.

3.2.1.2 Overpack and Repair Room

The area designated as the OP&RR shall provide space for equipment provided by system WH00. This area will continue to be called the OP&RR, but it shall not be used for TRU mixed waste management in any instances. A negative pressure relative to the CH Bay and the exterior of the WHB is maintained by the HVAC System (SDD HV00).

Adjacent to this area is a personnel change room and the small equipment decon room.

3.2.1.3 Site Derived Waste Room

This area includes capability for processing both liquid and solid Site Derived Waste. The Site Derived Waste can be drummed, packaged, and assayed in this area. A tank is installed in the firewater sump pit for the purpose of collecting liquid waste. This room is separated from adjacent areas with Air Lock Doors.

3.2.1.4 Small Equipment Decontamination Room

A small room is located between the OP&RR and the Site Generated Waste Room for the decontamination of small tools and hardware. This room is accessible through the Air Lock and the Site Generated Waste Room.

3.2.1.5 Shielded Storage Room

If there is a need to store a container with a high surface dose rate, a Shielded Storage Room is available to limit dosage to individuals in the preparation area performing preparation of other waste packages for transporting to storage or performing retrieval operations. The Shielded Storage Room can accommodate seven pack drums, as well as standard waste boxes.

3.2.2 Waste Handling Building, RH-TRU Area

This (RH) area of the WHB provides the space and enclosures to house the equipment and services necessary for RH-TRU Waste Containers with

maximum dose rates of 1000 rem. The RH-TRU WHB Area is shown isometrically in the Figure CF-II-2. The Waste Handling Equipment is described in SDD-WH00. However, the waste handling process is briefly described here to better explain the functions of the WHB.

Road Casks containing RH-TRU are received by either rail or truck at the RH-TRU Bay. The Road Cask is removed from the conveyance using the overhead bridge crane and placed on the Road Cask Transfer Car. The self propelled Transfer Car moves by rail from the RH Bay through the Shielded Door into the Cask Unloading Room of the Hot Cell Complex. The Shield Door is closed when waste handling containers are removed from the shipping cask.

Initially, RH-TRU Waste will be shipped to WIPP in either a 72-B Shielded Road Cask or a 10-160B Shielded Road Cask. Inside the 72-B Cask is a single waste canister which holds up to three 55-gallon drums of RH-TRU waste. The 10-160B Road Cask hold up to ten 55-gallon drums of RH-TRU waste which will be configured in two five-drum baskets. The 72-B process prepares the cask for transfer into the Transfer Cell where the inner lid is detensioned and removed, and radiological swipes are taken and evaluated as the waste canister is removed from the 72-B Cask into the Facility Cask. The 10-160B process takes waste shipped in 55-gallon drums, moves the drums from the shipping cask to the Hot Cell for canisterization, places three 55-gallon drums in a canister slightly larger than the 72-B canister but no larger than an overpack canister, transfers the canister from the Hot Cell into a shielded insert in the Shuttle Car in the Transfer Cell, repositions the canister in the Shuttle Car such that the canister can be lifted into the Facility Cask similar to the 72-B Canister Transfer. Once a canister of waste is in the Facility Cask, the Facility Cask is downloaded on the Waste Hoist to the underground for emplacement.

Also contained within the WHB-RH Area are various rooms for specialized maintenance, Air Locks to control the leakage of air between rooms, and HEPA Filters to prevent the release of radioactive particles to the atmosphere.

3.2.2.1 WHB Remote Handling Area

The RH Area of the WHB is that portion to the east of the Waste Shaft Hoist Tower and the CH Area. The function of this area is to provide radiation shielding and the space necessary for housing the equipment used to remotely service radioactive waste canisters. Space is also provided for maintenance of equipment which may have radioactive contamination. This area consists of a number of individual rooms, stations, corridors, etc. as shown on Table CF-II-1. The purpose of each of these areas is briefly discussed in the following sections.

Table CF-II-1, WHB RH-TRU Functional Areas

- RH-TRU Functional Areas
  - RH-TRU Bay
    - Cask Receiving Area
    - Cask Preparation Station
  - Hot Cell Complex
    - Cask Unloading Room
    - Hot Cell
      - Upper Room
      - Lower Room
    - Canister Transfer Airlock Room
    - Transfer Cell
    - Facility Cask Loading Room
      - Operator Station
    - Manipulator Repair Room
    - Crane Maintenance Room
    - Service Rooms
    - Hot Cell Air Locks
  - Hot Cell Operating Gallery
  - Filter Gallery
  - Access Corridor
  - Vestibule
  - Building Air Locks

3.2.2.2 Cask Receiving Area

The Cask Receiving Area (elevation 100') is used to unload Shipping Casks from incoming transporters and to load empty Shipping Casks onto outgoing transporters using the overhead crane. It is also used to lift the Road Casks onto the Transfer Car for transport into the Cask Unloading Room. The initial shipping casks for RH are 72-B and 10-160B Road Casks. Space is provided for railroad tracks into the building, and for rails between the bay and the Cask Unloading Room, and between the bay and the Cask Loading Room. Laydown space is provided for all equipment required to perform these functions and equipment maintenance.

The Cask Receiving Area is approximately 96 ft by 127 ft and provides for the following:

- Accommodation of the rail transporter (without the locomotive) plus 6 ft of clearance.
- Accommodation of the removal and storage of cask tie downs, etc., with at least 4 ft of clearance.
- Accommodation to permit transfer of casks on to the Transfer Car and movement into the Cask Loading Room or Unloading Room.
- Supports for a 140-ton overhead bridge crane providing an 85 ft overhead clearance.

A 37 ft length of rail for the Shipping Cask Transfer Car is mounted to the floor outside the Cask Unloading Room and extend into the Cask Unloading Room about 18 ft. When the Cask Unloading Room Shielded Door is closed, a 5 ft length of aluminum transition rail is removed to allow complete shielded closure. Locking pins are removed from each rail to permit removal of the rails.

3.2.2.3 Cask Preparation Area

The Cask Preparation Station (elevation 100') provides space and equipment for Shipping Cask venting, vent air sampling, and cask preparation prior to moving it into the Cask Unloading Room.

3.2.2.4 Hot Cell Complex

The Hot Cell Complex consists of a series of rooms, discussed in the following sections, which are shielded so that waste packages may be safely handled remotely while protecting the operators.

3.2.2.4.1 Cask Unloading Room

The Cask Unloading Room (elevation 100') is a concrete shielded room that provides space for waste containers to be removed from shipping casks (initially either a 72-B or 10-160B shipping cask), and raised into the Hot Cell using the Hot Cell crane. The Cask Unloading Room is provisioned with a 25-ton crane such that a 72-B Road Cask can be lowered into the Transfer Cell for preparation to direct load a 72-B waste canister from the shipping cask to the Facility Cask. A 140-ton concrete filled Shield Door on the south side of the room provides personnel radiation protection during removal of waste containers from a shipping cask. An operator control panel to operate the Shield Door is located near the Shield Door in the RH bay. The control panel to operate the 25-ton crane is located near to airlock door access to the Cask Unloading Room.

When moving waste from the shipping cask to the Hot Cell, pressure in the Cask Unloading Room is maintained higher than the Hot Cell but lower than the Cask Receiving Area.

Access to the Hot Cell above the Cask Unloading Room is via shield plugs in the floor of the Hot Cell. These plugs are in place when the shipping cask enters the unloading room. An interlock between the Shield Door and the Hot Cell crane requires that the Shield Door be closed in order to lower the hook on the crane into the Cask Unloading Room.

3.2.2.4.2 Hot Cell

The Hot Cell is a shielded room which provides space where RH-TRU Waste canisters are removed from their Shipping Casks, inspected, overpacked, if required, and transferred to the Canister Transfer Room. Shielded viewing windows are provided which allow nearly 100% visual observations of all operations within the Hot Cell. Shielded hatches are provided to connect the floor of the Upper Room of the Hot Cell to the Cask Unloading Room and to the Canister Transfer Room. A Shield Door is also provided between the Hot Cell and the Crane Maintenance Room. The Lower Room of the Hot Cell is separated from the Upper Room by a removable steel plate and grating floor. The Lower Room contains stairs and walkways to facilitate maintenance of the contained equipment. The Hot Cell ventilation air exits the cell through three shielded vents in the lower area.

The Hot Cell (elevation 123') is located above the Cask Unloading Room, Transfer Cell, and Canister Transfer Airlocked Room. The Hot Cell is a shielded room which provides space to canisterize waste shipped in a 10-160B Road Cask and overpack already canisterized waste if necessary. There is sufficient space to store the shield plugs when removed from the

floor of the Hot Cell, shield plug lifting devices, two 5-drum baskets of waste, and up to 9 waste canisters.

There are four oil-filled shield windows on the north side of the Hot Cell which provide viewing to operate the WH05 wall mounted manipulators and observation of the WH05 Hot Cell crane and bridge mounted power manipulator. Two additional windows are provided on the west wall of the Hot Cell to provide Hot Cell observation. An airlocked personnel access door is provided on the west side of the Hot Cell.

A Hot Cell opening to accommodate the WH05 glove box and transfer drawer are provided on the west end of the north wall to the Hot Cell near the wall mounted manipulators.

Two openings are located in the floor of the Hot Cell, one connecting with the Cask Unloading Room, and the other connecting to the Canister Transfer Airlocked Room and Transfer Cell. The opening connecting to the Cask Unloading Room is provisioned with shield plugs. The opening connecting to the Transfer Cell is equipped with a movable shield valve. The shield valve body is a plate of steel, nominally 6.5" thick 68" wide and 67.5" long. It is supported on four rollers which ride on 2 floor mounted tracks. The shield valve is positioned by a motor driven actuator.

Ventilation is supplied through the ceiling of the Hot Cell. The Hot Cell is provisioned with rails and supports for a 15-ton bridge crane and a 2.5-ton bridge mounted powered manipulator. Override ports are provided in the Hot Cell walls to allow manual operation of these cranes.

The Hot Cell working deck is at elevation 123' 6" with a lower level at 100' 0". A platform for the overpack weld station is at elevation 111' 10". A stairway is installed from the 100' elevation to the platform. The ceiling of the Hot Cell is at elevation 157' 10".

3.2.2.4.3 Canister Transfer Airlock Room

An airlocked room connects from the bottom of the Hot Cell to the top of the Transfer Cell. Provided within this room are the rails which serve to guide the waste canisters on their trip from the Hot Cell to the Transfer Cell. Access to the Lower Room of the Hot Cell is also provided through this room.

3.2.2.4.4 Transfer Cell

The Canister Transfer Cell is located below and connects to both the Hot Cell (via the Canister Transfer Airlock Room) and the Cask Loading Room. Canisters transferred from the Hot Cell are conveyed to the Facility Cask in the Facility Cask Loading Room by use of the Shuttle Car in the Transfer Cell.

3.2.2.4.5 Cask Loading Room

The Cask Loading Room (elevation 100') provides the space to contain the Facility Cask and Transfer Car during loading of a waste canister. A rail turntable is mounted in the center of this room which can reposition the Facility Cask Transfer Car for movement into the RH Bay for maintenance or to move other items into the Cask Loading Room. This rail turntable primarily provides a path for the Facility Cask once loaded with a waste canister to be moved from the Cask Loading Room to the shaft entry area for waste download.

A hatch with telescoping shield is located in the floor of this room. The shield is extended during transfer of a waste canister from the Transfer Cell to the Facility Cask.

Doors are located between the RH Bay and the Cask Loading Room. Doors are also located between the Cask Loading Room and the Waste Shaft.

A shielded alcove is provided in the north east end of the Cask Loading Room for the WH03 control panel which controls the Shuttle Car positioning in the Transfer Cell, the Transfer Cell robots, and Facility Cask loading.

3.2.2.4.6 Manipulator Repair Room

The Manipulator Repair Room (elevation 126' 6") provides space to perform repairs on the master slave manipulators and the electromechanical bridge mounted power manipulator. This room is located adjacent to the Hot Cell Operating Room to facilitate equipment handling. The Manipulator Repair Room is provided with an airlock entry.

3.2.2.4.7 Crane Maintenance Room

The Crane Maintenance Room provides space for maintenance of the bridge crane used in the Hot Cell. The room is located to allow the crane to remain on its rails. The room can be isolated from the Hot Cell by a Shielded Door.

3.2.2.4.8 Service Rooms

There are two service rooms within the Hot Cell Complex. One is spare, and is located outside the Transfer Cell (El 76'). The other is 10 ft above the first (El 86') and adjacent to the Transfer Cell wall. Contained within this room is the drive motor and operators for the Shuttle Car. The motor drive line protrudes through the connecting wall. Additional equipment for processing RH Waste is located in this room.

3.2.2.4.9 Hot Cell Complex Shielding

The Hot Cell shielding is designed for an internal gamma surface dose rate of 400,000 rem/hr, and for an internal neutron surface dose rate of 45 rem/hr. **[DSA SS SSC 4.4.4]**

The ability for the Hot Cell Complex structure to provide the required shielding is documented in CS-41-B-003.

The shielding design in the WHB, including the Hot Cell complex, is shown in the following drawings:

- 41-K-001-014, Rev. 3, Waste Handling Building 411 Radiological Protection, Radiation and Contamination Zones, Sheet 1 of 2
- 41-K-002-014, Rev. 3, Waste Handling Building 411 Radiological Protection, Radiation and Contamination Zones, Sheet 2 of 2
- 41-K-006-014, Rev. 3, Waste Handling Building 411 Radiological Protection, Rad. Sources & Shield Wall Thickness, Sheet 1 of 3
- 41-K-007-014, Rev. 3, Waste Handling Building 411 Radiation Protection Rad. Sources & Shield Wall Thickness, Sheet 2 of 3
- 41-K-008-014, Rev. 3, Waste Handling Building 411 Radiological Protection Rad. Sources & Shield Wall Thickness, Sheet 3 of 3

3.2.2.5 Hot Cell Operating Gallery

The Hot Cell Operating Gallery provides space for the Hot Cell operating personnel to monitor and control all operations occurring within the Hot Cell. Shielded windows are provided between the Hot Cell and the Operating Gallery to allow direct observation of the activities. Space is also provided to allow removal of the master/slave manipulators through this area to the Manipulator Maintenance Room.

3.2.2.6 Filter Gallery

The Hot Cell Filter Gallery provides space for the Hot Cell exhaust ventilation HEPA Filters. The gallery is isolated from personnel areas with access provided through Air Locks. The Hot Cell air is routed to the three HEPA Filter banks from shielded openings in the Lower Room of the Hot Cell.

3.2.2.7 Access Corridor

The Access Corridor provides connections, outside the Hot Cell Complex, between the RH-TRU Bay, the Filter Gallery, the Vestibule, an exit Air Lock, and a stairway up to the Hot Cell Operating Area.

3.2.2.8 Vestibule

The Vestibule provides access to the Facility Cask Loading Room Operator Station and the Filter Gallery.

3.2.3 Waste Handling Building Air Locks and Entries

The Air Lock and Entry System is established to provide operating personnel safety while also assisting the HVAC system in providing control of air flow within the building. Achieving these requirements assures that there will be no uncontrolled release of radioactivity or exposure of operating personnel, and that the general health and safety of the public is assured.

The Air Lock and Entry System is multifaceted. Included are the doors with their detectors, locks, etc.; the personnel Air Locks, many of which also include associated door operation interlocks; and equipment "Air Locks" many of which are also shielded and sealed. In essence the entire WHB is a series of personnel and equipment "Air Locks" which allow the waste to be moved from the shipping conveyance to the Waste Shaft conveyance while always assuring correct air flow and shielding to minimize exposure to radioactivity.

3.2.3.1 Pressure and Air Flow Control

For reference on Pressure and Air Flow Control refer to HV00.

3.2.3.2 Interlock and Access Control

Other rooms may also serve an Air Lock function but are not included because their primary function is to house equipment used for specific activities. For example, the Hot Cell (124) is an Air Lock between the Cask Unloading Room (126) and the Transfer Cell (079). However, the primary activity within the Hot Cell is the unpacking, inspection, repair, and repacking of waste containers. On the Tables and Figures, the letter enclosed in the circle by each door number or listed under interlocks, indicates which doors are interlocked together. All marked (A) are interlocked together and all marked (B) are interlocked together. One door could be interlocked with both (A) and (B).

Table CF-II-2 lists the Air Lock room numbers and the numbers and names of the adjacent rooms. Many of these Air Locks are equipped with door

interlocks so that only one door in the Air Lock can be open at a time. This prevents a direct flow of air between rooms by assuring that at least one door in the path is always closed. All interlocked doors in an Air Lock are equipped with emergency escape overrides to assure that personnel cannot become trapped in an Air Lock.

The Air Locks, which have interlocks on their doors, are identified under the column titled interlocks. The alphabetic identifiers show which doors are interlocked with one another. For example, Air Lock 114, "Personnel Access Corridor", has four doors. These are interlocked with each other as identified by the letter "I". One of the doors (139) is an entry to the Cage Loading Room (116) which is also an Air Lock. The doors for Room 116 are also interlocked as identified by the letter "L". In addition to Room 114 and Room 116 having interlocks on their individual doors there is also a cross connect between them for Door 139 as identified by the letters "I, L". The cross connect assures that Door 139 cannot be opened if any other door in either Room 114 or Room 116 is open. This same pattern is applied throughout Table CF-II-2, et seq.

3.3 System Performance Characteristics

The WHB, in conjunction with the supporting functions from the HVAC system (SDD HV00) and the Radiation Monitoring System (SDD RM00), provides a confinement capability to control the release of potential radioactive contaminants to the outside environment. The WHB performs this supporting function as a passive component.

Since the WHB is structurally designed for the DBE/DBT, its structural integrity is assured under the most severe environmental conditions at the WIPP Plant Site and the performance of the WHB, relating to its acting as a confinement, is assured under all conditions.

Table CF-II-2, WHB Air Locks, Sheet 1 of 5

AIR LOCK NO.	DOOR NO.	CONNECTING ROOM		INTERLOCKS	
		NO.	DESCRIPTION	BETWEEN	REF.
077	70	104	Remote Handling Area		
	71	078	Service Room & Corridor		
100	101	---	Outside	B	W3
	104			B	
	130	103	Contact Handling Area	B	
	131			B	
101	102	---	Outside	C	W3
	105			C	
	132	103	Contact Handling Area	C	
	133			C	
102	103	---	Outside	D	W3
	106			D	
	134	103	Contact Handling Area	D	
	135			D	
106	118	Bd 412	TMF		
	121	105	Stair #1		
	122	107	Air Lock		
	123	103	Contact Handling Area		

Table CF-II-2, WHB Air Locks, Sheet 2 of 5

AIR LOCK NO.	DOOR NO.	CONNECTING ROOM		INTERLOCKS	
		NO.	DESCRIPTION	BETWEEN	REF.
107	119	108	Overpack & Repair	F	W4
	120			F	
	122	106	Air Lock	F	
	124	103	Contact Handling Area	F	
110	125	109	Overpack Personnel Change	G	1
	126	108	Overpack & Repair	G	
	127	111	Small Equipment Decon.	G	
	128	112	Site Generated Waste	G	
113	136	112	Site Generated Waste	H	1
	137	103	Contact Handling Area	H	
114	114		Main Access Corridor Support Building 451	I	W2
	138	103	Contact Handling Area	I	
	139	116	Cage Loading	I, L	
	163	115	Air Lock	I	
115		115a	Air Lock		
	113	---	Outside		
	157	116	Cage Loading		
	163	114	Air Lock		

Table CF-II-2, WHB Air Locks, Sheet 3 of 5

AIR LOCK NO.	DOOR NO.	CONNECTING ROOM		INTERLOCKS	
		NO.	DESCRIPTION	BETWEEN	REF.
115A		115	Air Lock		
		---	Elevator EL 100'''		
116	139	114	Personnel Access Corridor (Air Lock)	I, L	W5
	140	103	Contact Handling Area	L	
	141	117	Shaft Entry	L	
	156			L,N	
	157	115	Air Lock	6	
117	141	116	Cage Loading	M	1
	156			M	
	142	120	Facility Cask Loading	M	
	155			M	
120	142	117	Shaft Entry		W7
	155			N, L	
	144	121	Vestibule		
	145	104	Remote Handling Area	N, L	
	146				
125	151	123	Filter Gallery		
	152	104	Remote Handling Area		

Table CF-II, WHB Air Locks, Sheet 4 of 5

AIR LOCK NO.	DOOR NO.	CONNECTING ROOM		INTERLOCKS	
		NO.	DESCRIPTION	BETWEEN	REF.
127	149	104	Remote Handling Area		
	150	126	Transfer Cask Unloading		
	154	128	Transfer Cask Chute		
128	153	124	Hot Cell		
	154	127	Air Lock		
129	112	---	Outside		
	143	119	Stair #2		
	168	121	Vestibule		
202	203	200	Mechanical Equipment	S	2
	204			S	
	205	224	Air Lock	S	
	206	203	Access Aisle El-126'	S	
	207	204	Standing Operator Sta.	S	
	208	---	Outside 2nd Floor Roof	S	
205	201	105	Stair #1		
	218	208	Mechanical Vent Supply		
	219	200	Mechanical Equipment		
206	222	208	Mechanical Vent Supply		
	223	200	Mechanical Equipment		

Table CF-II-2, WHB Air Locks, Sheet 5 of 5

AIR LOCK NO.	DOOR NO.	CONNECTING ROOM		INTERLOCKS	
		NO.	DESCRIPTION	BETWEEN	REF.
207	213	211	Hot Cell Operating Gallery		
	214	119	Stair #1		
210	211	211	Hot Cell Operating Gallery		
	212	209	Manipulator Repair		
212	216	211	Hot Cell Operating Gallery		
	217	124	Hot Cell		
224	205	202	Air Lock	Y	W9
	224	203	Access Aisle	Y	
225	209	203	Access Aisle El-126'	Z	W9
	225	211	Hot Cell Operating Gallery	Z	
403	405	400	Access Corridor El-142'	AA	W9
	406	404	Air Lock	AA	
404	402	402	Crane Maintenance	AA	W6
	406	403	Air Lock	AA	

3.4 System Arrangement

The WHB is located south of the main east to west site roadway and includes a Radiological Controlled Area (RCA) on the south side of the building. This RCA is enclosed by a fence. Within this fence is a concrete receiving, unloading and truck parking area.

The main Waste Handling Areas within the WHB are the CH-TRU Waste Area on the west side of the building, the RH-TRU Waste Area on the east side of the building, the Hoist Tower which is located between the RH-TRU and CH-TRU Areas, and the Mechanical Equipment Rooms located on the west side second floor. The building is constructed of structural steel columns and trusses which form a rigid frame to which preformed steel siding is attached.

3.4.1 WHB CH-TRU Waste Area

The CH-TRU Area is located at the west end of the WHB and adjacent to the Waste Shaft and the RH-TRU Area to the east as shown on Figure CF-II-2. To the west of the CH-TRU Area is connected the TMF, Building 412.

- CH-TRU is a large metal building containing several rooms and areas.

There are three Air Lock entrances into the CH-TRU Waste Handling Area on the south side for entry of shipping packages and other waste shipments and one large door into the RH-TRU Waste Handling Area for either rail shipments or other transporters.

The primary personnel entry into the CH-TRU Handling Area is via Air Lock Doors through an Access Corridor from the lamp room on the north side of the building.

The concrete floor of the major portion of the WHB is at the architectural elevation of 100'-0" which is equivalent to 3,413.50' above sea level.

3.4.2 WHB RH-TRU Waste Area

The RH-TRU Area of the WHB includes an unshielded Receiving Area, a Hot Cell Complex and other shielded rooms to facilitate unloading and loading of RH-TRU Waste from casks and containers.

The RH-TRU Area is located at the east end of the WHB and adjacent to the Waste Shaft and the CH-TRU Area as shown on Figure CF-II-2. The building consists of two major architectural areas, 1) a large metal building containing several rooms and areas, and 2) a concrete Hot Cell Complex which is totally located within the metal building.

The ground floor level is at architectural elevation 100'. Within the Hot Cell Complex floors are also located at elevations 76', 86', 122-6', and 142'. Within the conventional building and outside the Hot Cell, a floor is also located at the 122' elevation. The floor plans of these five elevations, including the names and locations of the various rooms, areas and access ways, are shown on Figures CF-II-3, CF-II-4, and CF-II-5.

3.4.3 WHB Hoist Tower

The Hoist Tower and Cage Areas are located on the north end of the WHB between the CH-TRU Handling Area and the RH-TRU Handling Area. The Hoist Tower is about 65' from east to west, about 43' from north to south and is approximately 227 ft high.

3.4.4 WHB Mechanical Equipment Rooms

The Mechanical Equipment Rooms are located on the mezzanine (elevation 123.0') over the north side of the CH-TRU Area.

3.4.5 WHB Air Locks and Entries

Because of the requirement to prevent the uncontrolled release of radioactivity to the atmosphere, and to control the exposure of operating personnel, the building contains numerous doors and Air Locks. These are illustrated on Figures CF-II-3, CF-II-4, and CF-II-5.

3.4.6 WHB Shielding Windows

The building contains one Dry Shielding Window which is located in the concrete wall separating the Facility Cask Loading Room from the operator's station. The building also contains six Oil Shielding Windows. These are located in the concrete shielding wall separating the Hot Cell from the Operating Gallery.

3.5 Component Design Description

The WHB is the most significant facility at the WIPP with many different areas and rooms to provide sequential treatment of two levels of TRU Waste prior to transfer to underground disposal.

The WHB structure is designed to prevent structural failure from a DBE. The safety function of the WHB structure is to prevent breaching waste containers outside closed shipping containers from WHB structural failure during the DBE. **[DSA DF 5.61]**

The ability for the WHB structure to withstand a DBE is documented in the following seismic analyses:

- CS-41-D-482, Seismic Analysis – Horizontal, Waste Handling Building, CH Area, Rev. 1, 02/29/84
- CS-41-D-483, Seismic Analysis – Vertical, Waste Handling Building CH Area, Rev. 1, 02/29/84
- CS-41-D-486, Seismic Analysis – Horizontal, Waste Handling Building, RH Area, Hoist Tower & Hot Cell Area Model Description (Part I), Rev. 1, 02/29/84
- CS-41-D-487, Seismic Analysis – Horizontal, Waste Handling Building, RH Area, Hoist Tower and Hot Cell Area Mass Calculation (Part II), Rev 1, 02/29/84
- CS-41-D-488, Seismic Analysis – Horizontal, Waste Handling Building, RH Area, Hoist Tower and Hot Cell Area Section Properties Calc. (Part III), Rev 1, 02/29/84
- CS-41-D-489, Seismic Analysis – Horizontal, Waste Handling Building, RH Area, Hoist Tower and Hot Cell Area Analysis (Part IV), Rev 1, 02/29/84
- CS-41-D-495, Seismic Analysis – Horizontal, Waste Handling Building, Hoist Tower, Part V, of Seismic Analysis, Rev 1, 02/29/84

- CS-41-D-490, Seismic Analysis – Vertical, Waste Handling Building, RH Area, Hoist Tower & Hot Cell Area Model Description (Part I), Rev 1, 02/29/84

- CS-41-D-491, Seismic Analysis – Vertical, Waste Handling Building, RH Area, Hoist Tower & Hot Cell Area Section Properties & Mass Calculation (Part II), Rev 1, 02/29/84

- CS-41-D-492, Seismic Analysis – Vertical, Waste Handling Building, RH Area, Hoist Tower & Hot Cell Area Analysis (Part III), Rev 1, 02/29/84

The WHB structure is designed to prevent structural failure from a DBT. The safety function of the WHB structure is to prevent breaching waste containers outside closed shipping containers from WHB structural failure during the DBT. **[DSA DF 5.6.1]**

The ability for the WHB structure to withstand a DBT is documented in the following analyses:

- Richards-Wilcox Analysis Calculations for Tornado Resistant Doors, 09/25/1985

- CS-41-D-007, Analysis of Tornado Loads for Waste Handling Building, Rev. 0, 11/18/83

- CS-41-D-008, Hoist Tower Static Analysis, Rev. 0, 11/18/83

- CS-41-D-009, Hoist Tower – Wind & Tornado Analysis, Rev. 0, 11/18/83

- CS-41-D-026, Hoist Tower Roof Framing Plan, Rev. 0, 11/18/83

- CS-41-D-072, Analysis & Design of Vertical Bracings for Waste Handling Building, Rev. 0, 11/18/83

- CS-41-D-086, Hoist Tower – Design of Vertical bracing, Rev. 0, 11/18/83

- CS-41-D-116, Hoist Tower Siding, Rev. 0, 11/18/83

- CS-41-D-125, analysis & Design of Wind Columns for Waste Handling Building, Rev. 0, 11/18/83

- CS-41-D-141, Hoist Tower – Tower Steel Columns, Rev. 0, 11/18/83

- CS-41-D-384, Hot Cell Wind/Tornado force Analysis, Rev. 0, 11/18/83

- CS-41-D-802, Wind and Tornado Loads for TRU-PACT Extension, Rev. 0, 04/30/08

- Waste Isolation Pilot Plant Tornado Damper Qualification, Rev. 3, 01/16/85

The WHB is designed to withstand straight-line wind of 110 mph, at 30 ft above ground, such that the building structure does not collapse and damage waste containers. **[DSA SC SSC 4.3.1]**

The ability for the WHB structure to withstand straight-line wind is documented in the following analyses:

- CS-41-D-006, Analysis of Wind Loads for Waste Handling Building, Rev. 0, 11/18/83

- CS-41-D-125, Analysis & Design of Wind Columns for Waste Handling Building, Rev. 0, 11/18/83

- CS-41-D-126, Analysis & Design of Wind Column Bracing – Waste Handling Building, Rev. 0, 11/18/83

- CS-41-D-008, Hoist Tower Static Analysis, Rev. 0, 11/18/83

- CS-41-D-009, Hoist Tower – Wind & Tornado Analysis, Rev. 0, 11/18/83

- CS-41-D-026, Hoist tower Roof Framing Plan, Rev. 0. 11/18/83

- CS-41-D-072, Analysis & Design of Vertical Bracings for Waste Handling Building, Rev. 0, 11/18/83

- CS-41-D-086, Hoist Tower – Design of Vertical Bracing, Rev. 0, 11/18/83

- CS-41-D-116, Hoist Tower Siding, Rev. 0, 11/18/83

- CS-41-D-141, Hoist Tower – Tower Steel Columns, Rev. 0, 11/18/83

- CS-41-D-384, Hot Cell Wind/Tornado Force Analysis, Rev. 0, 11/18/83

The WHB roof is designed to withstand a 27 lb/ft^2 snow load, and the WHB will not collapse under the design roof load. **[DSA SC SSC 4.3.1]**

The ability for the WHB structure to withstand snow load is documented in the following analyses:

- CS-41-D-026, Hoist Tower roof Framing Plan, Rev. 0, 11/18/83

- CS-41-D-124, Analysis & Design of Waste Handling Building Main Columns, Rev. 0, 11/18/83

- URS Letter of Transmittal; Roof Study for Additional Loads, 03/20/2006

- CS-41-D-008, Hoist Tower Static Analysis, Rev. 0, 11/18/83

The WHB meets NFPA 220 Type II construction such that fires outside the building or within the building do not propagate and damage waste containers outside of closed shipping casks. **[DSA SC SSC 4.3.1]** WIPP-023, Fire Hazard Analysis for the Waste Isolation Pilot Plant, Carlsbad, NM, states that the WHB is constructed in accordance with the requirements for NFPA 220, Type II construction.

The WHB is designed to provide a passive confinement function for release of radioactive particulate materials. When the ventilation is not operating as in a loss of power event, the WHB would impede any released radioactive material from being released into the environment since the air current in the WHB would be reduced to the air in-leakage and personnel opening and closing doors as they exit the facility. **[TSR DF 6.1]**

The building provides space, shielding, mountings, and supports for all interfacing components and equipment such as the cranes, HVAC ducts, piping, structural and electrical fixtures and cable, etc.

Detailed description of these areas is presented in the following sub-paragraphs. However, some of the design features are common in many of the areas and rooms and are therefore presented below in this section.

One feature of the WHB is that the floor of the CH-TRU Waste Area and the floor and the walls, up to 12 foot, of the RH-TRU Waste Area (including the Hot Cell Complex) are coated with an epoxy paint to prevent penetration of any radioactive waste into the concrete or crevices, thereby providing easement of decontamination. In addition, crevices and cracks in the wall are caulked to reduce radioactive material from entering the crevices. This caulking may also reduce air leakage that may disturb the pressure balance.

Another feature is that the building is maintained at a pressure less than the outside pressure to ensure that, in the event of any radiation leakage, there is no uncontrolled release of any contaminant to the environment.

The building's original existing roofing system (rock ballast, membrane and rigid insulation boards) was replaced with a sprayed-on, elastomer coated, polyurethane foam roofing system. The new roofing system is approved as non-combustible per UL 790, "Standard Test Methods for Fire Tests of Roof

Coatings." Thus, the new roofing system does not affect the classification of the WHB as Type II construction (built with non-combustible or limited combustible materials) per NFPA 220. **[DSA SC SSC 4.3.1]**

A sprinkler system is installed throughout the WHB except for the Hot Cell, Cask Unloading Room, and below ground level (100 ft) rooms.

As shown on the schematic diagram, Figure CF-II-6, a sprinkler (Firewater) water collection system is provided for these selected areas in the WHB. This system includes transfer and collection trenches, pits and sumps, and sump pumps. These trenches and pits are covered with metal plate or grating to allow water flow from the floor in areas where a potential fire may occur. Flexible air flow baffles, as located on Figure CF-II-6 are installed in the transfer trenches to prevent air leakage between areas to ensure that pressure balances between rooms are being maintained. In case of sprinkler use, water samples from the sump are taken and tested to determine whether the water is contaminated. If contaminated, it is processed as site generated waste.

3.5.1 CH-TRU Handling Area

The CH-TRU Waste Handling Area is shown isometrically on Figure CF-II-7 and in plan on Figure CF-II-8. The CH-TRU Waste Handling Area includes the following rooms and areas:

- Ch Bay
- Overpack and Repair Room
- Site Generated Waste Room
- Small Equipment Decontamination room
- Shielded Storage Room

The CH-TRU Waste Handling Area also includes an outdoor truck loading and off-loading area.

These rooms and areas are described in the following paragraphs.

3.5.1.1 CH Bay

The Inventory and Preparation Area in the CH-TRU section of the building (Elevation 100'-0") is used for the preparation, inspection, inventory control and temporary storage of CH-TRU Waste Containers.

This space in the CH-TRU Handling Area is provided for contamination control purposes, opening the shipping containers, removing the waste packages, transferring them to an empty CH-TRU Facility pallet, moving these packages into the Cage Loading Room and then entry into the Shaft Entry Room.

The 6-ton crane, used for removing the shipping container contents, is designed to remain on its runway and hold its load during the DBE event.

Mounting provisions for the CH-TRU loading and unloading docks are made in the central area to permit access by forklifts and the overhead crane.

From this area there is forklift access to the Cage Loading Room, the OP&RR, the Site Generated Waste Room, and the Shielded Storage Room.

In the northwest end of this area, a battery charging station with the necessary power, ventilation and space is provided.

The CH Bay is of a volume such that, when waste containers are outside a shipping container, a vapor cloud explosion (VCE) cannot occur within the CH Bay. **[DSA SC SSC 4.3.1]**

3.5.1.2 Overpack and Repair Room

The OP&RR provides an area to accommodate a supply of overpack containers and miscellaneous Waste Handling Equipment.

The room provides supports for a pendant controlled overhead crane on a north/south rail at the east side of the room. Other crane mountings are on the west side of the room.

Air Locked Doors from the Inventory and Preparation Area permit entry of the forklifts and other equipment as required with minimum interchange of air between the OP&RR and the main CH-TRU Waste Area. A personnel Air Lock on the east side of the room leads into the Site Generated Waste Room.

3.5.1.3 Site Generated Waste Room

The Site Generated Waste Room provides space for compacting, packaging and assaying site produced solid radwaste and solidification and packaging of site produced liquid wastes. However, it will not be used for TRU waste management.

A change area is provided from the Air Lock in the northwest corner of the room for when personnel must don protective clothing prior to entering the Site Generated Waste Room or OP&RR. A door to the Access Corridor is on the north side of the change room.

The primary sump and pump pit for fire fighting water drainage is located in the southeast corner of this room. Also installed in the west side of this pit is the liquid waste accumulation tank with piped connections. The pit is covered with steel grating. The sump pump is mounted on the southwest corner of this grating.

3.5.1.4 Small Equipment Decontamination Room

A Small Equipment Decontamination Room is located between the OP&RR and the Site Generated Waste Room. This room provides space for cleaning tanks and ultrasonic cleaning equipment.

3.5.1.5 Shielded Storage Room

The Shielded Storage Room provides temporary storage for waste with between 100 and 200 mrem, when required. This room, which is about 8' wide by 7' deep, is located in the southeast corner of the CH Bay. The Shielded Doors may be locked to provide access control.

3.5.2 Waste Handling Building, RH Area

See Section 3.2.2 for the description of the RH Area. Component descriptions of WH equipment are covered in the WH00 SDD.

The RH Area of the WHB is that portion to the east of the Waste Shaft (311) Hoist Tower and the CH Area. The function of this area is to provide radiation shielding and the space necessary for housing the equipment used to remotely process waste over 200 mrem prior to transfer underground. Space is also provided for maintenance of equipment which may have radioactive contamination. This area consists of a number of individual rooms, stations, corridors, etc. as shown isometrically on Figure CF-II-9 and in plan on Figures CF-II-10, CF-II-11, CF-II-12 and CF-II-13. A description of each of these areas is briefly discussed in the following sections.

3.5.3 Hoist Tower Area

The Hoist Tower provides an enclosure and supporting floor slabs and pads at various elevations for support of hoist system equipment. It also provides the guidance frame which provides support for the hoist equipment such as the fixed guides, wood arresters and the safety catch gear.

The Hoist Tower Area provides a cover over the Waste Shaft, as well as providing rooms, areas and supports required for the Waste Shaft Hoisting.

These areas include:

- Shaft Entry Room at elevation 100'-0"
- Cage Loading Room at elevation 100'-0"
- Master Control Station at elevation 126'-6"
- Support Floor and Access Corridor with Air Locks at elevation 142'-1"
- Sheave Room at elevation 161'-6"
- Hoist Machinery Room at elevation 185'-6"

On the north side of Hoist Tower and in line with the centerline of the Waste Shaft, from elevation 100' to the top of the tower, there is a 32' width of removable siding. Supports and space are provided for a 30-ton over-head crane at the top of the Hoist Tower for lifting of the hoist equipment.

An external ladder for access to the tower roof is located on the east side of the tower starting at a platform at the 185' elevation.

A Personnel Elevator is located in the northwest corner of the Hoist Tower. This elevator is commercial produced equipment, powered by a commercial elevator motor.

3.5.3.1 Shaft Entry Room

The Shaft Entry Room provides areas and access for loading waste pallets, equipment, and other loads onto the Shaft Cage. The doors to this room also serve as an Air Lock between both the Cage Loading Room and the Cask Loading Room and the Waste Shaft.

3.5.3.2 Cage Loading Room

The Cage Loading Room is adjacent to and west of the Shaft Entry Room. It provides an Air Locked entry from the CH-TRU Inventory and Receiving Area into the Shaft Entry Room. This Air Locked entry minimizes air movement from the Inventory and Preparation Area to the CH-TRU Area or down the Waste Shaft.

Rails for the conveyance car are embedded into the floor and traverse into the Shaft Entry Room.

A winch is installed on the west wall to move the conveyance into the Cage Loading Room.

An elevator for the Hoist Tower Area is in the northwest corner of the Cage Loading Room.

3.5.3.3 Control Station Floor

At elevation 126'-6", there is a room with an elevator in the northwest corner and with the equipment hatch in the southwest corner. A removable four panel heavy steel hatch cover provides protection for cage operators from any objects dropped from the upper levels of the tower.

The hoist guidance frame extends up through this floor level. Hand rails are mounted around the opening.

On the north side of this room there is an access aisle to permit entry to the Hot Cell Operating Gallery.

On the south side of the control station floor, there are access doors leading to an Air Lock from which access doors are provided to three areas as follows:

A. On the south side of the Air Lock room, there is a stairway to a door leading out to the roof of the WHB. On the roof there is a concrete slab for a steel platform at elevation 138'-0" for the RH-TRU Area HVAC equipment. Between the door and the concrete slab, there are walking pads for access to the concrete pad.

B. On the west side, doors lead on to the ramp or a stairway leading down to the Mechanical Equipment Room.

C. On the east side of the Air Lock, doors lead into the Hoist Operator Soundproofed Power and Control Room.

The Control Room is about 20 ft by 32 ft, with a rolling glass window, permitting operators to observe the shaft area. This Control Station is in a room on the south side of the Waste Shaft. In this room are control panels (UH06) and related equipment necessary for operating the Waste Hoist.

3.5.3.4 Support/Access Floor

The Access Corridor floor at 142'-1" provides a route from the Hot Cell via Air Locked Doors to the elevator and to a stairway.

3.5.3.5 Deflection Sheave Room

The Sheave Room (elevation 161'-6") provides multiple openings in the floor for hoist ropes, the elevator, the deflection sheave, and the guide ropes.

The six guide ropes for the Waste Shaft are mounted (suspended) at this level. The clamps on the four cage guide ropes and the two counterweight ropes are supported by steel blocks mounted on the floor of this room.

Six-inch-thick concrete pads for the filter unit and supply fan are provided.

An equipment access, with a removable hatch, is located in the south west corner of this room. An access for a down ladder is located in the north center of the room. The up ladder is mounted adjacent to this ladder access.

Mountings for the brake pumps are located at the south end of the room adjacent to the sheave.

3.5.3.6 Hoist Machinery Room

The Hoist Machinery Room (elevation 185'-6") provides openings similar to those on the Sheave Room floor for equipment access, the elevator and access to the ladder.

Several six-inch-thick reinforced concrete pads are provided for mounting equipment. HVAC equipment is installed on the concrete pad which is along the north wall between the elevator and the ladder. The pad in the southeast corner is available for future use.

The Hoist Machinery supports are located in the floor at the opening over the centerline of the Waste Shaft on the east side of this room.

Removable hand rails are installed around the equipment hatch.

A 30-ton bridge crane is supported by the Hoist Tower structure to transfer any equipment to and from its mountings to the equipment hatch.

A stairway to a walk way on the south wall provides access to the Crane Control Cubicle which is suspended from the crane beam.

An eight-inch-thick reinforced concrete slab covers the roof of the Hoist Tower.

Located under the Hoist Sheave is a re-grooving tool platform which provides support for equipment to refinish the diameter of any of the six sheaves to ensure that the diameter and therefore the tension on all six cables are equal.

3.5.3.7 Hoist Structure

The Waste hoist load bearing components are designed to support the Waste hoist load and load bearing components under maximum loading condition. **[TSR DF 6.14]**

The ability for the Waste Hoist structure to support the Waste hoist load and load bearing components under maximum loading condition is documented in the following analysis:

- CS-41-D-057, Hoist Tower – Steel Framing @ 161'-6", 11/21/83
- CS-41-D-141, Hoist Tower - -Tower Steel Columns, 11/12/83

The Waste Hoist structure is constructed of structural steel that supports the hoist operating machinery as well as the load of the conveyance, the load on the conveyance, the counterbalance weights, the hoisting ropes, and the counterbalance and guide ropes.

3.5.4 Mechanical Equipment Rooms

The Mechanical Equipment Rooms provide mounting pads and hangers for HEPA Filter units, exhaust fans, heaters, and vacuum pumps for the WHB areas.

Brackets and mountings are provided for controllers and control panels for the above equipment.

As shown in Figure CF-II-14, mounting and space is provided for the following:

- CH Area HEPA Filters and Exhaust Fans
- RH Area HEPA Filters and Exhaust Fans
- Forklift Battery Stations HEPA Filters and Exhaust Fans
- Support Building Labs HEPA Filters and Exhaust Fans
- Forklift Battery Station Area Evaporative Coolers/Heaters
- CH-TRU Waste Handling Area and Mechanical Room Coolers/Heaters
- Hot Cell Exhaust Fans (Note that the HEPA Filters for the Hot Cell are located in the Filter Gallery north of the Hot Cell.)

In the southeast corner of this room is a concrete ramp leading up to the 126'-6" level of the Hoist Tower. (see Paragraph 3.5.3.3)

3.5.5 Waste Handling Building Air Locks and Entries

3.5.5.1 Doors

3.5.5.1.1 Schedule of Doors

Shown in Tables CF-II-3, CF-II-4, CF-II-5, is a listing of all doors within the WHB along with a summary of their principal features. The nomenclature of the abbreviations used is listed in Table CF II-10. Several of the doors have unique features. These are described in the following paragraphs.

3.5.5.1.2 Shield Doors

The Cask Unloading Room Shield Door is shown on Figure CF-II-19. The door is 18'2½" wide, 23'4" tall and 48" thick. It is constructed of steel reinforcing members covered with a skin of steel plate. The interior of the door is filled with concrete to provide the necessary nuclear shielding. The door weighs about 140 tons.

The door is moved on four air bearings which are installed under the door and between supports on which the door rests when not in motion. The air to operate the bearing is supplied at 55 psig with a minimum flow rate of 300 scfm. With the weight of the door supported on the air bearings, the door is moved using a steel cable operated by a 4" diameter pneumatic cylinder with a 16' stroke. The maximum door velocity is 10 fpm.

The door liner motion is controlled by eight express roller bearings operating against case hardened steel load tracks. There is one roller bearing at each corner of the door face surfaces.

The maximum travel of the door is controlled by limit switches at each end of the travel. There is also a proximity switch located above the door which prevents the air bearing from lifting the door too high.

When the door is closed, pneumatically operated door seals may be actuated to seal between the door and its opening.

There are five large steel Shield Doors within the WHB. These are shown on Figure CF-II-17 and their locations are delineated on Figure CF-II-3. In addition there are several smaller Shield Doors located in the Hot Cell Area. These are identified on Tables CF-II-3, CF-II-4, CF-II-5, CF-II-6, CF-II-7, CF-II-8, CF-II-9, and Figure CF-II-15.

The Crane Maintenance Room - Hot Cell nuclear shielding door is shown on Figure CF-II-18. It is mounted from the ceiling to allow it to be opened upward thereby providing unrestricted clearance for moving the crane into the maintenance room on its own tracks. The maximum door width is 34'-11" and it is 12'-2¼" tall.

The door is constructed of a steel beam structure with a solid steel cover plate 2" thick which provides the necessary shielding. The door weighs about 33,000 lb.

The door is operated by a 10-ton capacity floor mounted electric wire rope winch through a series of pulleys. The winch includes 4-part double revving and both a motor and a mechanical load break. The wire rope is a ½" dia. 6x 37 wire rope with an independent core and a 23,000 lb nominal minimum strength. Limit switches are provided to control the range of motion of the door. (See SDD-WH00)

Removable test weights totaling 5,000 lb are used for periodic 125% winch capacity testing.

Ventilation seal plates are provided to seal the gap between the door and its jam which control the flow of air from the Crane Maintenance Room into the Hot Cell. These are adjusted to contact all around the door. Slotted holes are provided in the plates which allow 1,200 scfm of air flow while the door is closed.

Table CF-II-3, WHB Summary of Doors
(See Table CF-II-10 for Nomenclature list)

DOOR NO.	ADJ. ROOM NOS.	SPL.FUNCTIONS				CONTROLS			FEATURES				
		SD	TD	FR	EX	AI	RI	AC	SG	DB	OH	OP	**NOTES**
70	077 104					X	X	IS	A				3' x 7' RH R LOCAL ALARM
71	077 078					X			A				3' x 7' LHR
80	087 104							LS	A				3' x 7' RH R
101	OUT 100					4D B		IS			H	X	14'x12' RH KEY MOTOR
102	OUT 101					4D C		IS			H	X	14'x12' RH KEY MOTOR
103	OUT 102					4D D		IS			H	X	14'x12' RH KEY MOTOR
104	OUT 100					4D B		IS	A				3'x7' RH R
105	OUT 101					4D C		IS	A				3'x7' RH R
106	OUT 102					4D D		IS	A				3'x7' RH R
107	OUT 104		X		X			IS	M				3'x7' LHR AIR TIGHT
108	OUT 104		X		X			IS	M				3'x7' LHR AIR TIGHT
109	OUT 104		X					IS		Y		X	8'x18' PR RAILROAD
110	OUT 104		X		X			IS	M				3'x7' LH AIR TIGHT
111	OUT 122		X		X			IS	M				3'x7' RH AIR TIGHT
112	OUT 129		X		X			IS LS	M				3'x7' RH R MECH. ALARM

Table CF-II-4, WHB Summary of Doors

DOOR NO.	ADJ. ROOM NOS.	FUNCTIONS				CONTROLS			FEATURES				
		SD	TD	FR	EX	AI	RI	AC	SG	DB	OH	OP	**NOTES**
113	OUT 115		X			X		IS LS		N			6'x12' PR
114	B451 114		X	45		4D I		IS		N			2'6"x7' PR AIRTIGHT
115	B451 112		X	45	X			IS	M				3'x7' RH R AIRTIGHT
116	B451 109		X	45	X			IS LS	M				3'x7' RH R AIRTIGHT
117	OUT 108		X		X			IS	M				3'x7' RH R AIRTIGHT
118	B412 106				X			IS LS	A				3'x7' HR AIRTIGHT
119	107 108					4D F					H	X	14'x14' LH MOTOR OP.
120	107 108					4D F			A				3'x7' RH R
121	105 106			45		X			A				3'x7' RH R
122	106 107				X	4D F			A				3'x7' RH R
123	103 106			90	X	X			A				3'x7' LHR
124	103 107			90		4D F		LS			H	X	14'x14' LH MOTOR OP.
125	109 110					4D G			A				3'x7' LHR
126	108 110	X				4D G		LS		X2			3'x7' PR RH R 1' MIN THK
127	110 111				X	4D G		IS LS	A				3'x7' LHR

Table CF-II-5, WHB Summary of Doors

DOOR NO.	ADJ. ROOM NOS.	FUNCTIONS				CONTROLS			FEATURES				
		SD	TD	FR	EX	AI	RI	AC	SG	DB	OH	OP	**NOTES**
128	110 112					4D G				C			3'x7' PR RH R
129	111 112							LS		C			2'6"x7' PR RH R LOVERS
130	100 103		x			4D B			M				3'x7' RH R
131	100 103		x			4D B					L	x	14'x12' RH MOTOR
132	101 103		x			4D C			M				3'x7' RH R
133	101 103		x			4D C					L	x	14'x12' RH MOTOR
134	102 103		x			4D D			M				3'x7' RH R
135	102 103		x			4D D					L	x	14'x12' RH MOTOR
136	112 113					2D H				C			3'x7' PR RH R
137	103 113			90		2D H				C			3'x7' PR RH R
138	103 114			90		4D I				C			2'6"x7' PR RH R
139	114 116	x		90		4D IL		LS	X1				3'x7' RH R 1" MIN THK
140	103 116					5D L					H	x	15'x12' LH MOTOR
141	116 117	x				5D L			X1				2'6"x7' LHR 2" THK
142	117 120	x				4D M		LS IS	X1				3'x7' RH R 2" THK

Table CF-II-6, WHB Summary of Doors

DOOR NO.	ADJ. ROOM NOS.	FUNCTIONS				CONTROLS			FEATURES				
		SD	TD	FR	EX	AI	RI	AC	SG	DB	OH	OP	**NOTES**
143	119 129			45		x			A				3'x7' LH
144	120 121							IS LS	A				3'x7' RH R
145	104 120	x				2D NL		KO		X2		x	6'4"x14' PR 4" MIN THK MOTORIZED
146	104 120	x						IS LS	X1				3'x7' RH R 4" MIN THK
147	121 123							LS		C			3'x7' PR RH R
148	121 122									C			2'6"x7' PR RH R
149	104 127	x				x	x	IS LS	X1				3'x7' RH R 3" MIN THK
150	126 127					x		IS	A				3'x7' LHR LOCAL ALARM
151	123 125					x			A				3'x7' LHR
152	104 125					x			A				3'x7' LHR
153	124 128				x				A				2'7"x6'9" 3" MIN THK
154	127 128	x				x	x	IS	X1				2'10"x7' LHR 3" MIN THK
155	117 120	x				2D NL		KO		X2		x	6'4"x14' PR 2" MIN THK MOTORIZED
156	116 117	x				5D LN		KO		X2			6'4"x14'4" PR 2" MIN THK
157	115 116	x				5D L		LS		2X			6'4"x12'4" PR 3" MIN THK

Table CF-II-7, WHB Summary of Doors

DOOR NO.	ADJ. ROOM NOS.	FUNCTIONS				CONTROLS			FEATURES				
		SD	TD	FR	EX	AI	RI	AC	SG	DB	OH	OP	**NOTES**
158	103 104							LS	A				3'x7' LHR
159	103 104							LS			H	x	16'x14" LH MOTORIZED
160	103 118	x						IS LS		X2			8'3"x14'4" PR 6" THK
161	112 130							LS	B				3'x7' LHR
162	104 126	x							SPECIAL			x	16'10"x23'4" MOTORIZED
163	114 115					4D I			A				3'x7' RH R
168	121 129					x		LS	A				3'x7' RH R
169	115 115A								B1				3'x7' RH R
201	105 205			90					A				3'x7' LHR
202	104 211								A				3'x7' RH R
203	200 202					6D S		LS		C			3'x10' PR RH
204	200 202					6D S			A				3'x7' LHR
205	202 224					2D Y			B1				3'x7' RH R
206	202 203					6D S		LS		C			3'x10' PR RH R

Table CF-II-8, WHB Summary of Doors

DOOR NOS.	ADJ ROOM NOS.	FUNCTIONS				CONTROLS			FEATURES				
		SD	TD	FR	EX	AI	RI	AC	SG	DB	OH	OP	**NOTES**
207	202 204			45		6D S		IS LS		C			3'x7' PR RH R
208	OUT 202		x					IS LS	M				3'x7' LH
209	203 225					2D Z			A				3'x7' RH
210	209 211							x		C			2'6"x10' PR
211	210 211					x		LS	A				3'x7' LHR
212	209 210					x			A				3'x7' RH
213	207 211				x	x		LS	A				3'x7' LHR
214	119 207			45	x	x		LS	A				3'x7' RH R
215	209 211							LS	A				3'x7' RH
216	211 212	x				2D	x	IS LS	X1				3'x7' RH R 5½" MIN THK
217	124 212					2D			A				3'x7' RH R
218	205 208					x		LS	A				3'x7' LHR
219	200 205					x		LS	A				3'x7' LH
220	200 208												Leafs Removed
221	200 208												Leafs Removed

Table CF-II-9, WHB Summary of Doors

DOOR NOS.	ADJ. ROOM NOS.	FUNCTIONS				CONTROLS			FEATURES				
		SD	TD	FR	EX	AI	RI	AC	SG	DB	OH	OP	**NOTES**
222	206 208					x			A				3'x7' LHR
223	200 206					x		LS	A				3'x7' LHR
224	203 224					2D Y			B1				3'x7' RH R
225	211 225								B1				3'x7' LHR
402	402 404					3D AA	x	IS LS		C			2'6"x7' PR LOCAL ALARM
403	400 401							LS		C			2'6"x7' PR RH R
404	124 402	x							SPECIAL			x	34'11"x10' MOTORIZED
405	400 403					3D AA	x			C			2'6"x7' PR LOCAL LIGHT
406	403 404					3D AA	x			C			2'6"x7' PR LOCAL LIGHT
N/S	ELE 115A												
N/S	ELE 203			x					B1				
N/S	ELE 400			x					B1				
N/S	ELE 600												
N/S	ELE 800												

Table CF-II-10, WHB Summary of Doors
NOMENCLATURE

FUNCTIONS

SD	Shield Door
TD	Tornado Door
FR	Fire Rating in Minutes
EX	Emergency Exit

If a special function exists, an X is placed in the column or the minutes placed in the FR column.

CONTROLS

AI	Air Interlock
RI	Radiation Interlock
AC	Access Control

If any of the following symbols appear in a column, the column is applicable.

X	Applicable
IS	Intrusion Signal
LS	Lock Set
KO	Key to Operate
4D	Four doors involved in interlock
A	Each door involved with that specific interlock will have an "A" in the "SG" column

FEATURES

SG	Single Door
DB	Double Door
OH	Overhead Door
OP	Operator

3.5.5.1.3 Tornado Doors

All of the outside doors of the WHB are rated for the DBT. These doors are listed in Tables CF-II-3, CF-II-4, CF-II-5, CF-II-6, CF-II-7, CF-II-8, CF-II-9, CF-II-10 and Figure CF-II-15. The majority of these doors are standard size and type doors used for personnel movement. These doors are also equipped for emergency escapement.

Other Tornado Doors include the Railroad Door located on the east side of the RH-TRU Area, and the large equipment door (113) located on the north side of the Waste Shaft Area. Another type of Tornado Door is those installed between the CH-TRU Area and the truck inlet Air Locks. A sketch of these doors is shown on Figure CF-II-19.

3.5.5.1.4 Overhead Doors

There are seven rolling overhead doors within the WHB. These are doors numbered 101, 102, 103, 159, 140, 124, and 119. There locations are indicated on Figures CF-II-3, CF-II-4, CF-II-5 and their principal characteristics are tabulated in Tables CF-II-3, CF-II-4, CF-II-5, CF-II-6, CF-I-7, CF-II-8, CF-II-9, CF-II-10, and Figure CF-II-15.

3.5.5.1.5 Fire Doors

Fire Doors are specified for several areas throughout the WHB. These are identified in Table CF-II-3, CF-II-4, CF-II-5, CF-II-6, CF-II-7, CF-II-8, CF-II-9, CF-II-10, and Figure CF-II-15.

3.5.5.2 Air Locks

In order to assure that any potential radioactive particles are contained and trapped rather than being released to the atmosphere, it is necessary to maintain the WHB at negative pressure. This assures that all leakage is into the building. The negative pressure is maintained by the ventilation system which draws on the building room air and exhausts through the HEPA Filters.

In addition the ventilation system is adjusted so that different rooms within the building are maintained at pressures that assure that internal leakage is in the direction of flowing from areas of low probabilities of contamination to areas of higher probability of contamination. This helps assure that the exposure of operating personnel is minimized.

Maintaining the individual rooms and the overall building pressure differentials at the required values requires that large air flows between rooms and between the building and the outside must be prevented. This is accomplished with the use of Air Locks between all controlled areas.

The Air Locks are rooms with doors arranged so that only one is open at a time thereby preventing a large air flow area between adjacent rooms from existing. The locations of the Air Locks are shown on Table CF-II-2.

3.5.5.3 Air Lock Doors Interlocks

The Air Lock function of most WHB Air Locks is sufficiently critical to the proper operation of the air control system that the connecting doors are electrically interlocked. The Interlocks assure that no more than one door may be opened at a time. The interlocked doors are shown on Table CF-II-2. The operation of the controls is described in Section 3.6.1.

3.5.5.4 Controlled Access Doors

There are several doors within the WHB whose openings are not controlled by Interlocks; therefore, their openings must be controlled administratively in order for the building and/or individual rooms to be maintained at the required pressure. These are the:

- Railroad Door
- Emergency Exit doors
- Doors between the RH and CH Areas
- Air Locks with administrative control

3.5.6 Radiation Shielding Windows

The Radiation Shielding Windows contain several components. These are described in the following subsections.

3.5.6.1 Wall Liner

The Radiation Shielding Window Wall Liner is a fabricated carbon steel structure that is cast into the concrete wall separating the Hot Cell from the Operating Gallery. The liner houses the removable Radiation Shielding Window.

The liner is configured to have two steps which serve to prevent radiation streaming paths parallel to the optical axis. The steps are such that the liner is larger on the cold side. The window is installed from the cold side and the two steps provide a positive stop for positioning the window.

3.5.6.2 Dry Shielding Window

The Dry Window is comprised of a steel housing with a laminated glass assembly secured within by rammed lead wool. The glass laminate is comprised of one six-inch-thick piece of shielding glass with a cover glass laminated to each side.

3.5.6.3 Oil Shielding Window

The Oil Shielding Window is comprised of a carbon steel housing weldment, shielding glass, cover glasses and trim frame weldments at the hot and cold sides of the housing. The system also includes an oil expansion tank, fittings and tubing, and the oil within the window and the expansion tank.

The Oil Windows are installed from the cold side of the Wall Liner. Both the cold and hot side steps have steel skid bars to facilitate installation and to position the window. Two oil passages connect the interior of the housing to the cold side surface where the fill and drain valve and the oil expansion tank connections are made.

The hot and cold side cover glasses are fastened to the window housing by weldments using 3/8 diameter screws on three-inch centers. The trim frame has a shallow machined groove that retains the compression gasket. The spacer frame members give the weldment rigidity; protect the edges of the glass; and provides a means of supporting the static weight of the glass during installation and removal. Spacer blocks are used below and beside the cover glass to position the glass in the horizontal and vertical directions within the frame.

The cover glasses, with the aid of the cover glass gasket, retain the oil within the window housing. The cold side cover glass is tempered commercial plate glass and the hot side cover glass is non-browning glass.

3.5.6.4 Shielding Window Oil System

The Oil System includes the oil contained within the window and oil expansion tank, the window plug valve and fittings used to fill and drain the window and the tubing run and fittings used to join the expansion tank to the window.

The primary function of the window oil is to reduce unwanted reflections from the internal glass surfaces. The oil also provides radiation shielding and acts as a heat transfer medium. The purpose of the oil expansion tank is to provide a means of keeping the window full of oil despite temperature excursions caused primarily by exposure to radiation and by the heat load caused by exposure to high intensity lighting systems located within the Hot Cell. During normal operation, the expansion tank should be approximately half full. This level will accommodate higher or lower temperature extremes and yet keep oil in contact with the glass surfaces.

3.6 Instrumentation and Control

The WHB has over twenty electrically monitored and controlled Air Lock Areas with from two to five access doors to each area. Some other Air Lock Areas are administratively monitored and controlled. There are over fifteen major Rollup, Vertical Lift, and Double Leaf Doors requiring electrical monitoring and control. The following will cover each of the above functions either generically or specifically.

3.6.1 Waste Handling Building Air Locks and Entries

The Air Lock Areas in the WHB are shown in the building floor plans (Figures CF-II-3, CF-II-4, and CF-II-5). A typical electrical schematic of the Air Lock Area, Personnel Access Corridor between the SB and the CH Inventory and Preparation Area, is shown in Figure CF-II-20 and will be described below.

The above Air Lock Area is known as Room 114 which has four access doors, all electrically interlocked and all operated manually. Each of the four doors has an electrically operated locked-shut lock which is de-energized to unlock. Each door has a limit switch that is open when the door is closed. The limit switch may have one or more follower relays depending on how many relay contacts are needed for interlocking with other doors. On the inside and outside of each door is an operate push button and an emergency push button. On the push button box is a red light which will be illuminated if any of the other doors in this Air Lock Area are not closed. If the light is illuminated, the adjacent operate push button will not unlock its door. The relays and 24 VDC power supply are mounted on the wall, usually within the Air Lock Room and supplied power from a near by electrical distribution panel.

Door 139 (3 on Figure CF-II-20) is also interlocked with Air Lock Area 116. In addition to participating in the interlocking for Room 114, Door 3 also provides a relay door position contact to each door associated with Area 116 and receives a door position relay contact from each door position relay from Area 116.

To operate the door interlock system associated around Air Lock Area 114, depress the OPEN red button on the outside and around the periphery of one of the four doors (assume door 1). Time delay relay T.D. RELAY 1 will immediately energize and open contact T.B. 1. If no other Area 114 door is not closed, and their follower relay (R_S) energized, DOOR 1 LOCK will be de-energized and unlocked. The T.D. RELAYS are adjusted to remain in their energized position from 1 to 10 seconds to allow the door to be opened before the door lock is re-energized. Once inside the Air Lock and the first door closed, any of the 4 OPEN push buttons can be depressed to energize its T.D. RELAY and de-energize its door lock, assuming no other door limit

switch follower relay is keeping the door lock energized. To exit through the third door to the Air Lock Area 116, all Interlocks with Area 116 must be satisfied also.

As shown on the top of Figure CF-II-20, if any one of the eight EMERGENCY push buttons (one on each side of four doors) is depressed, all four door power locks are de-energized and all four doors can be opened. The EMERGENCY push buttoned remains depressed until rotated. If total power is lost to the building, the doors will remain unlocked.

3.6.2 Rollup Doors

Electrically operated Rollup Doors are used on the outside of the three entrance Air Locks, between the CH Bay and the RH Bay, between the CH Bay and the Cage Loading Room, and on both sides of the CH Bay-Overpack Air Lock. The Rollup Door between the two bays is only operated by a key with no Interlocks with other doors. The outside Rollup Door on an entrance Air Lock is part of a typical (see Section 3.6.1.1) four door Air Lock Area interlock scheme. The difference is that the Rollup Door is electrically operated rather than being manually operated as the Push-Pull Doors. A shipping package entrance Air Lock has two manual Push-Pull Doors, one Rollup Door, and one Vertical Pullup Door.

The schematic diagram for the controls of one of the entrance Rollup Doors is shown in Figure CF-II-21. The control panel is mounted in the overhead inside of the Air Lock. Electrical power is from a motor control center in the Overpack Area Room 108. There are STOP, OPEN, and CLOSE push buttons on the outside of the door and on the inside. If the other three doors (105, 132, and 133) associated with Air Lock 101 are closed, then Rollup Door 102 can be opened by depressing either the OPEN button on the inside or outside of the door. The OPEN COIL will be energized as long as the door is not fully open and the CLOSE COIL is not energized. An OPEN COIL relay contact will lock-in so the OPEN push button does not have to be held depressed. When the door has reached its fully up position, the UP limit switch will de-energize the OPEN COIL.

To close the door, either of the CLOSE push buttons on the inside or outside of the Rollup Door may be used. The button will not lock in and must be held depressed for the door to move in the closed direction. The CLOSE COIL can not be energized if the OPEN COIL is energized. If the door is moving up, it must be stopped before it can be closed. From the inside, the door can be moved mechanically.

The Rollup Door 140 between the CH Bay and the Cage Loading Room and the doors (119, 124) on each side of the CH Bay Overpack Air Lock (107) are similar. They all have their limit switch, and are interlocked with their Air Lock

Area. Air Lock 107 Rollup Doors have their Air Lock Door Interlocks only in the OPEN COIL circuit; not OPEN & CLOSE COIL circuit as shown in Figure CF-II-20.

All Rollup Doors can be moved mechanically from installed chain falls if necessary.

3.6.3 Vertical Lift Doors

The inner doors on the three shipping package entrance Air Locks are Vertically Liftup Doors (131, 133, and 135). The controls for a liftup door are shown in Figure CF-II-22.

The R relay contacts at the top of the figure prevent any Vertical Liftup Door from being moved if any of their other three doors of the common Air Lock are not in the closed position. The two STOP push buttons, one on each side of the door, if depressed, will de-energize the OPEN electrical contractor and the CLOSE electrical contractor. Under normal conditions, if either OPEN push button was depressed, the T1 time delay relay would be energized. If the door is closed, an instantaneous T1 contact will energize the DEFLATE solenoid valve and a 3-5 second delay contact will energize the OPEN contractor.

A contractor contact will lock the T1 relay in and the door will move to the top even if the OPEN button is released. TOP limit switch will stop the door. If the door had been partially open when the OPEN switch was depressed, the T1 instantaneous contact would have energized the OPEN contractor immediately.

If one of the two CLOSE buttons is depressed, the closing contractor will be energized. The door will move in the closed direction as long as the button is held or until the CLOSE limit switch stops the motor. The INFLATE solenoid valve is only energized by a few second time delay on relay T2 which is energized by the CLOSE limit switch and the T1 contact that shows no up movement is anticipated.

Doors 131, 133, and 135 are identical from a control standpoint. Door 131 is for Air Lock 101, Door 133 for Air Lock 102, and Door 135 for Air Lock 103.

3.6.4 Double Leaf Doors

There are four major Double Leaf Doors requiring complex control and interlocking. These doors are:

- Door 109 Railroad Door to RH Bay

- Door 145 RH Bay to Facility east Loading Room
- Door 155 Facility east Loading Room to Shaft Entry Room
- Door 156 Conveyance Car Loading Room to Shaft Entry Room

Each of these major doors are comprised of two leafs (right and left); Door 109, 145, and 155 will be considered a door with the following nomenclature.

- Active Door: Because of the overlapping of the two leafs, this door must be opened a certain distance before the other door is moved from its closed position.
- Inactive Door Because of the overlapping of the two leafs, this door must be closed before the other door is moved to within a certain distance of closed.
- Each door has a top and a bottom bolt which can extend into the floor and ceiling or can be retracted into the door itself.
- When a door is approaching the closed position or open position, its speed is automatically reduced.
- There is an OPEN (forward) electrical contactor and a CLOSE (reverse) contactor associated with each door half.
- All except Door 109 have a pneumatic actuated rail track air seal on each door half to force a plug into the rail track when the door is closed to reduce air leakage. Door 109 has a rubber plug which remains in the track.
- The limit switches on the door halves are called fully closed, almost closed, almost open, and full open.
- The key switches shown on the control panels for extending and retracting door bolts is no longer used. The function has been wired into the control circuit for automatic action.
- The door operator pressure equalizing valve is not used for Door 155.

Door 156 has the following nomenclature:

- There is one bolt, located on the active door, which extends into the floor only, or it can be retracted into the door.

- The active door must be completely opened before the inactive door can be opened. Conversely, the inactive door must be completely closed before the active door can be closed.

- The open and close buttons must be maintained in the depressed position for continued operation.

- The limit switches on the door halves are for fully open or fully closed.

- Door 156 has a pneumatic actuated air rail track air seal on each door half.

- The door operator pressure equalizing valve is not used for Door 156.

The typical control panel used for the four Double Leaf Doors is shown in Figure CF-II-22. Due to the complexity of the control circuits, the individual schematic and wiring diagrams must be referred to for details. Refer to WIPP Controlled Operations Procedures for the operational sequence of the Double Leaf Door Interlock System.

Table CF-II-11, Door Interlock Table for Waste Hoist Access

X = Doors interlocked for differential pressure control.
Example: If Door 156 is open, Doors 139, 140, 157, and 155 cannot be opened. If Door 145 is open, Door 155 cannot be opened.

Open Door	156	139	140	157	155	145
156	-	X	X	X	X	-
139	X	-	X	X	-	-
140	X	X	-	X	-	-
157	X	X	X	-	-	-
155	X	-	-	-	-	X
145	-	-	-	-	X	-

3.6.5 Shield Door 162

The 140-ton Shield Door to the Road Cask Unloading Room is floated on an air bearing and moved horizontally by a pneumatic piston and cable apparatus. There is a pneumatic door seal on the top and two sides of the sliding horizontal door (22'H X 18'L X 4'T). The control panel is located in the RH Bay near the door is shown in Figure CF-II-23. Refer to WIPP Controlled Operations Procedures for the door Interlock sequences.

A summary of shielded door position indication is given in Table CF II-11. To operate the Shielding Door, refer to WIPP Controlled Operations Procedures.

Table CF-II-12, Shielded Door Control Panel Indicators

INDICATOR	DOOR CLOSED	UNSEAL & LIFT DOOR	DOOR TRAVELING	DOOR OPEN
GAUGES				
Air Seal Supply Air (P3)	20 psi	0 psi	0 psi	0 psi
Cylinder Supply Air (P2)	0 psi	90 psi	90 psi	0 psi
Air Seal Cask Collar (P1)	20 psi	20 psi	20 psi	20 psi
Bear Lift Supply Air (P4)	0 psi	55 psi	55 psi	0 psi
Air Seal Cask Collar (P5)	1.5 psi	1.5 psi	1.5 psi	1.5 psi
LIGHTS				
Request to Open	OFF/ON	ON	ON	ON/OFF
Air Seal OFF	OFF	OFF/ON	ON	ON
Door Lifted	OFF	ON	ON	OFF
Radiation High	ON/OFF	OFF	ON/OFF	ON/OFF
Cylinder Air Pressure OFF	ON	OFF	OFF	ON
Permissive From Gallery	OFF/ON	ON	ON	ON
Grapple Open	OFF/ON	ON	ON	ON
Air Bearing Lift OFF	ON	OFF	OFF	ON
Sup. Air Cask Unl. Rm. HD				
Red Open	OFF	ON	ON	ON
Green Closed	ON	OFF	OFF	OFF
Door Status				
Red Open	OFF	OFF	ON	ON
Green Closed	ON	ON	ON	OFF

3.6.6 Hot Cell Crane Maintenance Room Door

The Hot Cell Crane Maintenance Room Door is a two-inch-thick, 33,300 pound, vertically hinged, swing up steel door. It is pulled open by an electrical winch and cable. The control panel for the winch is located in the Crane Maintenance Access Corridor between the Crane Maintenance Room Air Lock and the Personnel Elevator. The control panel is shown in Figure CF-II-24 and the electrical schematic in Figure CF-II-25.

3.7 System Interfaces

Refer to Section 3.7 of Chapter G which documents the subsystem primary and secondary interfaces.

4.0 OPERATION

The operating equipment of the WHB subsystem are limited to doors, door operating equipment, Interlocks and the Personnel Elevator as described in the following paragraphs. To aid in the operational descriptions of the doors, they are referenced to door numbers as shown on Figures CF-II-3, CF-II-4, and CF-II-5.

4.1 Motor Operated Doors (109, 145, 155, 156)

Normal door operations are carried out from the door control panels where door operations can be monitored. Since the Railroad Door (109) opens to the outside, the open button is located outside on the east wall to allow monitoring of the door pathway. For Doors 145 and 155, there are auxiliary control boxes on opposite side of each door that contain open and close push buttons only. These can also be used to operate the doors; however, they are not considered the normal control stations since the door operating sequence cannot be monitored from this area and the area of the door swing is not visible to the operator.

Refer to WIPP Controlled Operating Procedures for more information.

4.2 Air Lock Doors Interlocks

Refer to WIPP Controlled Operating Procedures for Air Lock Door Interlock sequences.

4.2.1 Normal Operation

Each interlocked Personnel Door is equipped with a door entry control panel which contains an entry button. Pressing this button allows the door to be opened, providing that no other door on the same interlock system is open at

the same time. If another door is open, a red light will be energized signifying that fact, and all other doors on the network will be locked out.

If in an emergency situation it is necessary to open a door which does not respond to the normal operation, then it is possible to push the emergency button adjacent to the open button and override the interlock network allowing the door to be opened.

It may also be necessary, on occasions, to intentionally have two or more doors of one Air Lock open simultaneously. This can be accomplished by locking in the emergency button. This situation should exist for the minimum time possible, and the building airflow and pressures should be monitored to assure that the building leakage requirements are met.

Shutdown is accomplished by removing electrical power from the interlock network.

4.3 Cask Unloading Room Shield Door

Refer to WIPP Controlled Operating Procedures relative to the operation of the subject Shield Door.

4.4 Personnel Service Elevator

Refer to WIPP Controlled Operating Procedures for administrative control of the Personnel Service Elevator.

5.0 SYSTEM LIMITATIONS, SET POINTS, AND PRECAUTIONS

5.1 CH and RH-TRU Receiving Areas

5.1.1 Limitations

The capability to stay within the operating limit of the proper pressure control, as defined in SDD-HV00, is dependent upon the operation of the ventilation system and the capability of the door Air Locks of this system to prevent excessive leakage between the various rooms and areas and to the external environment.

5.1.2 Precautions

The RH Receiving Bay is maintained at a negative pressure with respect to the atmosphere outside the building to prevent the migration of radioactive contamination to the environment. Since there is no Air Lock provided at the Receiving Bay Railroad Access Door (Door 109), it is important to minimize the time this door remains open.

There are no Interlocks between Door 109 and any of the other doors; therefore, the Rollup Door between the RH and CH Areas (Door 159) shall be closed prior to opening the Railroad Door 109 to prevent a loss of the required pressure differential between the CH Bay and the outside.

The Receiving Bay Access Doors and the Shielded Doors to the Waste Shaft and Cask Loading Room are motor operated. They therefore present a hazard to personnel and equipment. Whenever these doors are opened, the operator should either be in a position to have a clear view of the door travel path or be in communication with a spotter who does, to ensure there are no interferences with the full travel of the doors.

The Cask Unloading Room Shield Door weighs 140 tons and can develop significant momentum when operated. The operator controls the direction of travel with the Open and Close air push button. If the door is traveling at an abnormally high speed or must be stopped during travel, the operator should release the air button, and if necessary, press the opposite one to slow or stop the door.

Prior to closing the door assure there are no personnel or obstructions in the path of travel.

5.2 Shielded Storage Area

5.2.1 Limitations

- This area is to be used for drums in excess of 100 mrem that cannot be placed underground by the end of a shift or that cannot be left in the shipping package.
- Containers should not be left in this area for more than one week unless major equipment repair requires a longer period.

5.3 Hot Cell

5.3.1 Limitations

- No more than nine RH Waste Containers are permitted in the Hot Cell at one time.
- The Hot Cell Facility is designed to handle waste canisters having radiation level up to 7,000 rem/hr.

5.3.2 Precautions

- The Hot Cell is used as a Shielded Exclusion Area and not as a contaminated Processing Area. Periodic access to the Hot Cell room is necessary. Therefore, the Hot Cell should be kept free of surface contamination by cleaning contaminated areas if and when they occur.

- The oil within the Shielding Windows plays an important role in the proper functioning of the window. The oil change should be planned upon the first occurrence of the onset of cloudiness, haze, or loss of visual acuity consistent with the operating schedule of the Hot Cell. Failure to replace the oil at such time may result in permanent visual degradation. Such degradation will require major window disassembly and rework.

5.4 Hoist Tower Elevator

5.4.1 Limitations

- The capacity limit of the Personnel Service Elevator shall be 650 pounds.

5.4.2 Precaution

- A method is required to ensure the safety of personnel on the upper floors of the Hoist Tower when the hoist is operating or when the guard rails are removed from around the open hatch in the south west corner. Administrative controls and visual warning posting and other requirements as defined in OSHA shall be observed when the guard rails are down.

6.0 OFF-NORMAL EVENTS AND RECOVERY

The following events are considered to be off-normal events in the WHB.

- Loss of Ventilation and Differential Pressure Control (SDD HV00)

- Radioactive Particulate Release

- Loss of Electrical Power (SDD ED00)

- Loss of Compressed Air (SDD CA00)

- Fire (SDD FP00)

- Design Basis Earthquake or Tornado

- System or Component Malfunction

Refer to WIPP Controlled Operating Procedures for the recovery sequence associated with each of these off-normal conditions.

6.1 Loss of Ventilation and Differential Pressure Control (WHB)

Under a loss of Differential Pressure condition with radioactive material in the WHB, cease any waste handling activities that may result in Radioactive Particle Release until the proper pressure differential is recovered.

6.2 Radioactive Particle Release (WHB)

The basic operating philosophy for waste handling operations at the WIPP Site is that the facilities start clean and are maintained clean; however, if there is a contaminated component or release of radioactive particulate, the area should be isolated and waste handling operations suspended in the affected area. Action should be taken to establish a recovery plan to contain and prevent the spread of contamination or release of radioactive particles and to decontaminate, as required.

6.3 Loss of Electric Power (WHB)

In the event of the interruption of normal electric power, the non-interruptible power capability is activated for specific equipment, i.e. LPU, CAM, CMR, or CMS.

6.4 Loss of Compressed Air (WHB)

The loss of air pressure will interrupt door operation to the Cask Unloading Room; in this event normal operations will be delayed until air pressure is restored.

6.5 Fire (WHB)

If a fire in the WHB is observed or detected, the normal Waste Handling Operations in process should stop in the effected areas. Since the CH-TRU Waste Containers and the RH-TRU Waste canisters are sealed and free of any external contamination under normal operations, any processing operation in the building can be safely suspended until the fire is extinguished.

6.6 Design Basis Seismic/Tornado (WHB)

- The WHB (411), and the TMF (412), are designed to withstand the DBE/DBT.

- All crane supports in the WHB and Building 412 are designed to support the crane load in place in the event of a DBE.

- In the event of a DBE/DBT, the WHB and Building 412 shall be inspected to assure no damage has been sustained.

6.7 System or Component Malfunction (WHB)

6.7.1 Door Interlocks

- Operational failure or improper operation of door Interlocks or confinement integrity may result in improper pressure distribution among the various rooms and the external environment. In this event, cease all Waste Handling Operations that may release any radioactivity, until the proper pressure balance is recovered.

6.7.2 Hot Cell Windows

- In the unlikely event that a structural failure should occur, the oil level in the window could drop to the extent that a radiation hazard to personnel in the Operating Gallery may exist. This is probable only if one or both of the window cover glasses is shattered. If such an event were to occur, radiation sources should be moved away from the area of the window, and preferably, removed from the Hot Cell to permit the damaged window to be sealed off from the cell.

- If an oil seal were to develop a leak, the leak rate will be small and the leak would be detected by observing a drop in the oil expansion tank level and/or the formation of a nitrogen bubble at the top of the window oil. Such a condition may be remedied in the short term by adding oil to the Oil System. If the leak rate cannot be tolerated, it will be necessary to take the window and possibly the Hot Cell out of service and/or limit Hot Cell use to repair the leak.

6.7.3 HEPA Enclosure Failure

- The failure of a HEPA Filter enclosure within the Filter Gallery could lead to reduced differential pressure and airflow within the Hot Cell. If such a leak leads to a condition where the required pressure differentials cannot be maintained within the building, then a repair shall be effected using the prior approved maintenance procedures.

7.0 MAINTENANCE

7.1 Maintenance Approach

Refer to Section 7.1 of Chapter G for information regarding the general maintenance approach.

7.2 Corrective Maintenance

The following items shall be addressed in the WIPP Controlled Operating Procedures.

7.2.1 Floor Coatings

Repair nuclear coating on floors and walls, as well as repair any caulking, as required, and as determined by the results of periodic inspection. These areas include both the CH-TRU and the RH-TRU Areas.

7.2.2 Door Interlocks

Repair any malfunctioning door Interlocks with attention to any failure of doors to close unaided, especially with any pressure difference tending to keep doors open.

7.2.3 Cask Unloading Room Shield Door

Repair any malfunctioning door operating equipment which may include such items as:

- Air Bearings Seals
- Inflatable Door Seals
- Tracking Bearings
- Translating Cylinder
- Micro-Switches

7.2.4 Door Operators

Repair any malfunctioning equipment used to open and close various doors.

7.3 Preventive Maintenance

Preventive Maintenance shall be performed on the following equipment:

The tornado and Air Lock Doors "preventative maintenance" is addressed in operating procedures.

Conventional industrial plant building preventive maintenance shall be used. The quality of the nuclear coating as defined in 3.5 shall be maintained.

7.3.1 Radiation Shielding Windows

The following activities shall be performed on a monthly basis using approved maintenance procedures:

- Check the level of the oil within the oil expansion tank.
- Check the breather bag for cracks, holes, leaks, etc.
- Inspect the oil within the window for visual clarity.
- Verify that the molecular sieve beads within the oil expansion tank are blue in color.
- Clean the cold side cover glass.

At the end of the first and second years of operation only, tighten the hot side cover glass trim frame screws. These should not be tightened thereafter because the gaskets harden after exposure to radiation.

At the end of the first, second, and fifth years of operation only, tighten the cold side cover glass trim frame screws.

7.4 In-Service Inspection

In-Service-Inspection procedures shall be established to ensure correct conditions of the operating features of the WHB. Included among these features are the following:

- Air lock Door Interlocks
- Door Operators
- Door Position Detectors
- Oil Filled Shielding Windows

A program shall be identified to check annually, as a minimum, items such as:

- Structural Materials of Confinement Buildings
- Nuclear Coatings

More frequent checks are required on:

- Pressure Balance in the WHB and Underground
- Operability of the WHB Door Interlocks
- Operability of the WHB Floor Operators

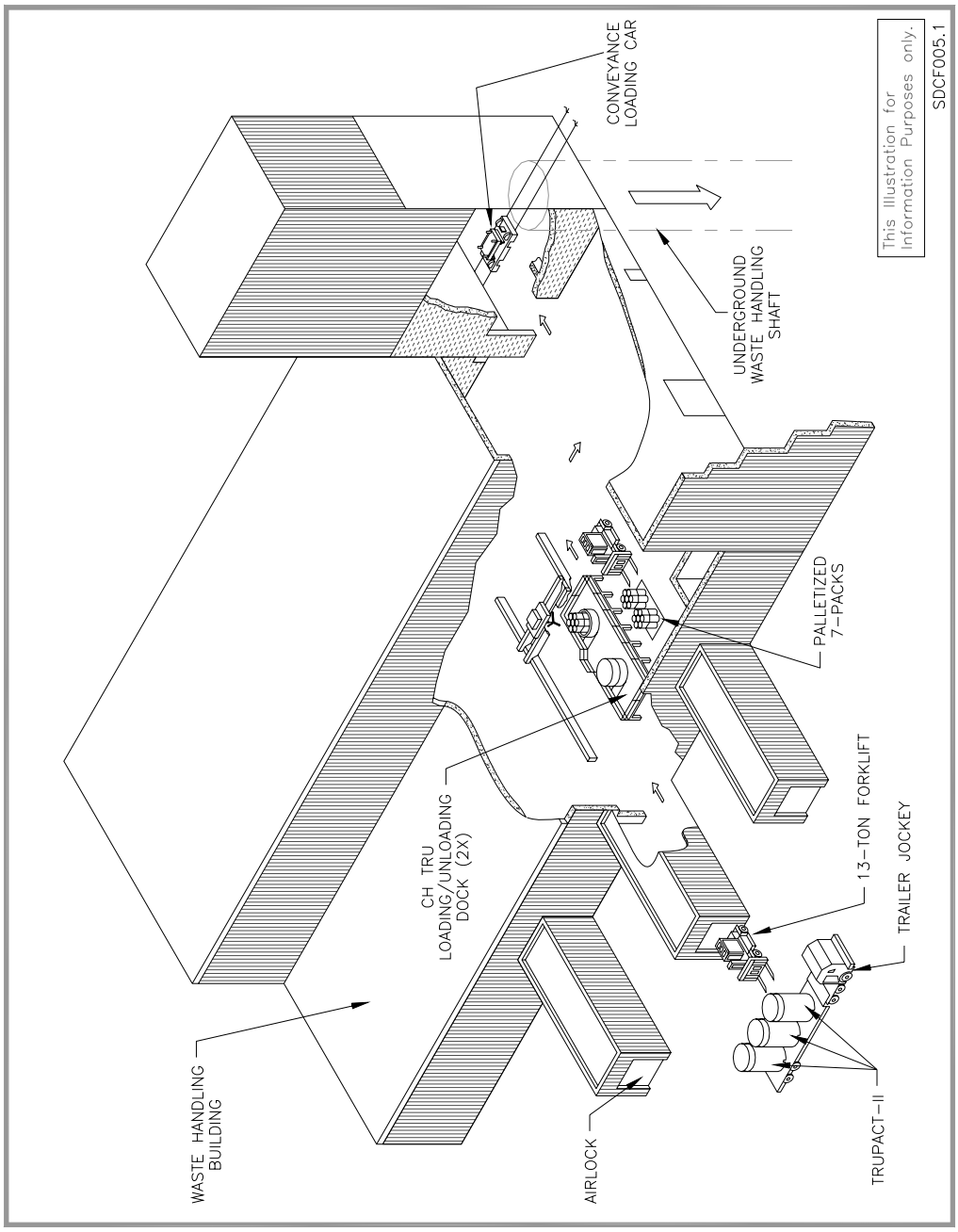


FIGURE CF-II-1 CH TRU Waste Handling Area

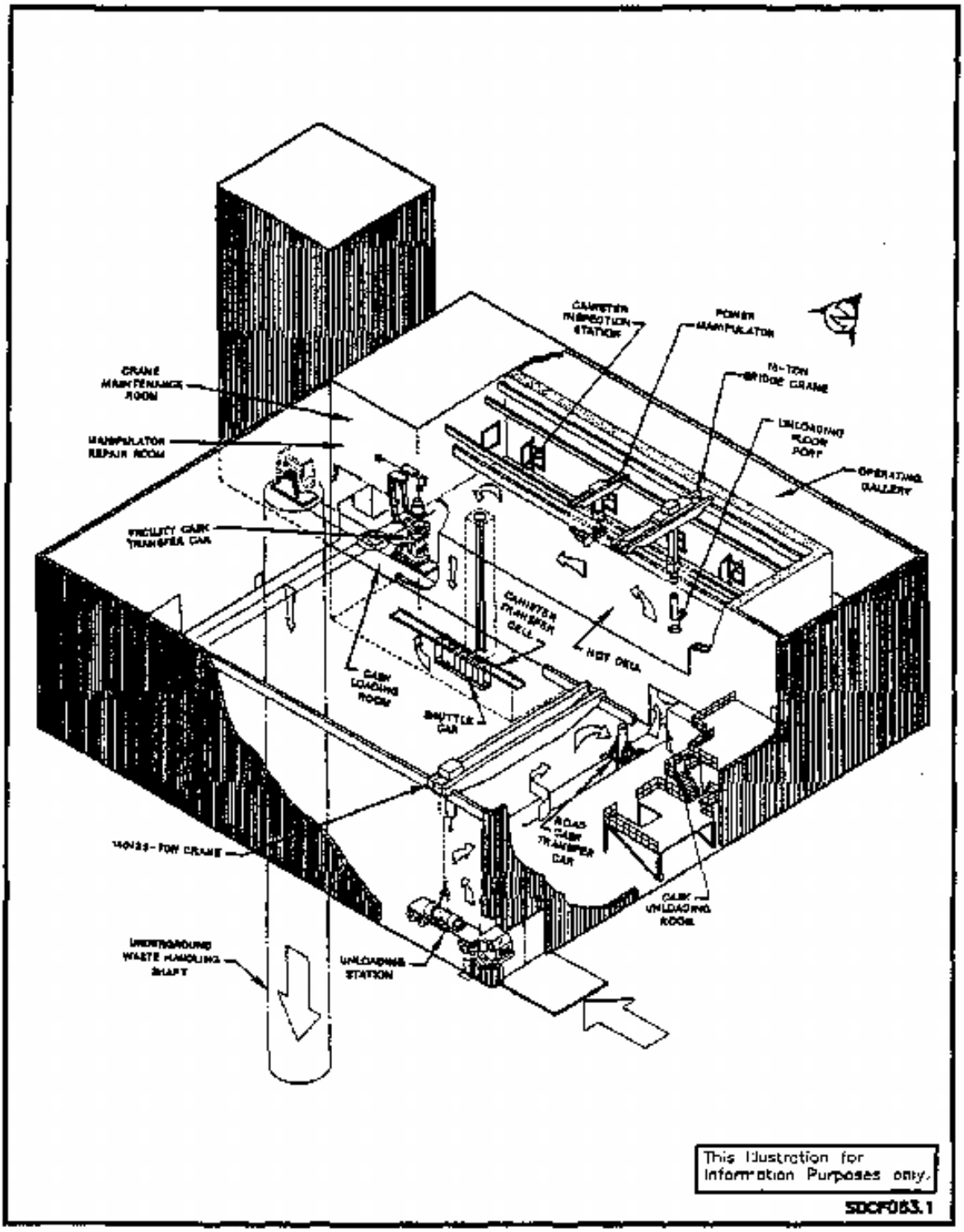


Figure CF-II-2, RH-TRU Waste Handling Area

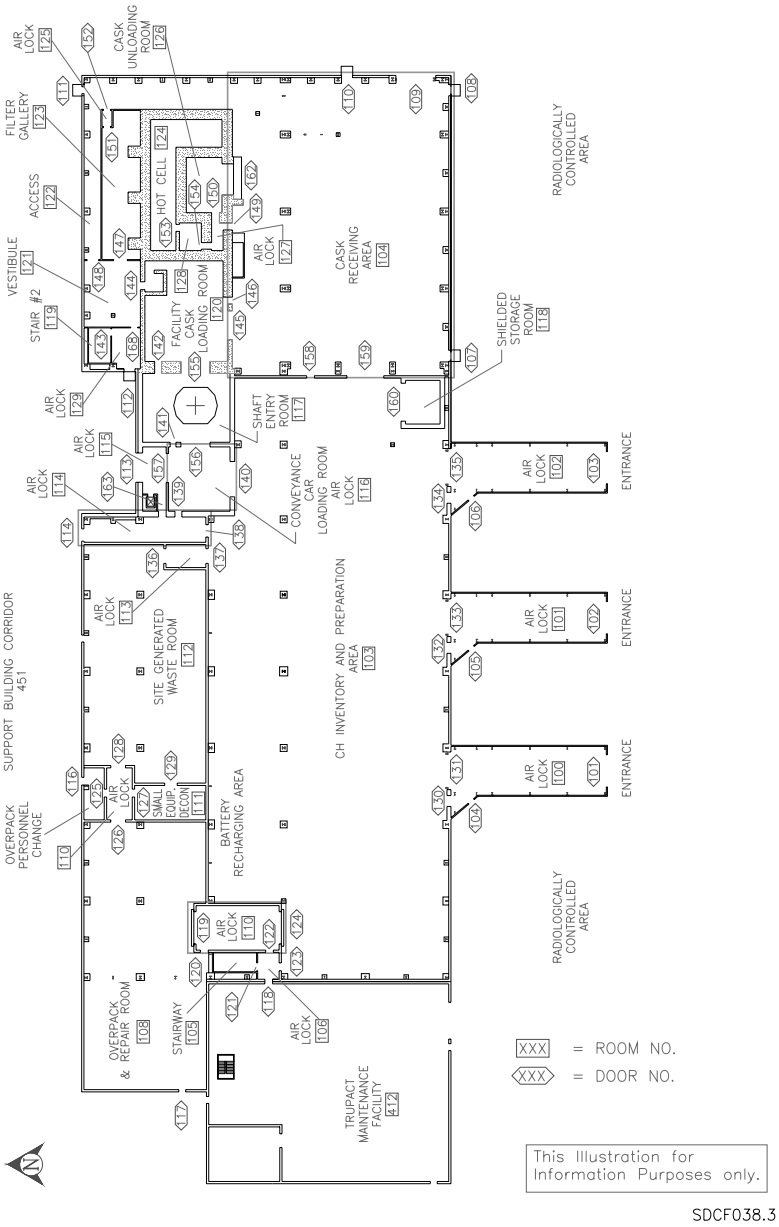


Figure CF-II-3, Waste Handling Building – El.100'

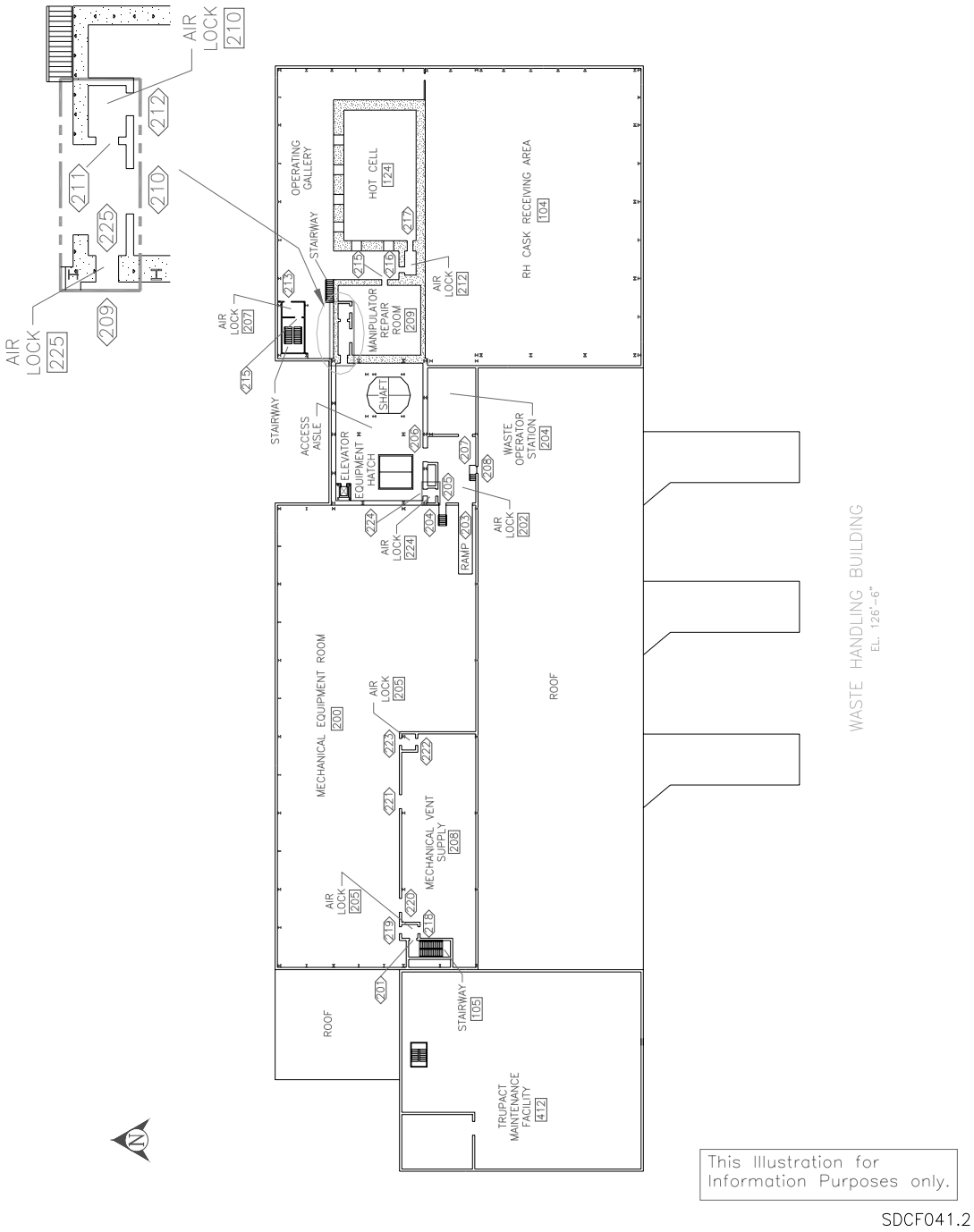


Figure CF-II-4, Waste Handling Building – El. 126'-6"

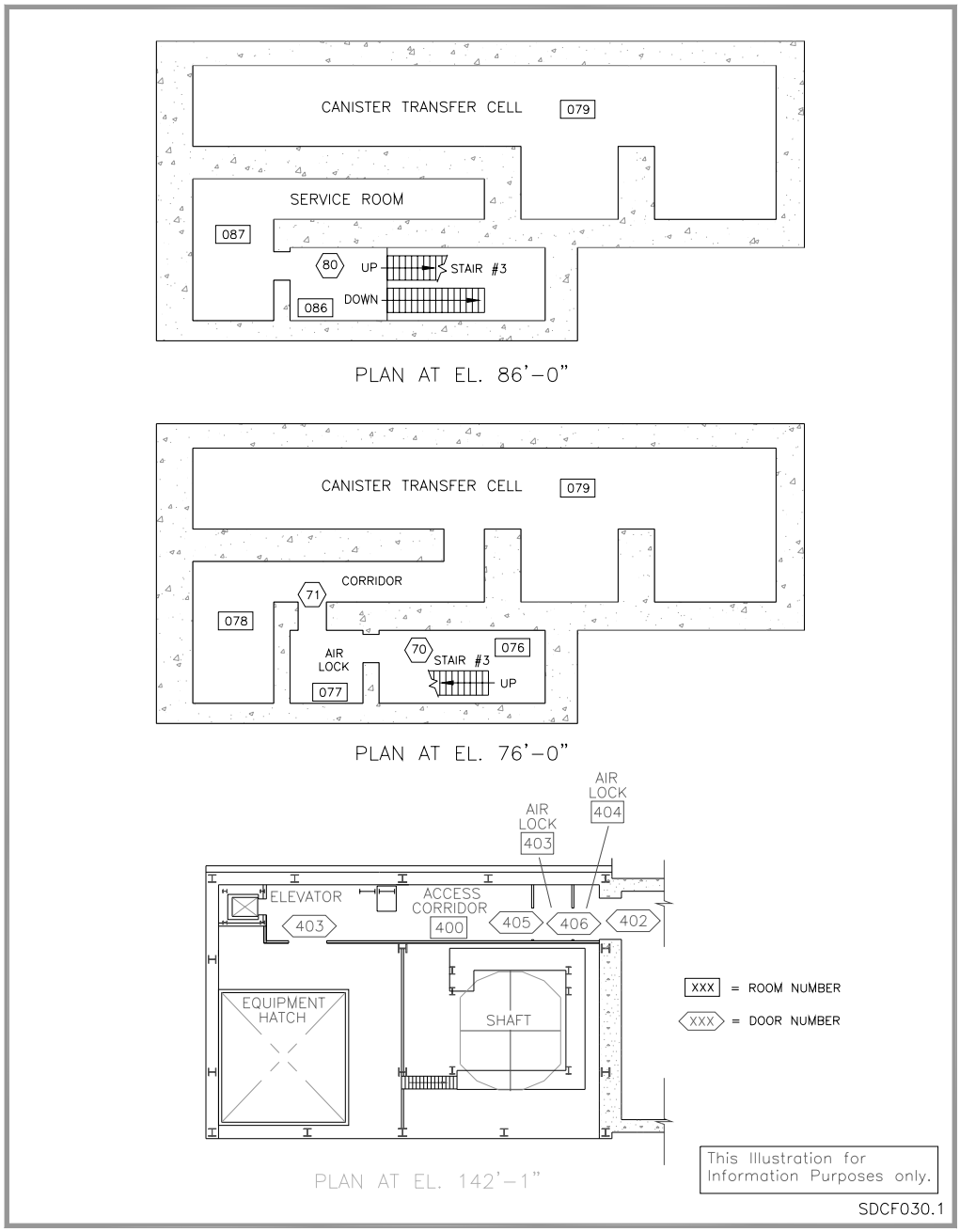


Figure CF-II-5, Waste Handling Bldg. – RH Area Plans
At Elevations 76', 86', and 142'

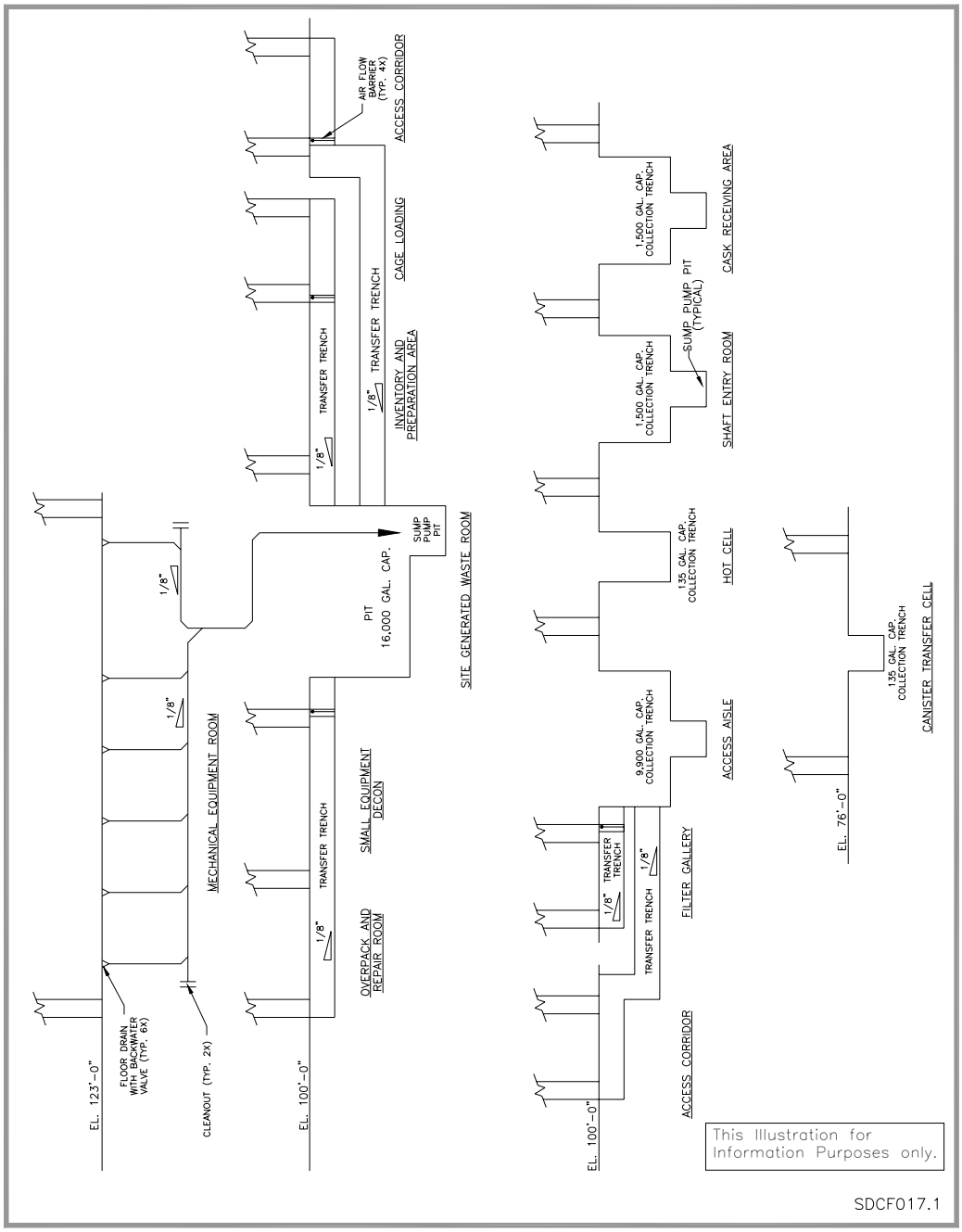


FIGURE CF-II-6 Firewater Collection System

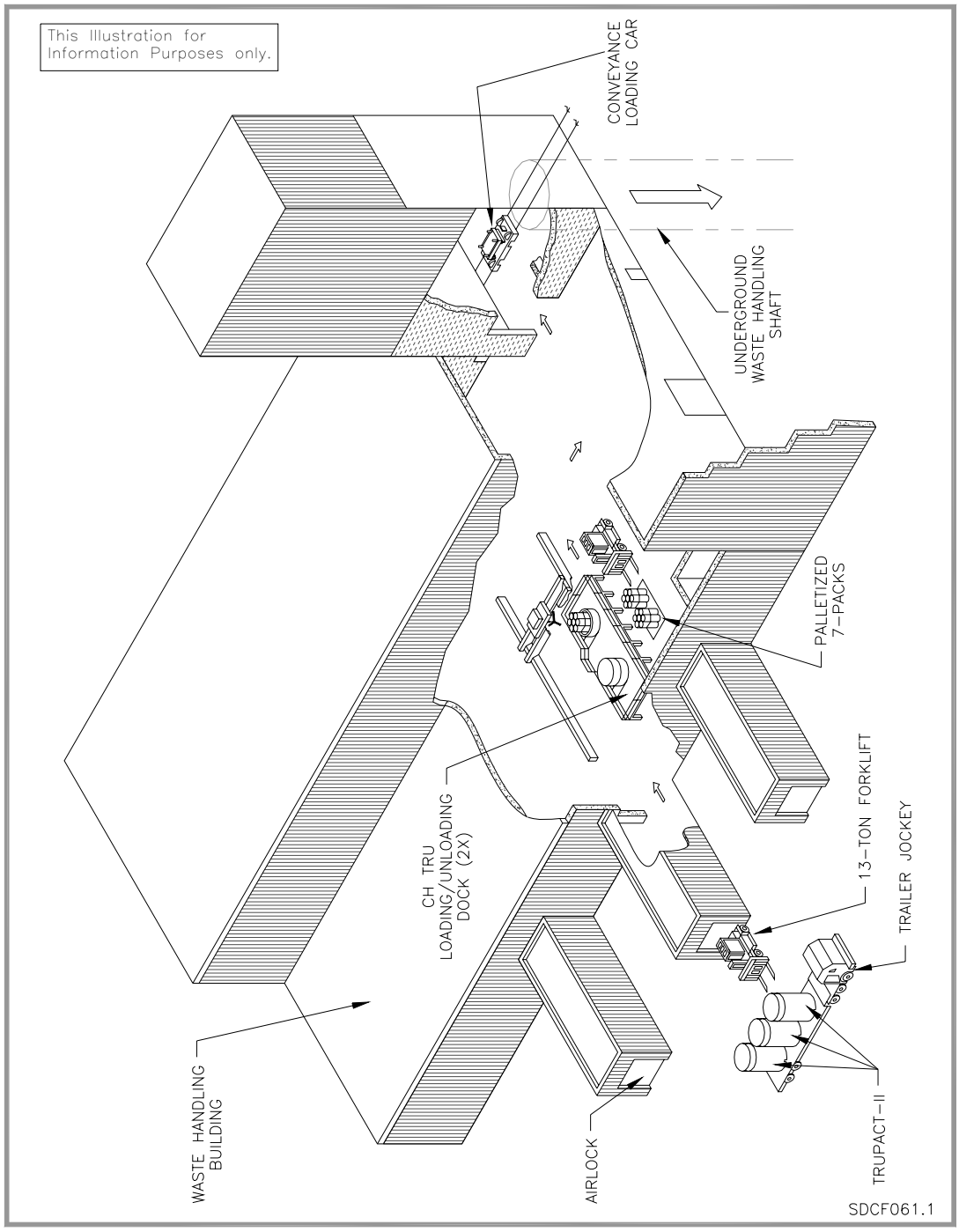


FIGURE CF-II-7 CH TRU Waste Handling Area

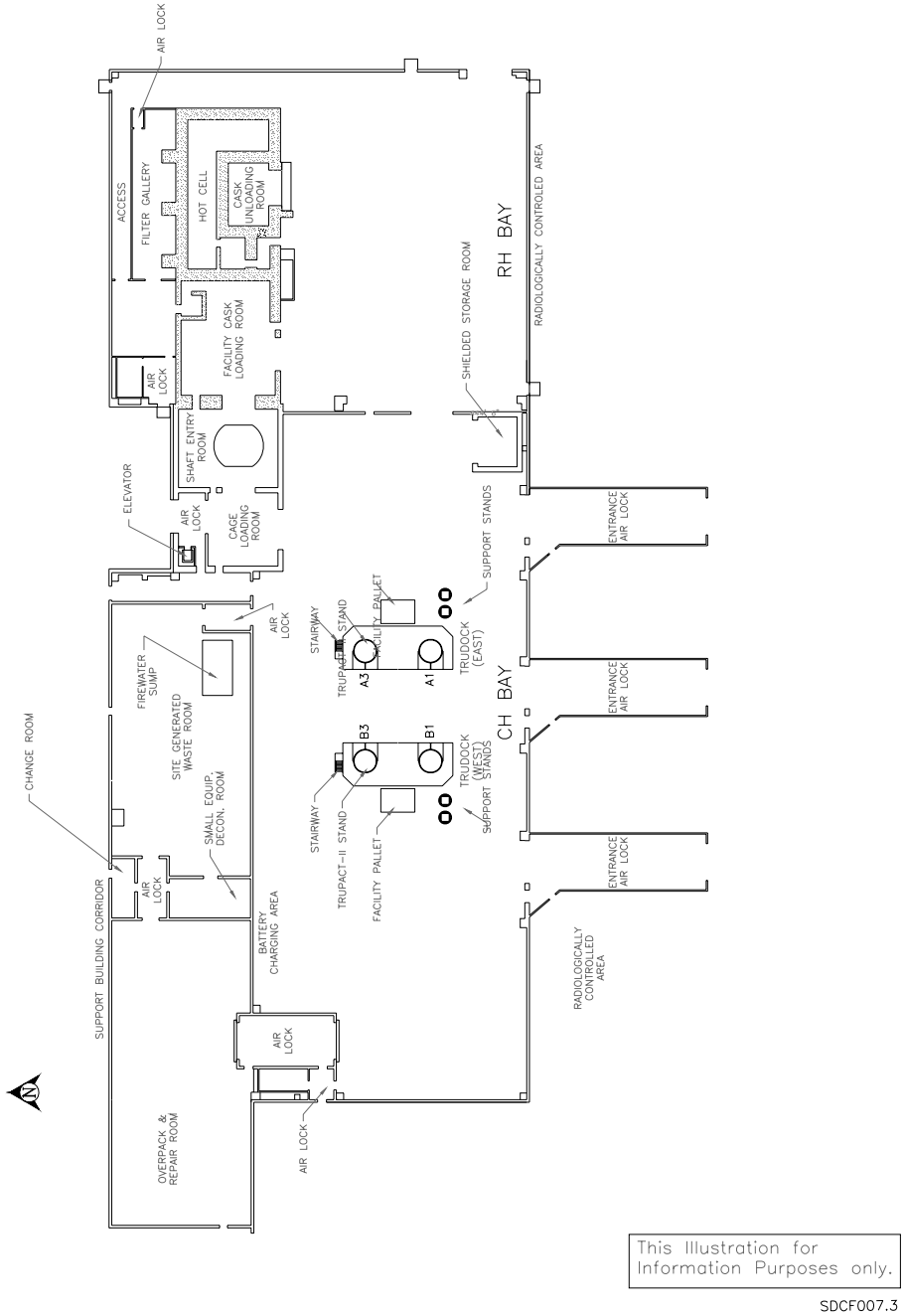


Figure CF-II-8, Waste Handling Building Plan (Ground Floor)

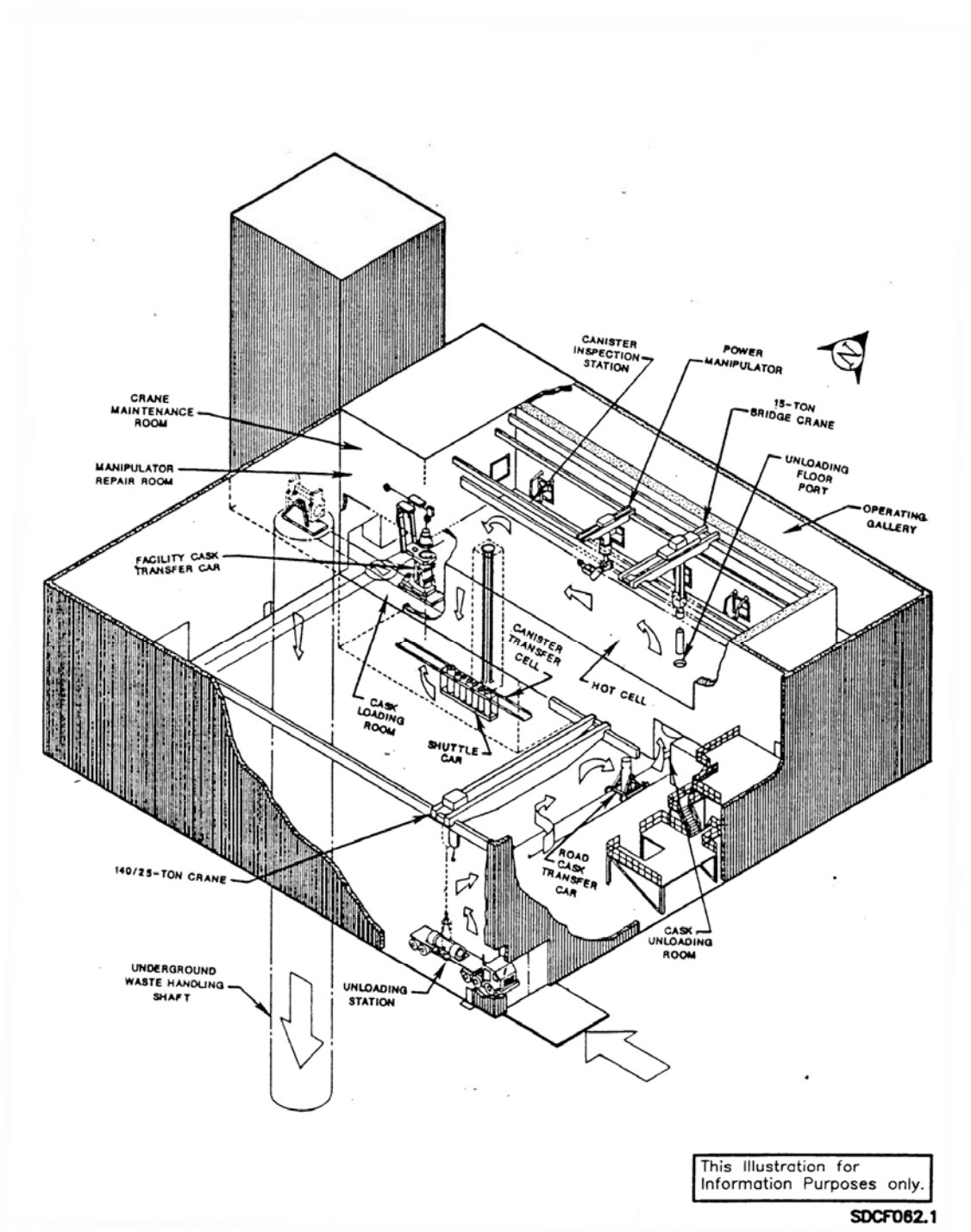


FIGURE CF-II-9 RH TRU Waste Handling Area

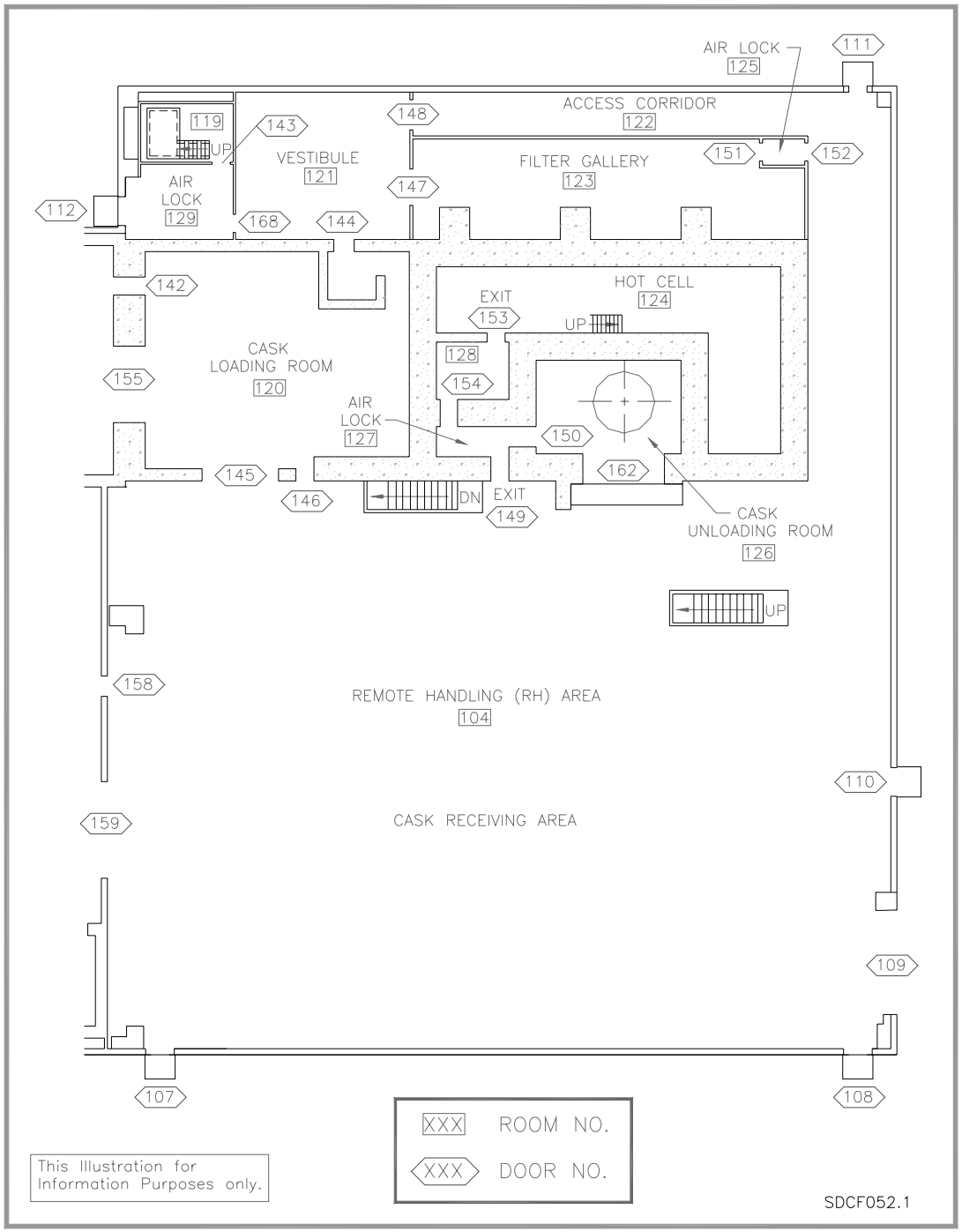


FIGURE CF-II-10 Waste Handling Building RH Area Plans At 100'

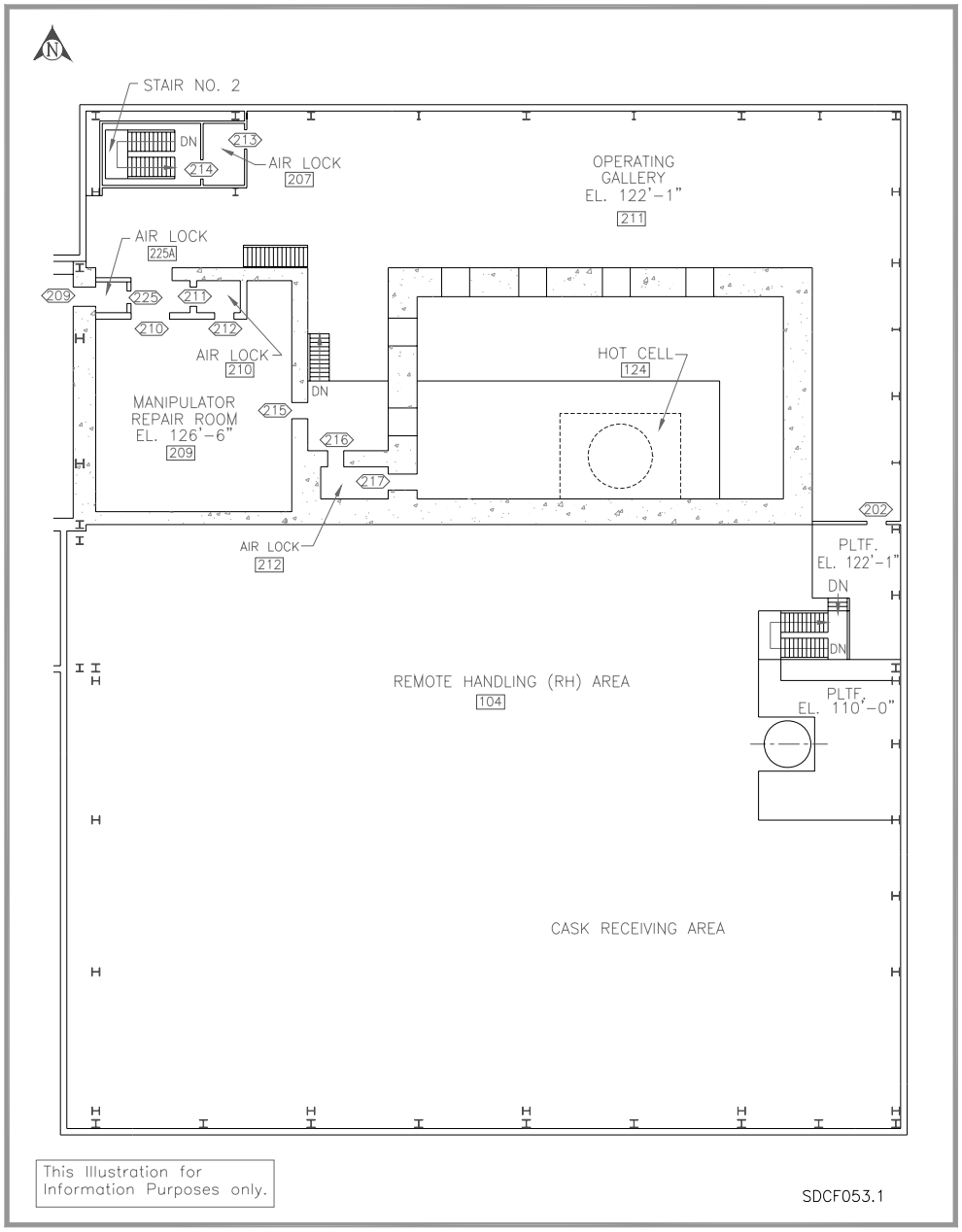


FIGURE CF-II-11 Waste Handling Building RH Area Plans at 126'-6"

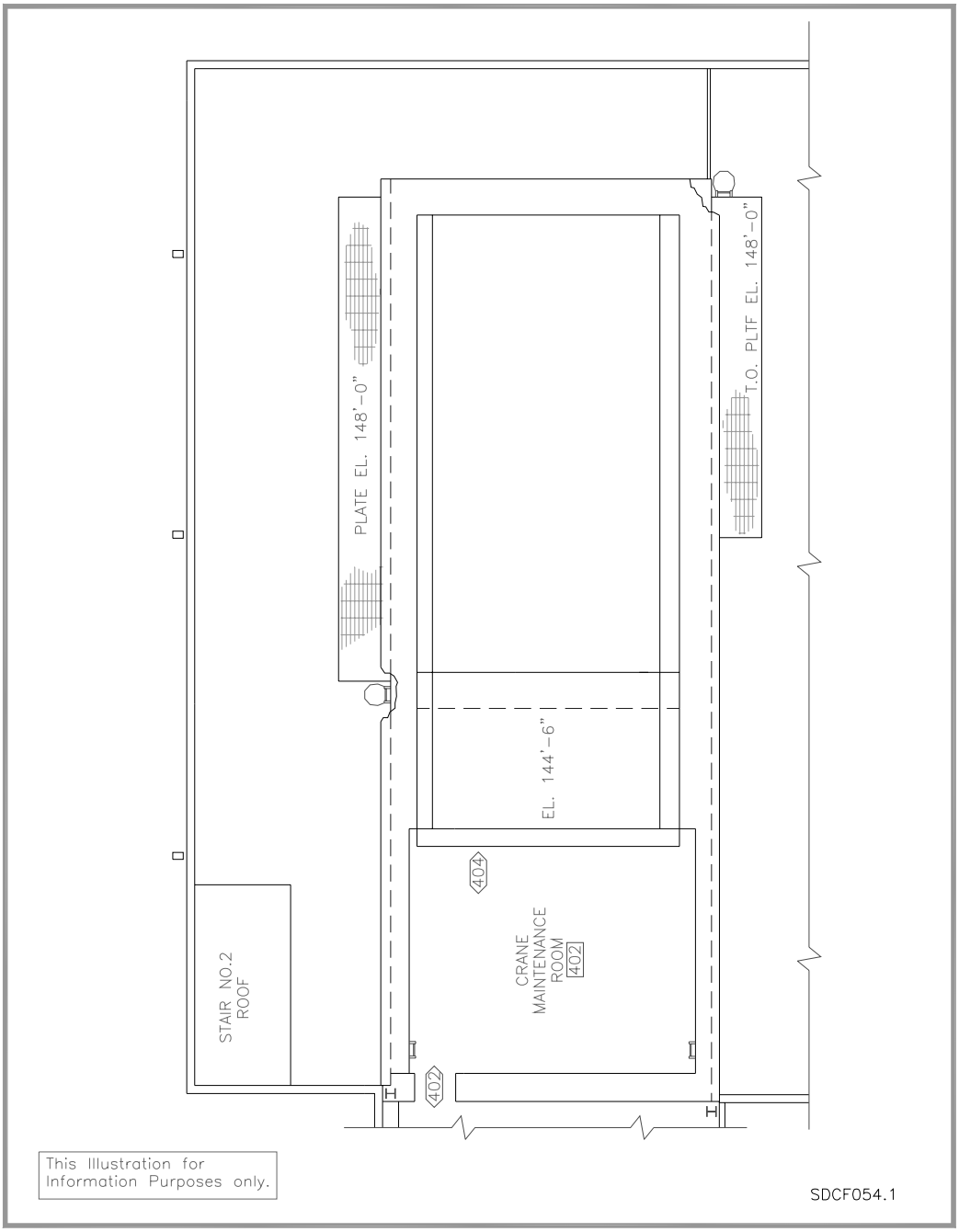


FIGURE CF-II-12 Waste Handling Building Plans at 142'-1"

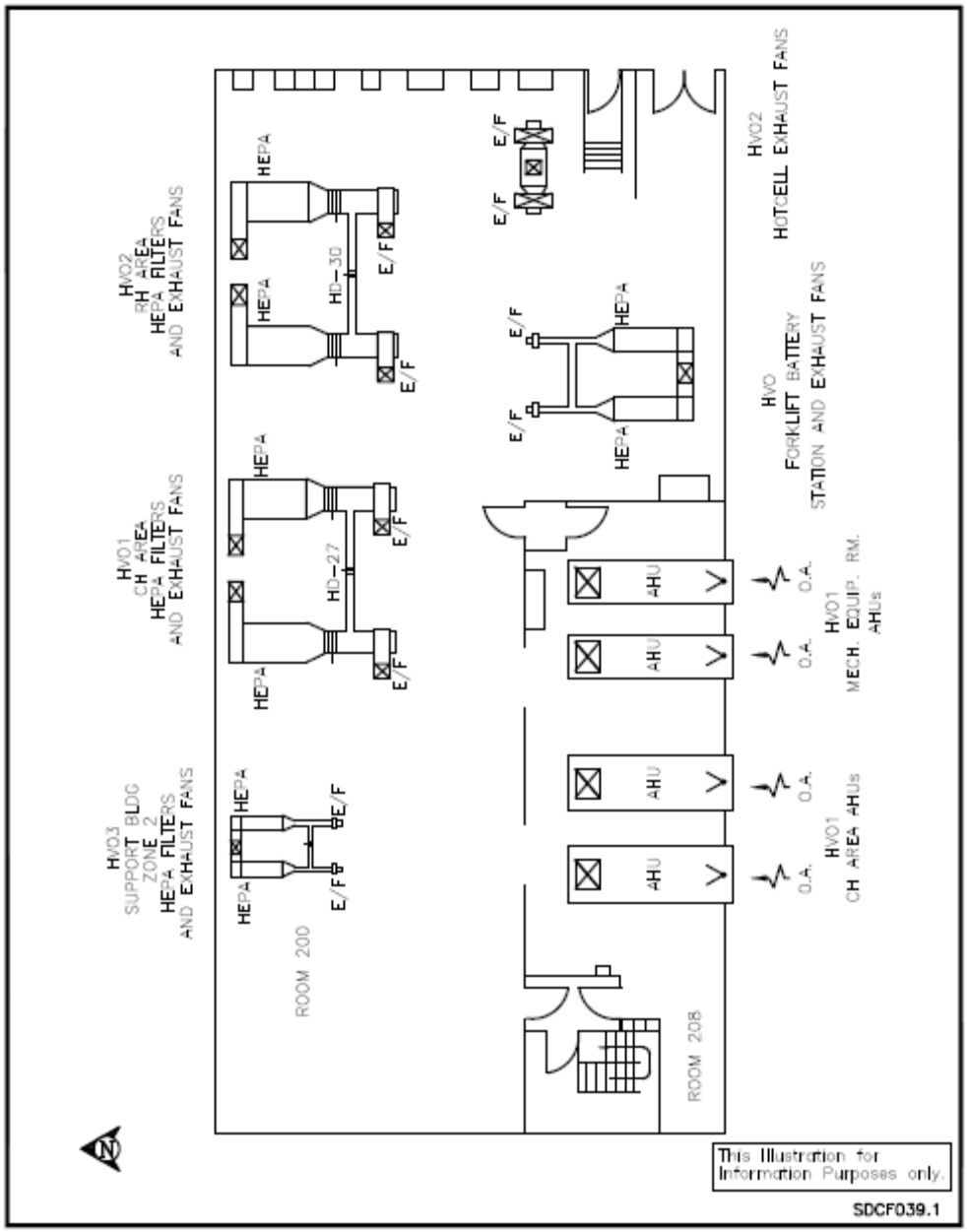


FIGURE CF-II-13 – Layout of Components in the Mechanical Equipment Room

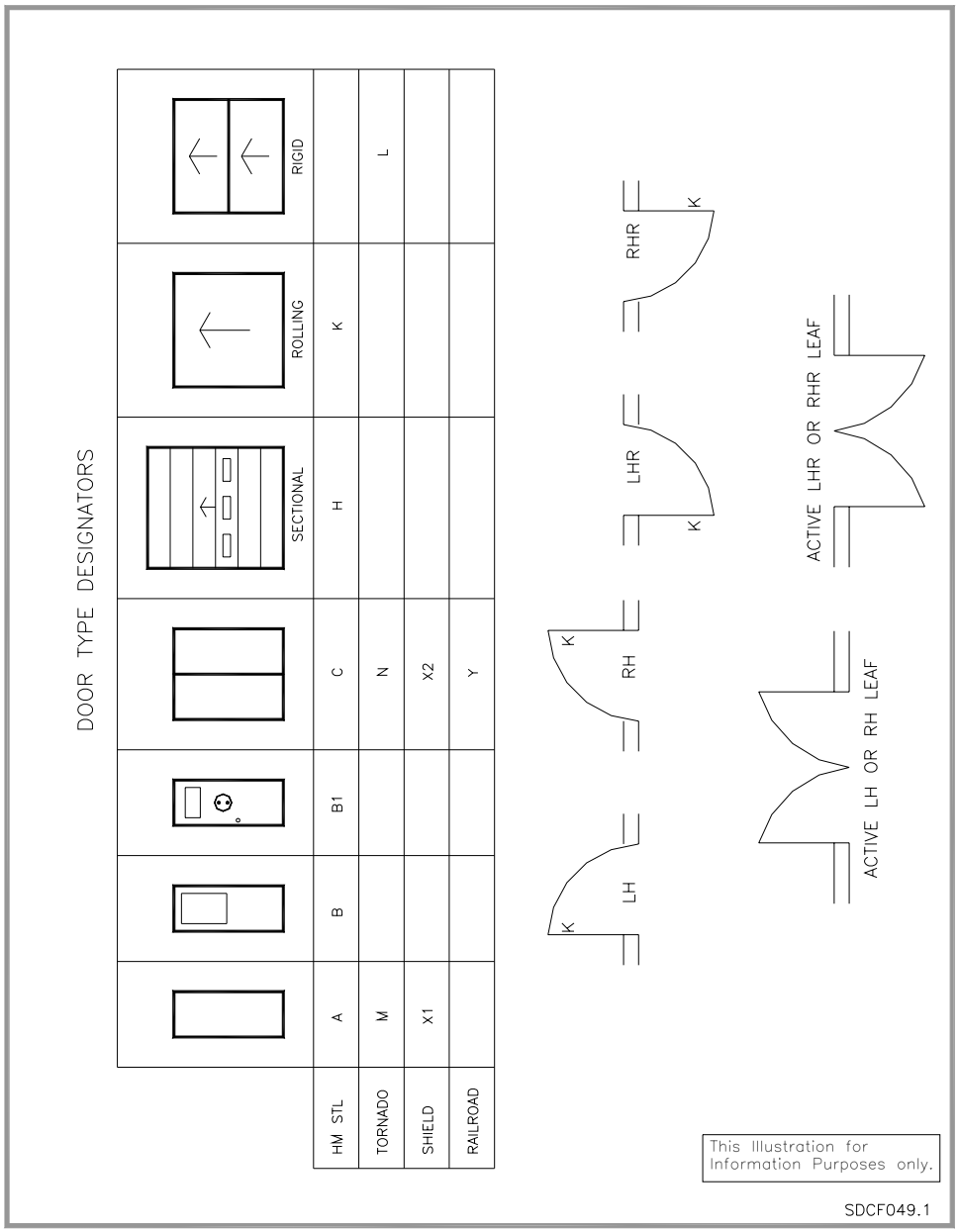


TABLE CF-II-14 Waste Handling Building (Sheet 9 of 9)

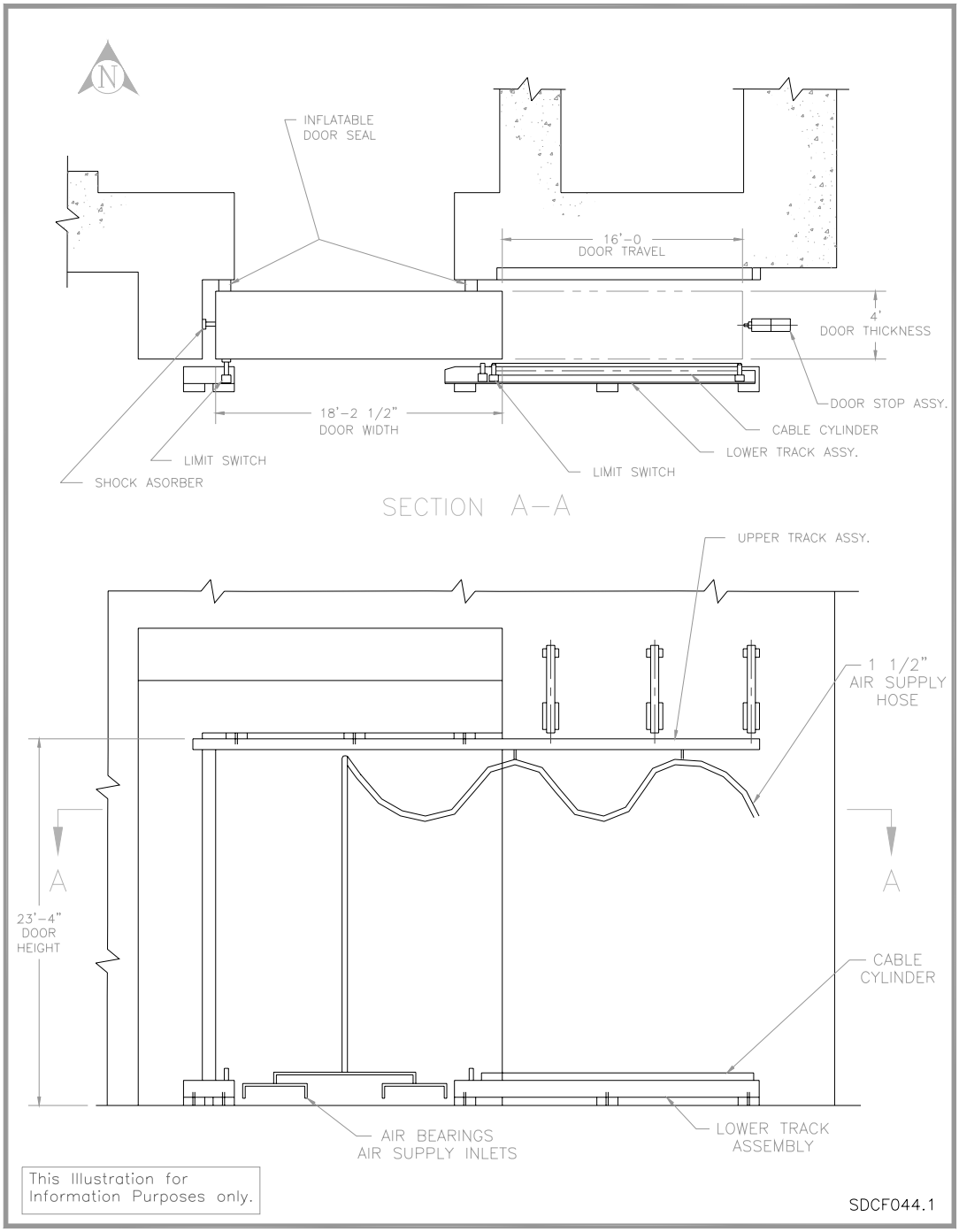
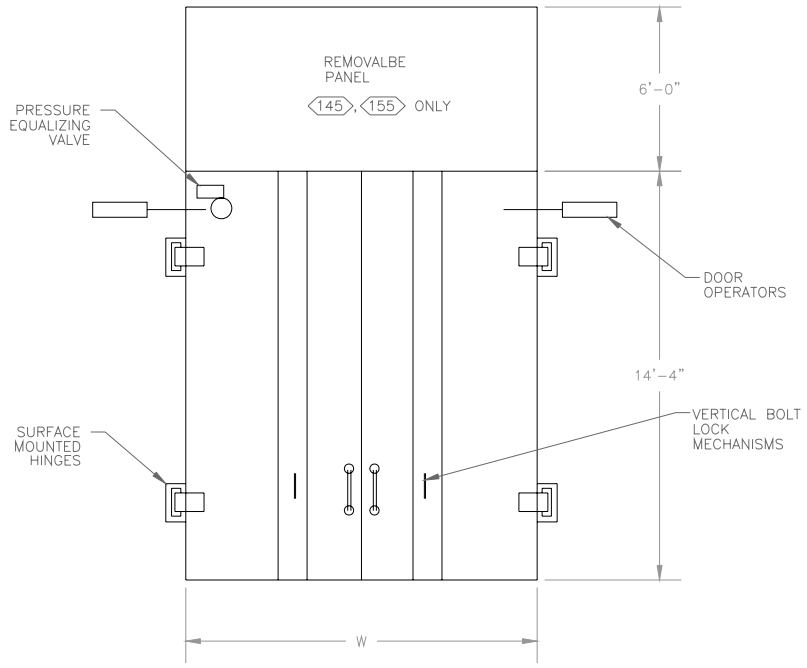


FIGURE CF-II-15 Waste Handling Building Cask Unloading Room Door 162



DOOR NO.	WIDTH "W"	THICKNESS – IN.	WEIGHT OF LEAF – LBS.	FEATURES
145	12"-8"	4	14,000	
155	12'-8"	2	7,000	DOOR OPERATOR PRESSURE EQUALIZING VALVE
156	12"-8"	2	7,000	DOOR OPERATOR PRESSURE EQUALIZING VALVE
157	12'-8"	1 1/2	5,000	MANUAL OPERATION KEY LOCK
160	16'-6"	6	30,000	MANUAL OPERATION KEY LOCK

This Illustration for Information Purposes only.

SDCF035.2

FIGURE CF-II-16 Waste Handling Building Shield Doors 145, 155, 156, 157, 160

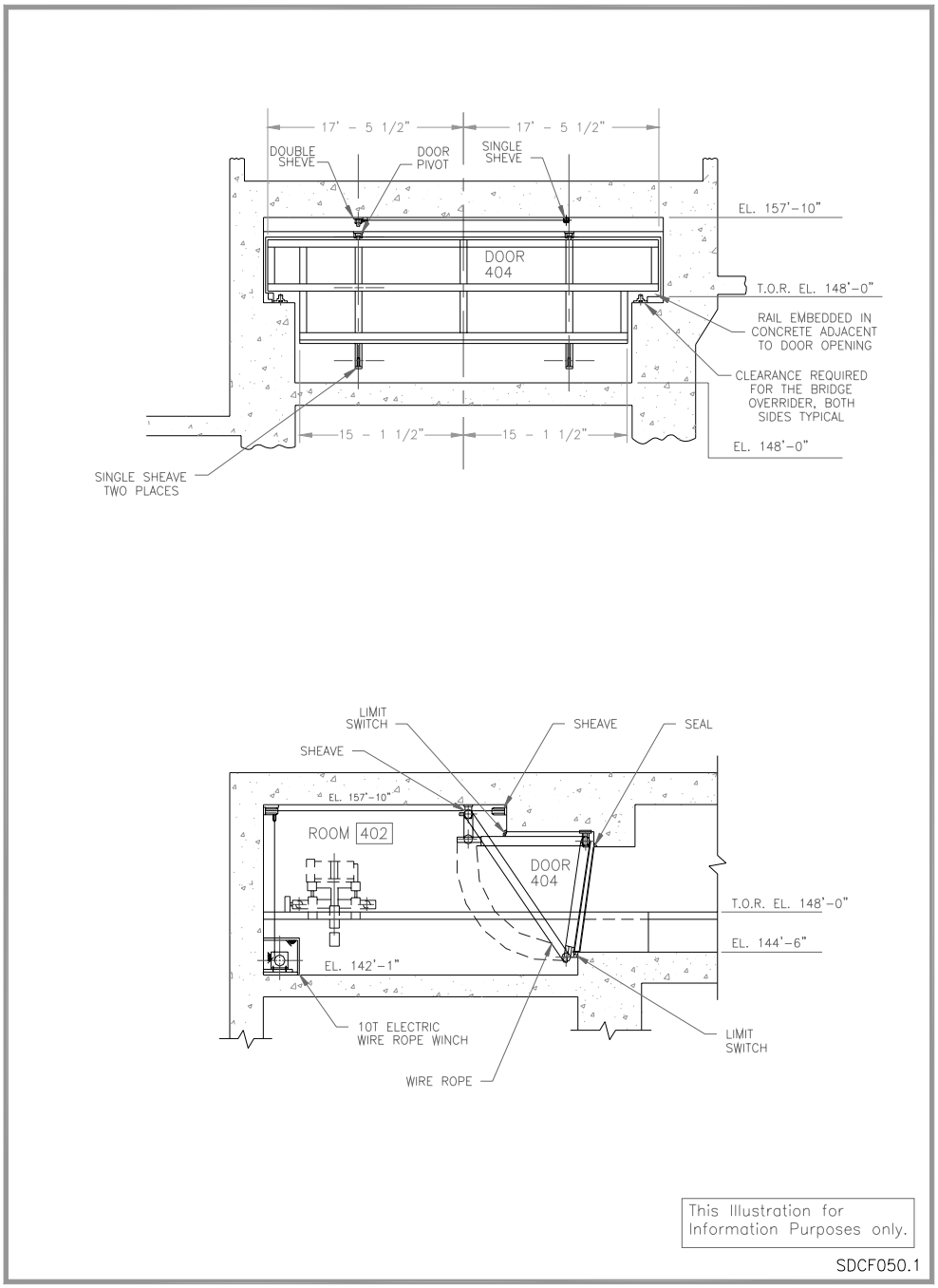


FIGURE CF-II-17 Waste Handling Building Crane Maintenance Room Door 404

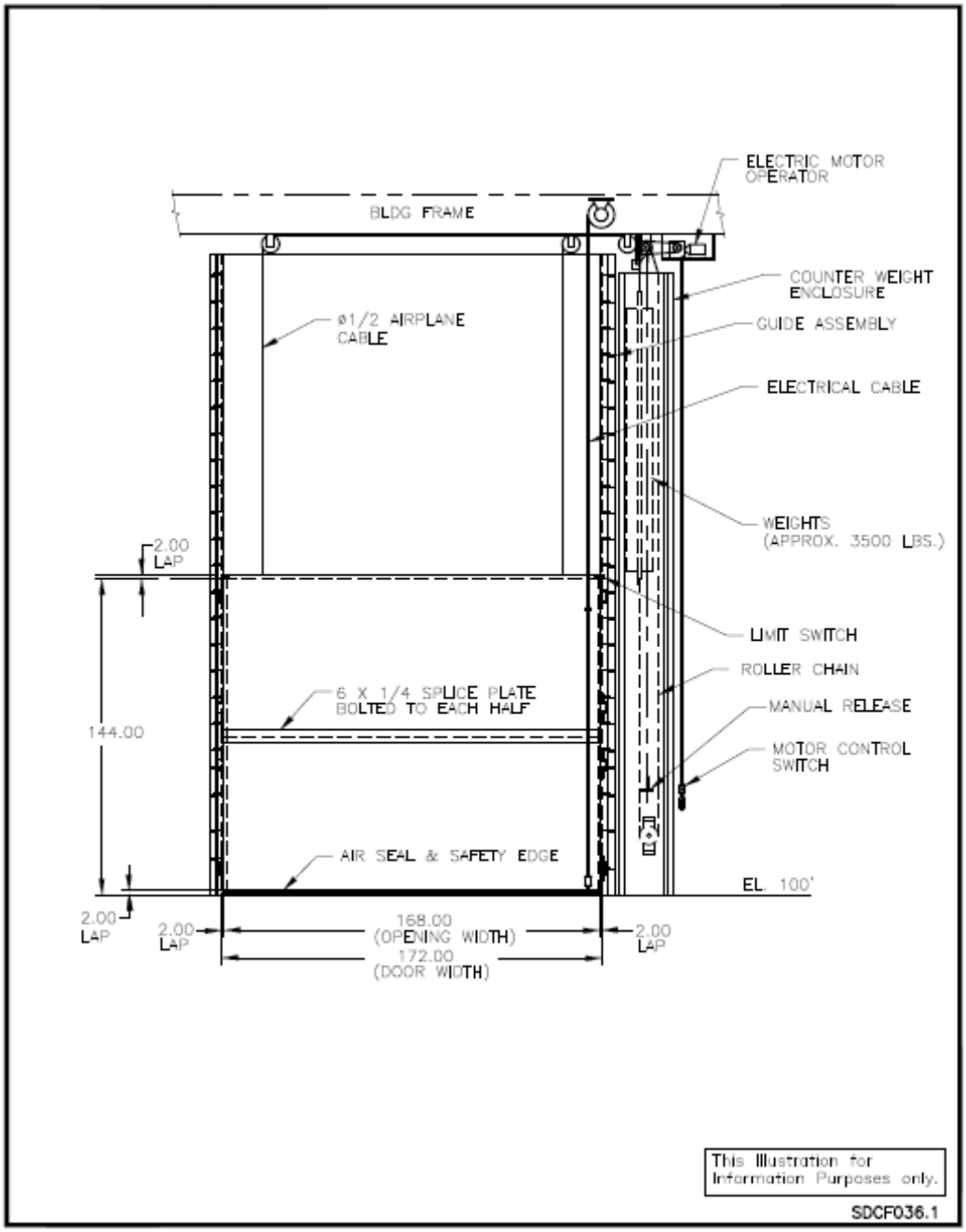


FIGURE CF-II-18 – Waste Handling Building Tornado Doors 131, 133, 135

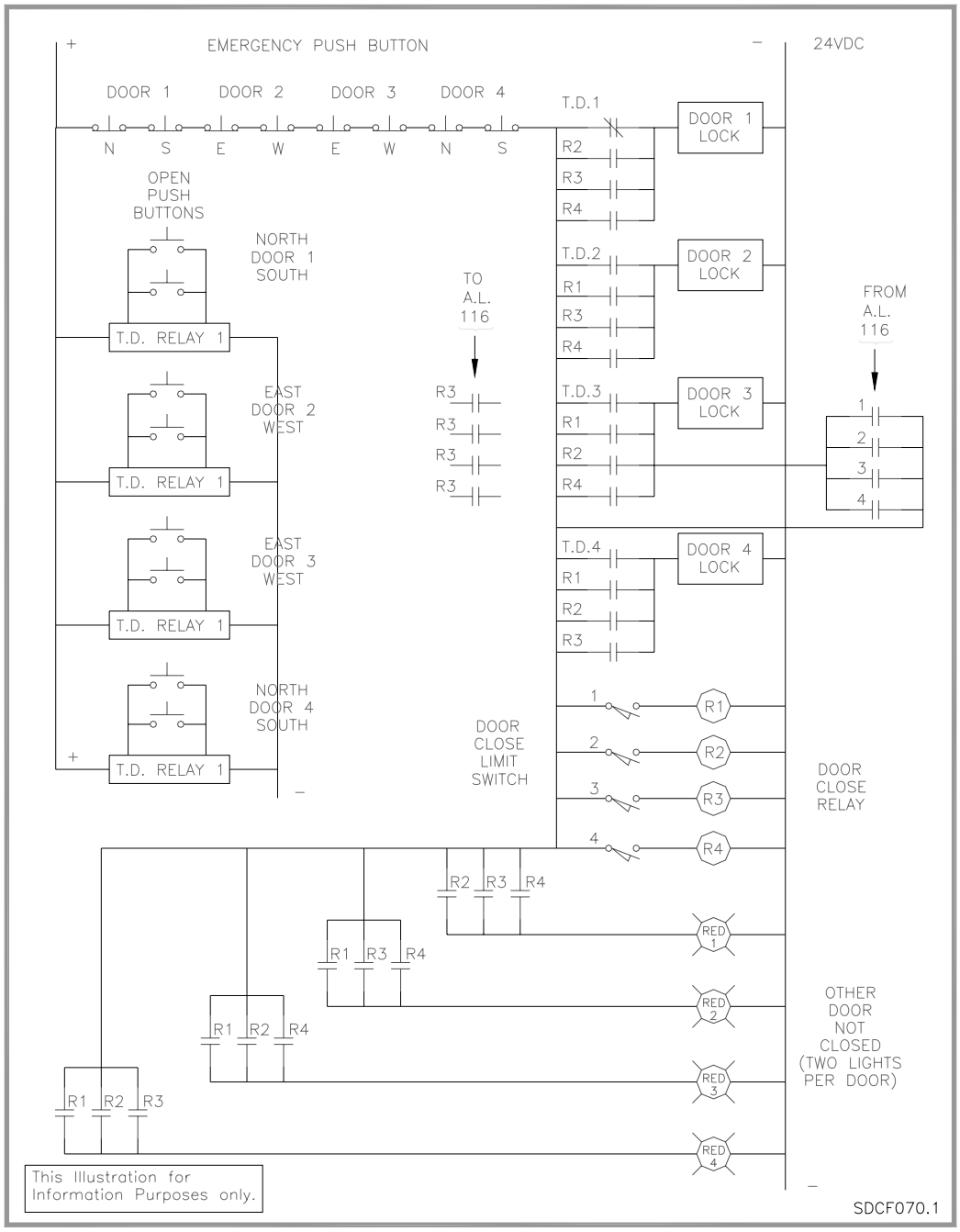


FIGURE CF-II-19 Air Lock 114 Schematic

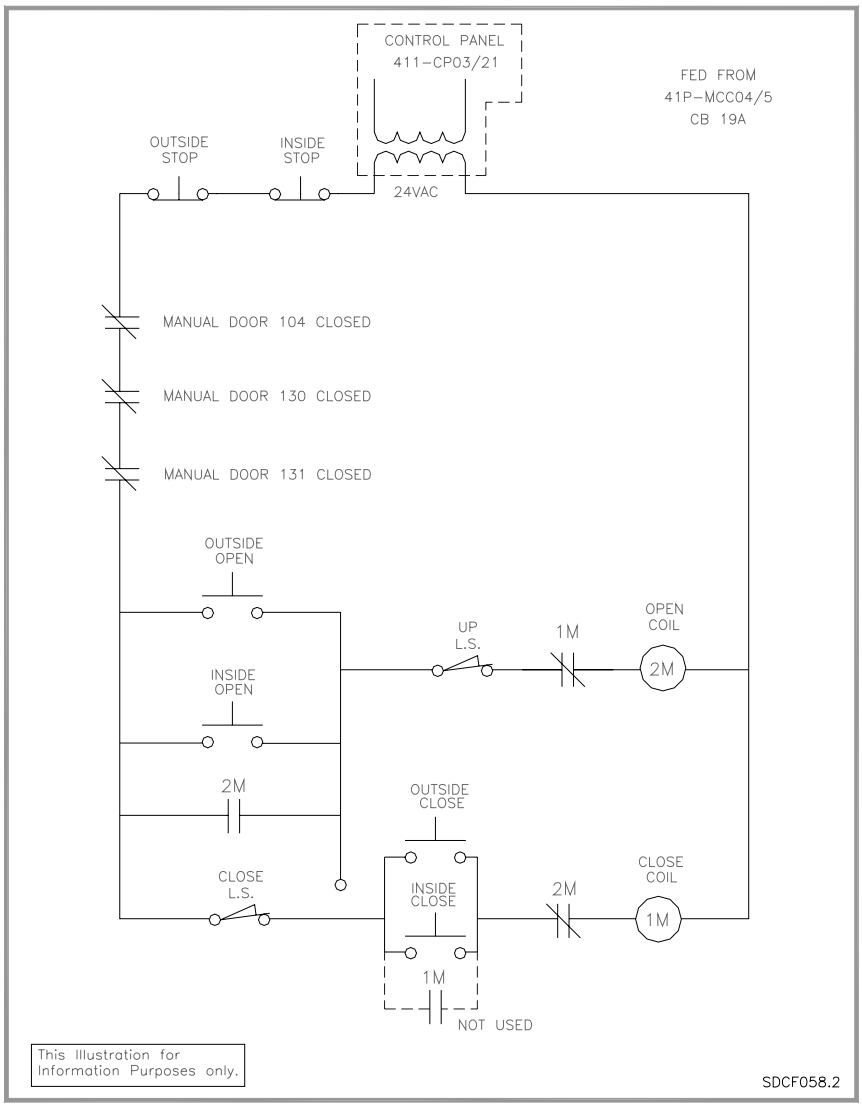


Figure CF-II-20, Rollup Door 102 Control Schematic

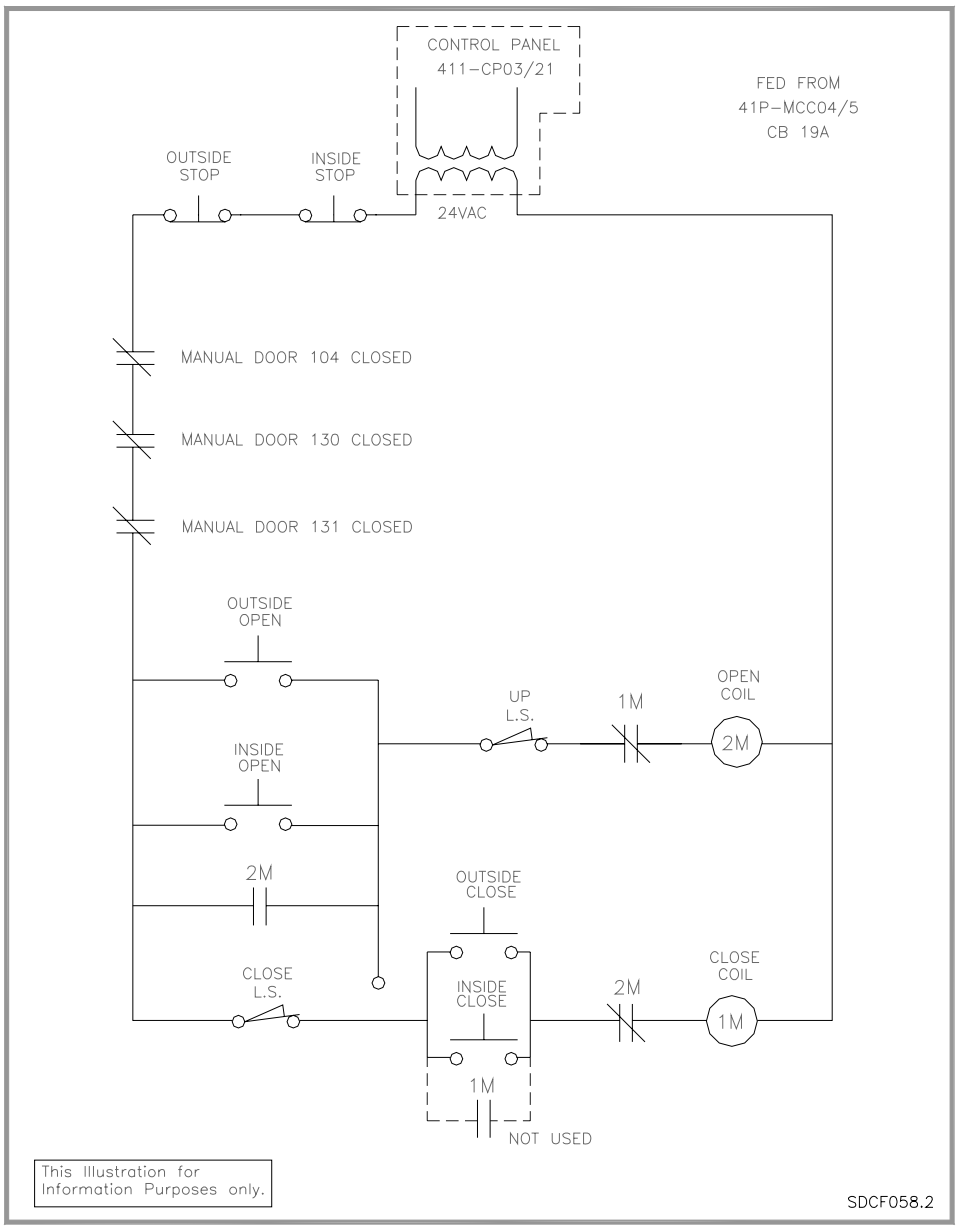


Figure CF-II-21, Liftup Door 133 Control Schematic

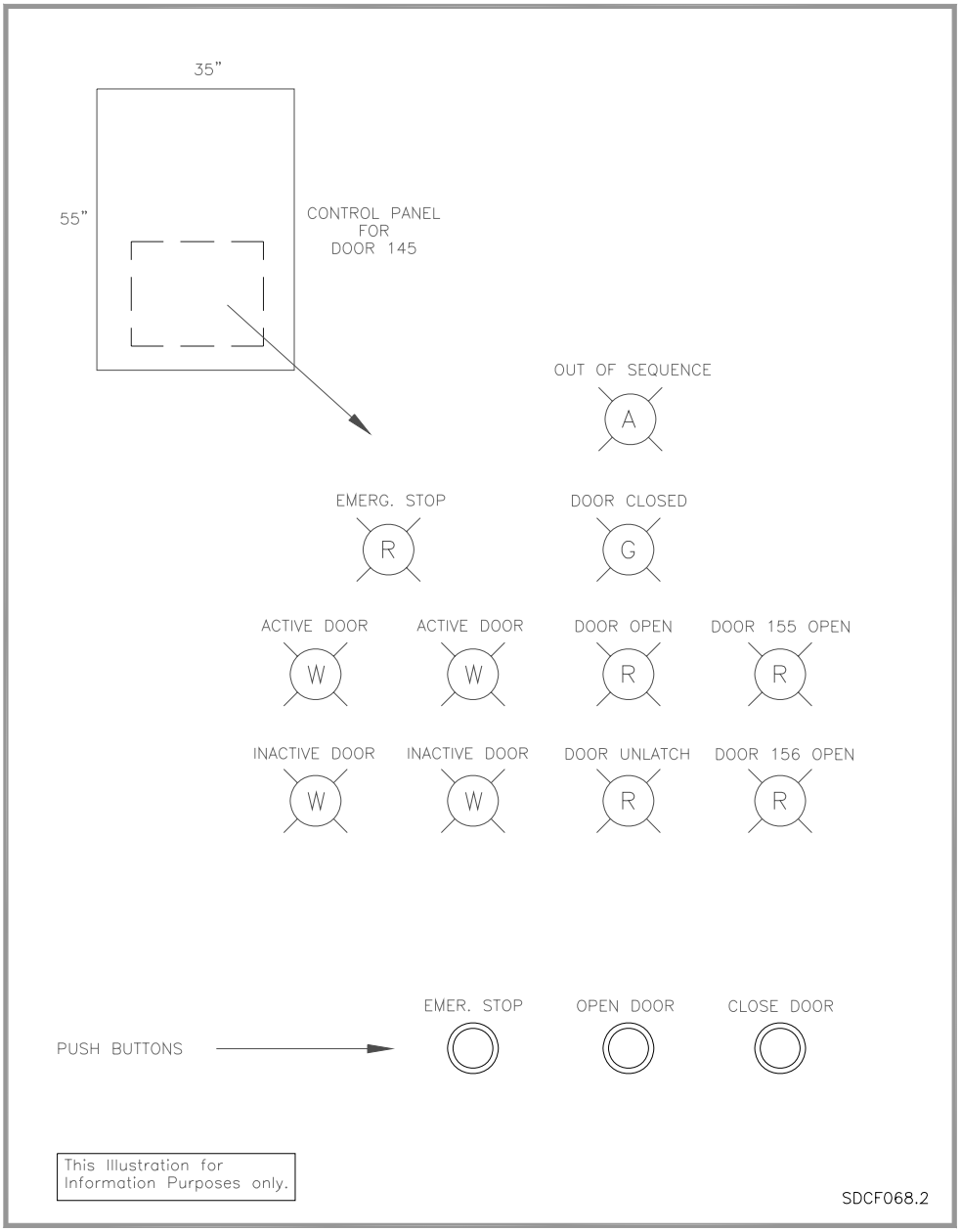


FIGURE CF-II-22 Double Leaf Door 145 Control Panel

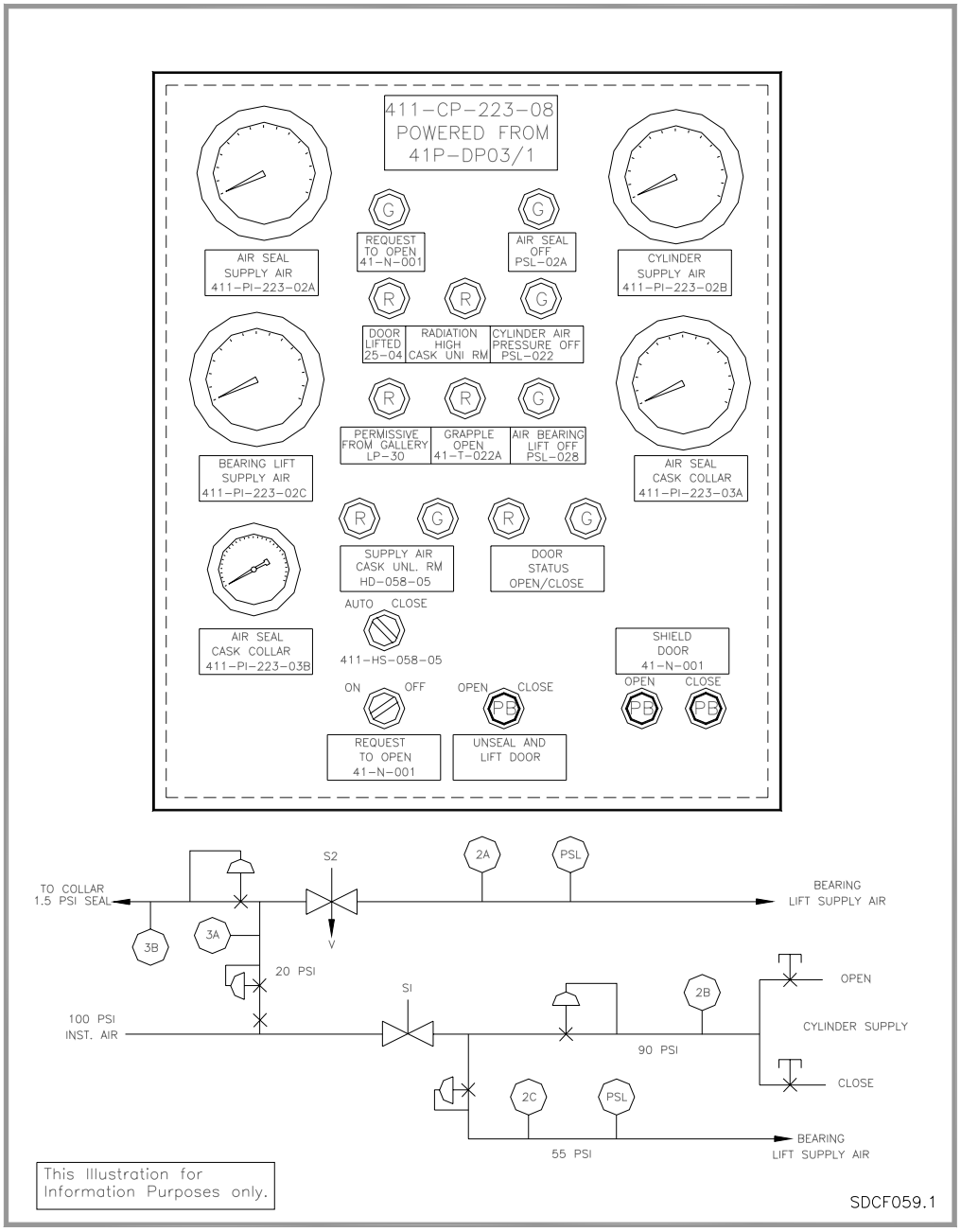


FIGURE CF-II-23 Sheild Door 162 Control Panel

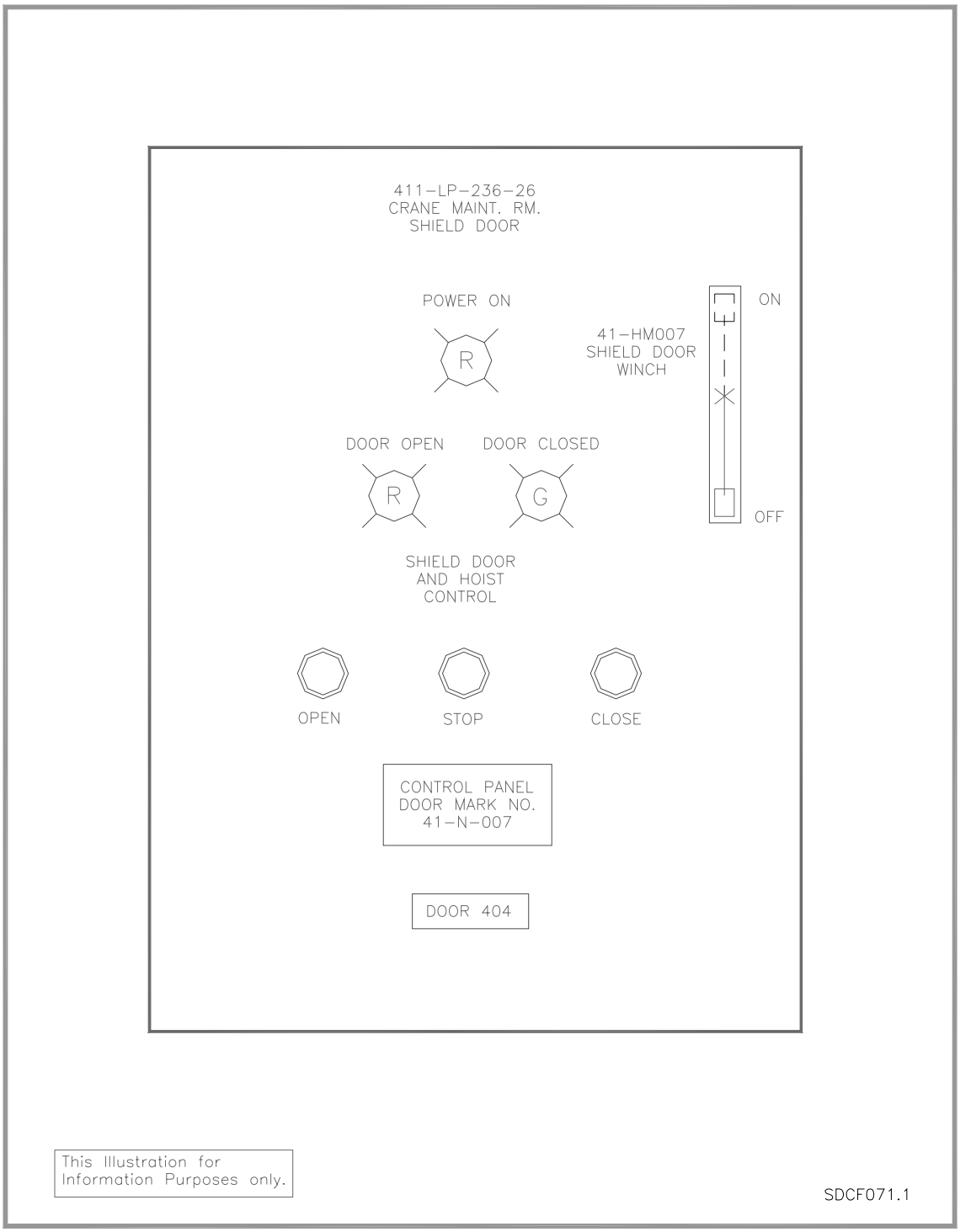


FIGURE CF-II-24 Crane Maintenance Room Door Control Panel

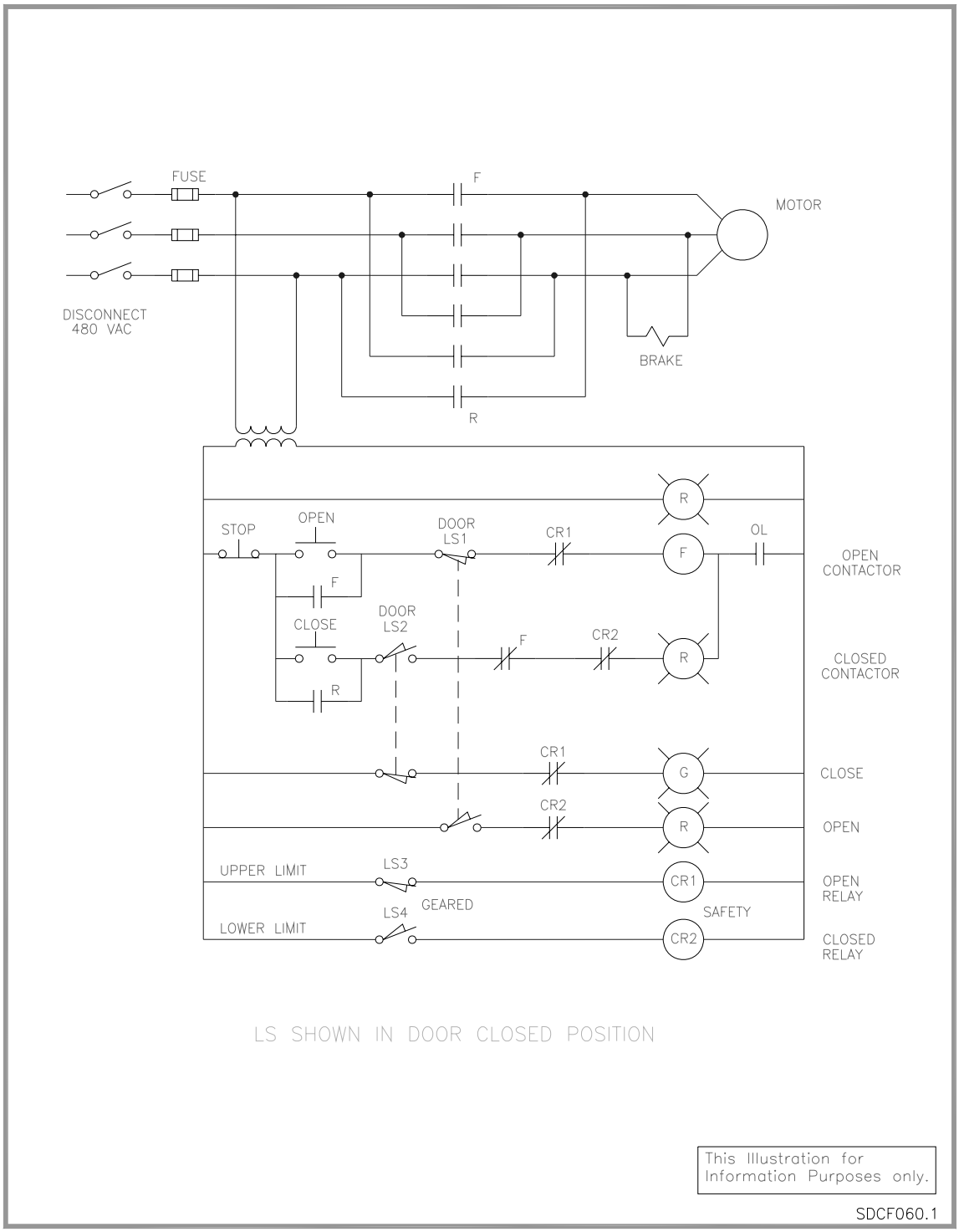


FIGURE CF-II-25 Crane Maintenance Room Door Control Schematic

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Chapter II-I

Subsystem GC01, Roads and Grounds System

1.0 PRIMARY FUNCTIONS

The primary function of the Roads and Grounds System (GC01) is to provide on-site roads, accesses, railroads, parking areas, sidewalks, storm drainage and paved areas for the WIPP.

2.0 DESIGN REQUIREMENTS

2.1 General

2.2 Subsystem General Requirements

2.2.1 On-Site Roads and Grounds

The design of on-site and access roads shall be in conformance with the New Mexico State Highway Department "Standard Specifications for Road and Bridge Construction." The asphalt pavement shall be in conformance with the Asphalt Institute Standard "Thickness Design, Asphalt Pavement Structures for Streets and Highways."

The geometric design of all on-site roads shall be based on design speeds of 25 MPH.

The on-site roads, sidewalks, and paved areas shall be designed to handle all traffic generated by employees, visitors, waste shipments and movements of operational and maintenance vehicles.

A parking lot shall be sized to accommodate employees and visitors immediately outside the fenced area that is directly accessible from the north access road by two entrances. On the south side of the main access road there shall be a separate parking area for mass transportation vehicles.

Concrete sidewalks shall be provided between the plant main entry gate and the major buildings.

Truck parking areas shall be provided near the WHB for waste truck transporters. The truck parking area shall be sized to accommodate up to 25 truck trailers.

Concrete pads shall be provided for supporting trailer stands.

The minimum grade limitations shall be: 0.00% for all roads, 0.50% for parking areas, and 1.00% for paved areas.

The minimum radii to edge of pavement at intersections shall be:

8.0 40.0 ft – Waste haul road and plant entrance
9.0 35.0 ft – Plant roads with semi-trailer truck traffic
10.0 25.0 ft – Other plant roads or service roads
11.0 15.0 ft – Parking areas

A minimum horizontal clearance of three feet shall be maintained between the edge of paving and any structure projecting above shoulder grade. The minimum vertical clearance shall be: 15 ft over plant roads and 12 ft over other roads. Vertical clearances shall be maintained to the full extent of required horizontal clearance.

The on-site road minimum lane width and shoulder width shall be as follows.

Classification	Lane Width	Shoulder
Plant Entrance	2 Lanes – 12 ft	---
Waste Haul Road	2 Lanes – 12 ft	8 ft
Plant Road	2 Lanes – 12 ft	3 ft
Service Road	1 Lane – 15 ft	---

The plant entrance, waste haul roads and plant roads shall be designed for American Association of State Highway Transportation Officials (AASHTO) H20-S16 wheel loading. Service roads shall be designed for AASHTO H10 wheel loading. The plant entrance and all the roads shall be paved with hot-laid plant mixed asphalt surfacing.

Truck parking stalls shall be designed to accommodate AASHTO WB-50 Semitrailer. The minimum size for the stall shall be 10 ft by 40 ft. The truck area shall be paved with concrete or hot-laid plant mixed asphalt surfacing.

The parking lot serving only passenger cars or pickup trucks shall be surfaced with an asphalt single surface treatment over 4" of gravel road base material. The parking lot shall be sized on the basis of parking stall size of 9 ft wide and 19 ft long and driveway (travel way) width of 26 ft.

Sidewalks shall be a minimum of 6 ft wide and shall be of 4-inch-thick reinforced concrete.

In preparing graded areas, the top soil and organic material shall be stripped to a depth of six inches minimum within grading limits. All fills and structural backfill material shall be indigenous soil with less than 20% passing the U.S. Standard Sieve No. 200 (by weight).

The WIPP site and unpaved roads shall be stabilized with a layer of caliche surfacing. Such stabilization is not required for the salt storage area and sanitary landfill area.

2.2.2 North Access Road

The north access road shall provide access to the site from U.S. Highway 62/180 which is about 13 miles to the north.

The north access road shall be designed as a traffic arterial highway for personnel vehicles, waste transporters, semi-trailer trucks, and passenger cars. The design shall be in conformance with the New Mexico State Highway Department "Standard Specifications for Road and Bridge Construction".

The design traffic volume (for WIPP personnel and shipments only) shall be based on an average daily traffic of 800 vehicles at the start of plant operation and 920 vehicles 20 years after the startup of plant operation. Two percent of the vehicles shall be assumed to be trucks (excluding light delivery trucks). The design hourly volume shall be assumed to be 144 vehicles with 67% of the vehicles traveling in the predominant direction of travel.

The north access road shall consist of two 12 foot driving lanes, with two 8-foot shoulders. The geometric design of the road shall be based on a design speed of 70 MPH, a minimum stopping sight distance of 600 ft., and a minimum passing sight distance of 2,500 ft. The maximum grade shall be 5%. The desirable grade should be 3% or less.

The minimum radius ® of horizontal curves shall be 1,800 ft. Where restricted, smaller radii may be permitted only if warning signs are provided.

Super-elevation (e) shall be as follows:

R (ft)	e (ft/ft)
1,101 to 1,350	0.09
1,351 to 1,600	0.08
1,601 to 1,900	0.07
1,901 to 2,200	0.06
2,201 to 2,700	0.05
2,701 to 3,500	0.04
3,501 to 4,500	0.03
4,501 to 25,000	0.02
Over 25, 000	0.0

Minimum super-elevation runoff shall be 200 ft.

Where natural terrain or elevation of the road do not permit minimum passing sight distance, pavement markings shall be provided to control passing.

Horizontal reverse curves shall have a sufficient tangent distance between the curves to accommodate the super-elevation transition. Compound curves shall not be used. Pavement widening at horizontal curves is not required.

Maximum side slopes shall not exceed:

12.0 1:4 for Fill slopes and side ditches
13.0 1:3 for Cut slopes in soil
14.0 1:1 for Cut slopes in caliche or rock

At intersections without provisions for acceleration or deceleration, the minimum radius to the inside edge of pavement shall be 85 ft.

At intersections where acceleration and deceleration lanes are provided, the minimum lengths of the acceleration and deceleration lanes (including taper) shall be as follows:

15.0	Deceleration, right-turn:	450 ft (60 MPH to 25 MPH)
16.0	Deceleration, left turn:	500 ft (60 MPH to stop)
17.0	Acceleration, right-turn	1,100 ft (25 MPH to 60 MPH)
18.0	Acceleration, left-turn	1,125 ft (15 MPH to 60 MPH)

The minimum length of taper shall be 270 ft and the turnouts shall have a minimum radius of 150 ft and a super-elevation of 0.10 ft/ft.

The design drainage for the north access road shall be based on a 10-year frequency storm. Culverts shall be designed for a 10-year storm without static head at entrance and a 25-year storm utilizing the available head below the road subgrade.

The storm runoff shall be calculated in accordance with "Hydrology", Section 4, National Engineering Handbook and "Peak Rates of Discharge for Small Watersheds", Engineering Field Manual for Conservation Practices, both of U.S. Soil Conservation Service.

The capacities of culverts and ditches shall be calculated by Manning's formula, using the Manning's coefficients of roughness listed below.

19.0 n = 0.013 for concrete box culverts
20.0 n = 0.020 for lined ditches
21.0 n= 0.025 for corrugated metal pipe

22.0 n = 0.030 for unlined ditches

The minimum size of culverts shall be 24" and minimum slope 0.005 ft/ft. The minimum cover below road subgrade shall be 12". The culverts shall be designed to withstand AASHTO H20 loading. Headwalls shall be provided when required to prevent scouring or to improve flow capacity. Pipe used for culverts shall be galvanized corrugated metal pipe.

Ditches shall be provided on both sides of the road in cut areas. Ditches shall normally be vee-shaped and shall be widened as necessary to increase capacity. Ditches shall be normally caliche-lined.

Maximum velocity in caliche lined ditches shall be 5 ft/sec. Maximum velocity in unlined ditches shall be 2.5 ft/sec. Ditch side slopes shall not be steeper than 1:3, except in rock or caliche cut.

Where the calculated runoff for a 25-year storm exceeds 300 cfs or where the resulting headwater will cause undesirable flooding, a section of the road shall be depressed to discharge the upstream runoff. The 25-year flood level shall not exceed the elevation of the adjacent non-depressed roadway and existing highways. In conjunction with the depressed roadway, culverts with combined capacity of at least 5% of the 25-year runoff shall be provided.

At roads without raised curbs, a horizontal clearance of 3 ft shall be maintained between any structure projecting above shoulder grade and the edge of paving, or traveled way in the absence of paving.

For guard rails, cattle guards and traffic signs, the minimum horizontal clearance shall be two ft from edge of paving or traveled way.

At roads with raised curbs, the minimum horizontal clearance shall be 2 ft from any structure projecting above top of curb elevation and the face of curb.

Minimum vertical clearance for structures over access roads shall be 16 ft over traveled way and 15 ft over shoulders.

2.2.3 Railroad

Access and on-site railroad tracks shall be provided and installed for shipping waste to the WIPP site by railroad. The on-site railroad shall provide sufficient tracks so that an on-site area can be used as a receiving terminal for waste shipments, the receiving terminal shall be capable of being used as a temporary holding area for incoming cars until ready for unloading, for empty cars until scheduled for pick up, and for making up the cars for railroad carrier pick up.

2.2.4 Site Storm Drainage System

The on-site storm drainage system shall be based on a 10-year, 24-hour duration frequency storm. Culverts shall be designed to discharge a 25-year, 24-hour duration storm, utilizing the available head at entrance. At on-site roads, the static head shall not exceed the subgrade. Minimum design concentration time shall be five minutes. The rainfall intensities shall be as shown in Figure GC I-1.

The on-site surface runoff (Q) in cubic ft per second shall be calculated by:

$Q = C*I*A$,
where:
C = Average coefficient of runoff,
I = Rainfall intensity in/hr, and
A = Contributing total area in acres.

The following "C" values shall be used in the design calculations:

C = 1.00 for roofs and asphalt pavements
C = 0.40 for caliche surfaced areas and other graded area
C = 0.15 for natural ground

Capacities of ditches and pipes shall be calculated by Manning's formula, using the Manning's coefficients of roughness listed below.

n = 0.013 for concrete sewer pipe
n = 0.020 for lined ditches
n = 0.025 for corrugated metal pipe
n = 0.030 for unlined maintained ditches

Salt water evaporation ponds shall be provided to contain storm water runoff from the salt storage area. The ponds shall be sized to handle a 25 year frequency storm of 24 hour duration, as directed by the New Mexico Environmental Department's Ground Water Quality Board, and the total accumulation from the average total precipitation for Carlsbad, New Mexico. The storm water runoff shall be calculated by using C=1.0 for the salt storage piles and salt ponds. The salt water evaporation rate shall be calculated by using a coefficient of 0.70 of the fresh water evaporation rate. The sizing of the ponds shall also consider an allowance for the accumulation of salt. The ponds shall be lined to prevent the infiltration of the collected water into the shallow ground water aquifer.

The Probable Maximum Precipitation (PMP) runoff shall be calculated by using the below listed "C" values.

C = 1.00 for roofs and asphalt pavements
C = 0.90 for caliche surfaced areas and other areas
C = 0.85 for natural ground

For each drainage area of 10 square miles or less, the PMP runoff shall be calculated by using rainfall intensities derived for drainage areas of 10 square miles.

All season PMP values derived for drainage areas of 10 square miles are as follows: (Based on Hydro-meteorological Report #51, NOAA, June 1978.)

Duration (hr)	PMP Depth (in)	PMP Intensity (in/hr)
72	40.00	0.56
48	38.50	.80
24	34.00	1.42
12	30.00	2.50
6	24.50	4.08
3	16.40	5.47
2	13.00	6.50
1	9.0	9.30
0 min.	6.62	13.24
5 min.	4.77	19.08
10 min.	3.77	22.62
5 min.	2.45	29.40

Analysis shall be performed to ensure that local PMP does not flood any of the on-site facilities that provide confinement or contain confinement SSCs.

The site storm drainage system shall include and provide the following:

23.0 Peripheral ditches
24.0 Culverts
25.0 Ditches
26.0 Under drains

Specific design requirements for the above four items are provided in sections 2.2.4.1 through 2.2.4.4 below.

2.2.4.1 Peripheral Ditches

Peripheral Ditches and/or berm shall be provided adjacent to the site to intercept Probable Maximum Precipitation (PMP) runoff from upland watersheds. The upland PMP runoff shall be directed away from the site to natural drainage courses. The peripheral ditches and/or berm shall be designed so the plant PMP runoff will not overflow into the site.

2.2.4.2 Culverts

Culverts shall be designed to conform to the following:

27.0 Minimum size 12"
28.0 Minimum slope 0.005 ft/ft
29.0 Minimum allowable velocity at design flow 2 ft/sec
30.0 Maximum allowable velocity at design flow 8 ft/sec

Under on-site railroad tracks, minimum cover required shall enable the culvert to withstand Cooper E80 loading. Elsewhere, the minimum cover required shall enable the culvert to withstand AASHTO H20 loading. Headwalls shall be provided at inlets and outlets when required to prevent scouring or to improve flow capacity.

Pipe used for culverts in the open ditch system shall be galvanized corrugated metal pipe. AISC Handbook of Steel Drainage and Highway Construction Products (1971 Edition) may be used as a design guide.

2.2.4.3 Ditches

Ditches shall normally be trapezoidal in cross section with a minimum bottom width of one foot. The side slope shall normally be 1:3. Where space is limited and soil conditions permit, steeper slope may be used.

Ditches shall normally be lined with six inches of caliche to prevent erosion. Maximum velocity in caliche lined ditches should not exceed 5 ft/sec except a maximum of 8 ft/sec shall be used for PMP flow.

Vee ditches may be used for laterals not exceeding 200 ft in length. The side slope shall normally be 1:3. Minimum gradient shall be 0.002 ft/ft, minimum depth shall be 6" and maximum depth shall be 2 ft.

Shallow swales may be used adjacent to buildings. Minimum gradient shall be 0.01 ft/ft. Minimum depth shall be 3" and maximum depth shall be 12".

For unlined ditches, the maximum design flow velocity shall be as follows:

Soil Type	Maximum Velocity
Fine sand or silt	2.5 ft/sec
Coarse sand to sandy loam	2.5 ft/sec
Sandy clay	3.5 ft/sec
Clay	5.0 ft/sec

2.2.4.4 Under Drains

Subsurface drainage systems shall be used for the removal of detrimental amounts of ground water under roads, railroads, and pavings and away from foundation structures.

The subsurface drainage system may consist of a single under drain or several under drains in an effective pattern depending on the quantity of water and type of material to be stabilized. Surface drainage shall not be collected in the system.

Pipe used for under drains shall be perforated, galvanized corrugated metal pipe. Minimum pipe size for the under drains shall be 6" for piping lengths 500 ft or under. For longer piping lengths, the minimum pipe size shall be 8". Minimum slope shall be 0.003 ft/ft for 6-inch subdrains and 0.002 ft/ft for 8-inch subdrains. Under drain piping placed at the bottom of a narrow trenches shall be backfilled with filler material.

2.2.4.5 Storm Water Ponds

Storm water Ponds shall be provided to contain all discharges of storm water from the site. The ponds shall be sized to contain the runoff from a 25 year frequency storm of 24 hour duration. The ponds shall be lined to prevent the infiltration of the collected water into the shallow ground water aquifer.

2.2.5 Salt Storage Stockpile

A surface area shall be provided outside the property protection area for storing excavated material from the shafts and underground.

2.3 Operation

The Roads and Grounds are passive and require no operating procedures.

2.4 Structural Requirements

The plant entrance and waste haul roads shall be designed for AASHTO H20-S16 wheel loading and shall be paved with hot laid mixed asphalt surfacing.

Service roads shall be designed for AASHTO H10 wheel loading.

Parking areas shall be surfaced with an asphalt single surface treatment over 4" of gravel road base material.

The culverts shall be designed for Probable Maximum Precipitation and sized that no confinement facility or facility containing confinement SSCs is flooded.

Culverts shall be designed for AASHTO H20 loading, covered with minimum 1 foot of soil and made from galvanized corrugated metal pipe.

The railroad shall meet minimum design requirements of the American Railway Engineering Association (AREA) and the Burlington Northern Santa Fe (BNSF) railway system.

2.5 General Arrangement and Essential Features

2.5.1 On-site Roads and Grounds

The on-site traffic circulation system shall be designed in accordance with AASHTO Site Planning Guidelines for lane widths, lateral clearance to fixed objects, minimum pavement edge radii, and other geometric factors.

Objects in or near the roadway shall be prominently marked in accordance with the standards contained in the Manual on Uniform Traffic Control Devices for Streets and Highways as modified by the State of New Mexico.

Guard posts shall be installed where the lateral clearance is inadequate for protection of the vehicle or any facility close to the roadway.

2.5.2 North Access Road

Traffic signs and pavement markings shall be provided for the access road in accordance with the NMSHD standard specifications and details.

Objects in or near the roadway shall be prominently marked in accordance with the standards contained in the Manual on Uniform Traffic Control Devices for Streets and Highways as modified by the State of New Mexico.

Guard rails or guard posts are required where the lateral clearance is inadequate for protection of the vehicle or any facility close to the roadway.

2.5.3 Railroad

The railroad shall provide an off site, single track railroad from the existing Burlington Northern Santa Fe (BNSF) Duval spur to the WIPP property protection area and the required tracks within the property protection area. The tracks within the property protection area shall be taken to and into the WHB, as well as spurs to provide for rail car storage.

2.6 Maintenance Requirements

Refer to Section 2.6 of Chapter G.

2.7 In-Service Inspections

Refer to Section 2.7 of Chapter G.

2.8 Instrumentation and Control

There are no general or special instrumentation and control requirements.

2.9 Interfacing System Requirements

Refer to Section 2.9 of Chapter G for the interfacing system requirements.

2.10 Quality Assurance Requirements

Refer to Section 2.10 of Chapter G for the general quality assurance requirements.

2.11 Codes and Standards

Refer to Section 2.10 of Chapter G for the governing codes and standards.

2.12 Reliability Assurance

Refer to Section 2.12 of Chapter G for the general reliability assurance requirements.

3.0 DESIGN DESCRIPTION

3.1 Summary

Refer to Section 3.1 of chapter G for summary design descriptions.

3.2 Detailed System Description

This subsystem provides for on-site and access railroads, on-site and nearby access roads, parking areas, sidewalks, storm drains, and paved areas to handle all vehicular and pedestrian traffic approaching and within the fenced security area to support the operation of the facility.

The railroad is provided to handle only waste shipments and is not intended for shipment of any maintenance or operating supplies.

The site storm water drainage system provides the capability to collect, route, and dispose of rainfall (or melted snow) to minimize any adverse effect on the site. The drainage is collected in three storm water ponds, located just outside of the Property Protection Area.

Two storm water ponds are located directly south of the Property Protection Area. The west pond is approximately 100 ft wide by 120 ft long, while the east pond is approximately 175 ft wide by 175 ft long. Both ponds are approximately 6 ft deep and have been lined with High-Density Polyethylene (HDPE) liner,

The third storm water pond is located west of the Property Protection Area, between the railroad spur and the south entry into the site. The pond is approximately 600 ft long and varies in width from approximately 260 ft to 380 ft. Its depth varies between 2 ft and 4 ft. The pond is lined with an HDPE liner.

3.3 System Performance Characteristics

The paved and graveled area, including the graveled road that surrounds the PPA boundary, separates structures within the PPA from the indigenous low-profile vegetation surrounding the WIPP site. The safety function of paved and graveled PPA is to minimize the wildland or other outdoor fires from propagating to the WHB per 24-C-028-W1, WIPP Site Finish Grading and Paving, Rev. AC, April 15, 2008. **[DSA 5.6.10]**

The gravel and pavement surfaces maintain a physical separation between the indigenous low profile vegetation surround the site and the WHB. This separation prevents external fires in the OUTSIDE AREA from propagation to areas that may contain WASTE. **[TSR DF 6.10]**

PPA is constructed of noncombustible materials in the area around the WHB per WIPP-023.

The site storm drainage system is designed to perform so that the local Probable Maximum Precipitation (PMP) does not flood any of the confinement facilities or facilities containing confinement SSCs at the plant. Further, the plant operating conditions have no impact on the performance of the site storm drainage system.

3.4 System Arrangement

3.4.1 Roads

The main access to the WIPP site is from U.S. Route 62-180. The total length of the main access road is about 13 miles. A southern access road is provided from N.M. State Highway 128.

Two entry roads from the north access road connect with the personnel parking lot and the main site entrance and security gate. The entry road to the sewage lagoon extends southward from the south access road.

Inside the property protection area, the main road extends eastward from the main gate. From this main road, a road on the west side of the WHB permits trucks carrying waste casks to enter the receiving, parking and unloading area.

At about the midpoint of the east/west road, a road extends northward through a gate in the security fence and into the salt storage area.

Other auxiliary roads serve the meteorological towers, construction landfill area, etc.

The parking lot is located outside the property protection area with additional handicapped parking areas around certain buildings such as the Engineering Building and the SB.

Refer to the controlled emergency drawing records for current As-Build road and site-area interface layouts.

3.4.2 Railroads

The arrangement of the on-site railroad is shown on the plot plan Figure GC I-2. The arrangement allows one rail car at a time into the RH-TRU area inside the WHB.

The on-site railroad is within the Plant Property Protection Area. There is a locked gate in the security fence near the north access road.

There are three sidings with ladder tracks connecting these sidings to the entry track at each end. A spur extends from the southern siding for parking several rail cars. There is sufficient space for parking 30 railroad cars on the sidings (based upon a length of 70 ft per railroad car).

The off-site access portion of the railroad is about 6 miles long and connects to the BNSF Duval Spur.

3.4.3 Site Storm Water Drainage System

The site storm water drainage system, which is located throughout the site, provides for water collection and drainage for all land and buildings within the property protection area.

3.4.4 Salt Storage Stockpiles

The Salt Storage Stockpile and the SPDV Salt Storage Stockpile are located on the north and east sides of the site, respectively, and are outside the Property Protection Area. The stockpiles have been contoured, capped and planted with native vegetation.

The Salt Storage Extension is located on the north side of the site, north of the Salt Storage Stockpile. Access to the Salt Storage Extension from the site is provided by a gate through the north fence of the Property Protection Area and a haul road around the east end of the Salt Storage Stockpile.

3.5 Component Design Description

3.5.1 Roads

This includes the north and south access roads, parking lot, and all roads and parking areas within the property protection area. Service roads to such areas as the salt storage area, environmental towers, and sewage lagoons are also included.

These roads are constructed to handle all traffic generated by employees, visitors, waste shipments and movements of operational and maintenance vehicles. The minimum vertical clearance over plant roads is generally 15 ft. The lane width for the plant entrance, waste haul road and other plant roads is 12 ft.

The parking lot is located outside the main gate with two plant entrance roads from the north access road. Provisions for about 645 spaces with widths of 9 ft and lengths of 19 ft are provided.

Truck parking lots south of the WHB have concrete pads for supporting trailer stands.

The parking lot can accommodate car pools, busses, vans, autos and pickup trucks. In addition, handicapped parking areas are located around other building such as the Support and Engineering buildings.

Guard posts and railings are installed around parking areas and along roads inside the property protection area to preclude any vehicles and personnel from entering or falling into any storm water ditches or safety hazards.

3.5.2 Grounds

The property protection area ground surface has been graded as level as practical considering the requirements of the site storm drainage, reasonable grading to all building foundations, and grade requirements for the roads and railroads.

The top soil and organic material to a depth of 6" (within grading limits) has been stripped from the surface and is stored in the SPDV and topsoil stockpiles on the east side of the site.

The surface within the land withdrawal boundary is completely sand covered with regular topographical features. Most of the site is covered by stabilized sand dunes, with some active sand dunes about 5 miles to the south. The sand dunes are underlain by caliche and Gatuña. The plant site has a gentle slope to the southwest with a natural slope of about 1 percent. Since the north east side of the site is at a higher elevation, dikes have been graded on the north and east side of the site, to prevent the flow from a heavy rainfall into the WIPP security boundary. The WIPP Drainage Facility is shown on Figure GC I -2.

3.5.3 Railroads

The Burlington Northern and Santa Fe (BNSF) railroad is the serving railroad company for the site access railroad. However, it is intended that on-site transfer of rail cars to and from the sidings into the WHB building will be performed by the WIPP rail car prime mover.

The railroad facilities includes signs, road crossings, cattle guards, pipe crossings, culverts ditches and other facilities necessary for operation and maintenance of the railroad.

The CH-TRU waste can be shipped in shipping package on rail cars. The maximum gross weight of the 4-axle flat car is expected to be about 263,000 lb.

Commercial rail cask cars may be used for shipping RH-TRU waste with up to 7 waste canisters in a shielded shipping cask.

3.5.4 Site Storm Drainage System

The drain water from the roofs of most building is dispersed onto splash plates and which then soaks into the ground or runs into the storm ditches. On certain buildings, such as the engineering building and SB, the water is directed into the storm water retaining ponds. Runoff from the ground, streets, and roads on the site are then collected in concrete and/or asphalt lined ditches and catch basins and storm sewers. The WIPP Drainage Facility is shown on Figure GC I-2.

After final collection of storm water from all passages and ditches, the water is allowed to exit at multiple locations at the property protection area, including the west side of the site between the Pumphouse and the Security building. The water is channeled into storm water retaining ponds located south and west of the site.

3.5.5 Surface Salt Storage Area

The Surface Salt Storage Area is located on the north side of the site, outside the Property Protection Area. The area contains two salt storage stockpiles, the Salt Storage Stockpile and Salt Storage Extension, and three evaporation ponds.

The Salt Storage Stockpile is no longer in use. It has been contoured, capped and planted with native vegetation. Its evaporation pond and runoff ditches have been lined with HDPE liner material.

The Salt Storage Extension is the active salt storage area. The Salt Storage Extension was lined with HDPE liner material prior to the placement of salt, and was provided with a leachage collection system which drains to the stockpile's evaporation ponds. The stockpile's evaporation ponds are double lined with HDPE liner material and have sumps for detecting leaks in the ponds' outer liner.

3.6 Instrumentation and Control

There are no instrumentation and control requirements for the roads and grounds identified under Subsystem GC01.

3.7 System Interfaces

Refer to Section 3.7 of Chapter G which documents the subsystem primary and secondary interfaces.

4.0 OPERATIONS

Not applicable.

5.0 SYSTEM LIMITATIONS, SET POINTS, AND PRECAUTIONS

There are no Limitations and Set Points associated with Roads and Grounds (GC01), the Precautions are:

5.1 Road surfaces must be maintained in good repair in order to assure safe transportation.

5.2 Road signs (stop signs, speed signs, caution signs, etc.) must be installed and maintained in good repair.

6.0 OFF-NORMAL EVENTS AND RECOVERY

6.1 Flooding

The site storm water drainage system is constructed to assure that the 25 year, 24 hour duration, storm will not cause an adverse effect on critical facilities. Peripheral ditches and berms are provided. However, should excessive water level develop, assure that water does not enter confinement facilities, facilities containing confinement SSCs, or the mine shafts by use of temporary measures as necessary.

When the water level has receded, inspect the roads and grounds for damage and repair as necessary.

7.0 MAINTENANCE

7.1 Maintenance Approach

Refer to Section 7.1 of Chapter G for information regarding the general maintenance approach.

7.3 Corrective Maintenance

The WIPP corrective maintenance program shall be configured to:

7.3.1 Repair any deteriorating road pavement or side walks.

7.3.2 Repaint any worn or obliterated lines and signs on roads and parking lots.

7.3.3 Replace rotted or damaged ties, loose spikes, and misaligned rails in the railroad tracks.

7.3.4 Regrade any eroded surfaces on the graded grounds or roads that could cause a walking or driving hazard.

7.4 Preventive Maintenance

Vegetation in the PPA is controlled through periodic application of herbicides and routine housekeeping by outside vendors.

A conventional and standard industrial road maintenance program shall be established for access and on-site paved roads and site grounds.

The American Railroad Engineers Association manual shall be the maintenance guide for the railroad.

7.5 In-Service Inspection

The WIPP in-service program includes the following activities:

7.6 Roads In-service Inspections

The roads shall be inspected periodically for surface degradation that could affect the personnel and vehicle safety.

7.7 Grounds In-Service Inspections

The grounds shall be inspected for water or wind erosion after any unusual weather event that could compromise or adversely effect any facility operation.

7.8 Railroad In-Service Inspection

The railroad shall be inspected for rotting railroad ties, excessive weed growth along the right of way, excessive bolt and spike corrosion, and any erosion that may effect the support of the tracks.

Inspection of all roads to be used for the transportation of waste containers shall be made to ensure they remain adequate for safe transportation and that any adverse effect upon the roads by the transportation be brought to the attention of the proper authorities.

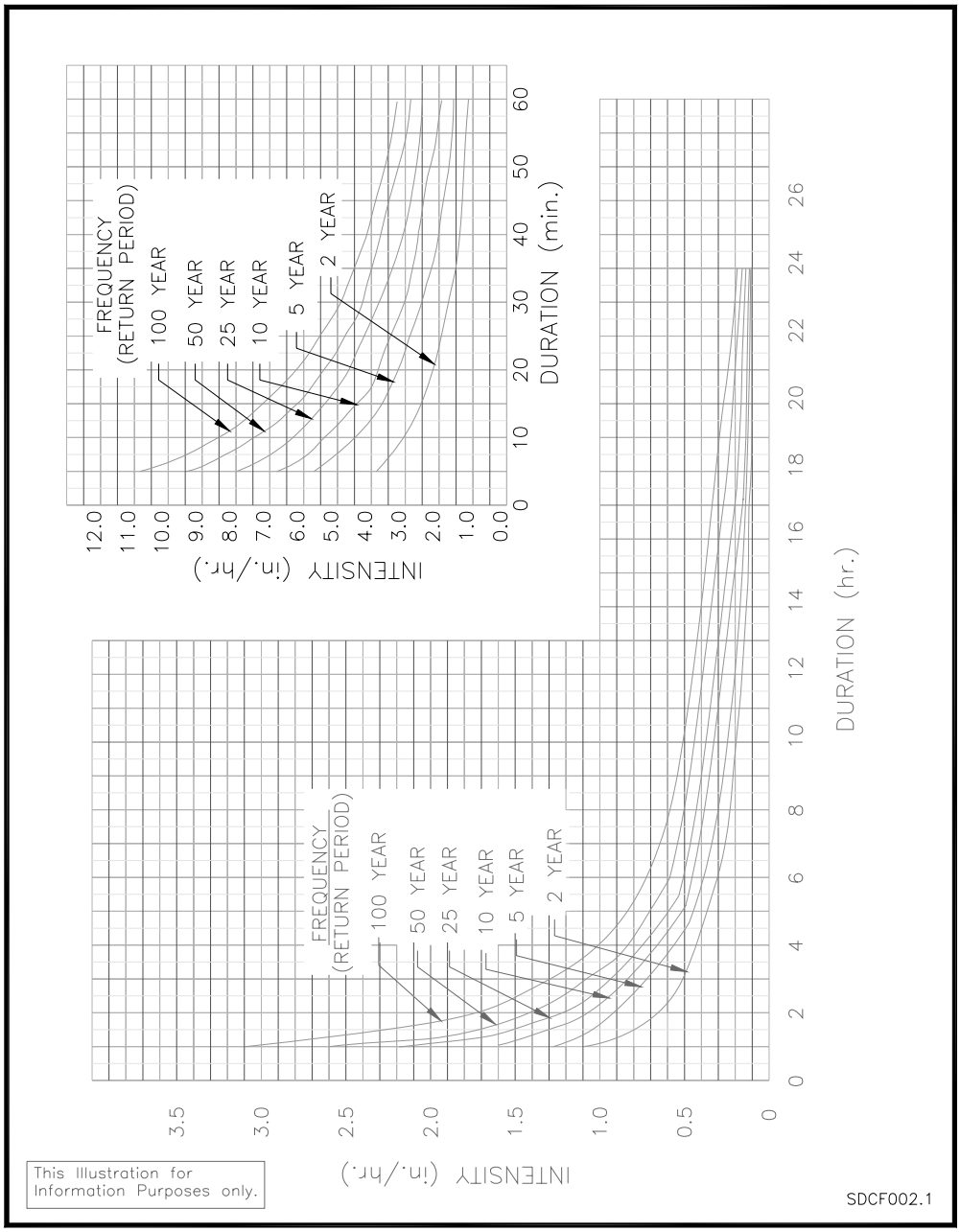

FIGURE GC-I-1 100-Year Rainfall Intensity-Duration Curve

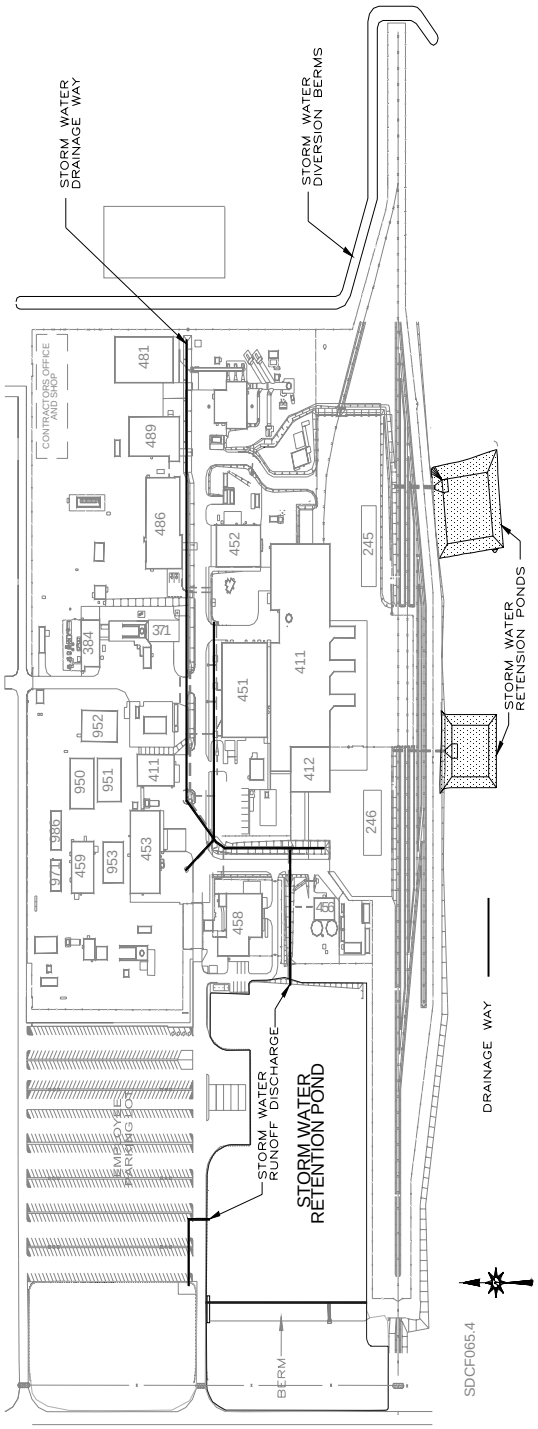

Figure GC-I-2, WIPP Facility Drainage System

Part II, Chapter II

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Part II, Chapter II

Subsystem GC02, General Surface Facilities System

1.0 PRIMARY FUNCTIONS

The primary functions of the General Surface Facilities System (GC02) is to provide all the buildings (except those in GC01) and surface facilities within the security fenced area needed for personnel occupancy, housing various equipment, and conducting facility operations. Provide within the buildings the normal miscellaneous features and utilities such as:

31.0 Restroom and drinking fountain facilities.

32.0 Domestic water and sewage plumbing to the external interface.

33.0 Supports for other utilities including HVAC, lights, electric outlets, Fire Protection, and communication.

2.0 DESIGN REQUIREMENTS

2.1 General

2.2 Subsystem General Requirements

2.2.1 Safety and Emergency Services Building (452)

Safety and Emergency Services Building (S&ESB) shall be designed as a two-story pre-engineered metal structure. The S&ESB shall be designed in compliance with the MBMA.

The S&ESB shall provide space for the following laboratories and emergency response activities.

Laboratories	Emergency Response Activity
Dosimetry	Emergency Operations Center (Subsystem PC06)
Low Level Counting	Mine Rescue
Industrial Hygiene	Emergency Medical Treatment
	Emergency Vehicles Garage (ambulance and fire truck)

A personnel elevator is provided, which is also designed, to accommodate the handicapped, and demonstrating compliance with ADA (Americans with Disabilities Act).

2.2.2 Warehouse Building (453)

Warehouse/Shops Building shall be designed as an UBC Occupancy Group H-3, Construction Type V-N, one-story building. The building shall provide space for administration, warehouse, and shop activities.

2.2.3 Water Pumphouse (456)

The Water Pumphouse shall be designed as an UBC Occupancy Group B-4, one-story building. The Water Pumphouse shall provide space for the fire pumps, domestic water pumps, water chlorinating system and chemical storage equipment.

2.2.4 Guard and Security Building (458) and Gatehouse (475)

The Guard and Security Building shall be designed as an UBC Occupancy Group A-2/B-2, Construction Type II, one story building.

The Guard and Security Building shall include a security control room located at the site entrance near the Gatehouse. This room shall have the three exterior structural walls hardened with steel plate and bullet resistive glass panels. The doors shall be made of bullet resistive frame and glass. The interior walls shall be hardened with two layers of metal mesh. These requirements shall meet UL752.

The Security Control Room shall provide space for plant security activities and equipment specified by the plant protection system (PP00). It shall be located to allow visual check of personnel and vehicles entering and leaving the WIPP site.

In addition to the Security Control Room, the Guard and Security Building shall have space and provision for a cafeteria, auditorium, and conference rooms that can be used as dining room areas, visitor entrance logging in area, and a display area.

A Gatehouse shall be provided as required by system PP00 for the security forces to control the authorized access of personnel and vehicles into the WIPP site and activities as specified by system PP00.

The Gatehouse shall be a one-story structure with 8-inch reinforced concrete masonry walls and a 4-inch concrete slab roofing supported on metal decking. It shall be sized to provide a nominal floor space of 480 sq. ft. A hardened area shall be provided within the gatehouse as specified in system PP00.

2.2.5 Engineering Building (486)

The Engineering Building shall be designed as a one-story pre-engineered metal structure in compliance with the MBMA. The Engineering Building shall provide office space for engineering and administrative activities.

2.2.6 Core Storage Building (459)

The Core Storage Building shall be designed as a one story pre-engineered metal structure in compliance with the MBMA. The Core Storage Building shall provide a floor space of approximately 6,000 sq. ft, with half of the space for core storage and the other half for office areas.

The floor of the building shall be made of a 6" concrete slab with the top face 6" above the finished grade. The partition between the core storage area and the office area shall be a 2 hour fire rated wall with a 2 hour fire rated door.

2.2.7 Compressor Buildings (463 and 485)

The North Compressor Building (485) and South Compressor Building (463) shall each be designed as a one story pre-engineered metal building in compliance with the MBMA.

The North Compressor Building (485) and South Compressor Building (463) shall be designed to provide space for the primary compressed air system (CA00) and the backup compressed air system, respectively, including the air compressors, and other accessories.

2.2.8 Armory Building (473)

The Armory Building shall be designed as a one-story building of concrete blocks with both vertical and horizontal reinforcements and with the cavities filled with grout. The floor of the building shall be a concrete slab on grade.

The building shall be designed to provide space for storage of weapons, ammunition, riot equipment, and their maintenance.

2.2.9 Hazardous Materials Buildings (474A-F)

The Hazardous Materials Buildings shall consist of six separate buildings and/or facilities:

34.0 Hazardous Waste Storage Buildings (Buildings 474A & 474B)

35.0 Storage Building for Oil and Grease (Building 474C)

36.0 Gas Bottle Storage Shed (Building 474D)

37.0 Hazardous Materials Storage Building (Building 474E)

38.0 Waste Oil Retainer (474F)

The Hazardous Waste Storage Buildings (474A & 474B) shall be designed as one story pre-fabricated metal structures. The buildings shall be designed to provide a total storage space of approximately 165 sq. ft divided into three bays of 55 sq. ft each.

The Storage Building for Oil and Grease (474C) shall be designed as a one story pre-engineered metal structure in conformance with the MBMA. The building shall be designed to provide a total storage space of approximately 900 sq. ft.

The Gas Bottle Storage Shed (474D) shall be designed as a raised concrete platform with gas bottle storage racks with a floor space of approximately 490 sq. ft.

The Hazardous Materials Storage Building (474E) shall be designed as a one story pre-engineered metal structure in conformance with the MBMA. The building shall be designed to provide a total storage space of approximately 570 sq. ft divided into three bays of 190 sq. ft each.

The Waste Oil Retainer (474F) shall be designed as a concrete vault with the outside dimensions of 6 ft by 16 ft approximately and a wall thickness of 8". It shall have a 1-1/2" steel grating cover at the top.

2.2.10 Auxiliary Warehouse Building (455)

The Auxiliary Warehouse Building shall be designed as a one-story pre-engineered metal structure in conformance with the MSBM. The building shall be designed to provide space for general maintenance shop activities.

2.2.11 Effluent Monitoring Instrument Shed, Station B (365)

Station B, the Effluent Monitoring Instrument Shed, shall provide the space to contain the necessary Effluent Monitoring equipment (EM01) of System RM00. It shall be located beneath the filtered exhaust air duct to minimize air sample tube runs. Space shall also be provided in the Station B shed for housing the backup batteries for the monitoring equipment and for the data gathering equipment inspection activities. It shall be designed as an off-the-shelf metal shack, structure in conformance with the MBMA.

The shed shall be insulated to protect the equipment from temperature extremes. Ambient temperature inside the building shall be maintained within the range of 50-80 degrees Fahrenheit by ventilation equipment of system HV00.

2.2.12 Electrical Calibration Shop (482)

This building shall be designed as a one story pre-engineered metal structure in conformance with the MBMA. The building shall be sized to provide a nominal gross floor space of 1,200 sq. ft.

2.2.13 Underground Services Office Building (384A)

This building shall be designed as a one story pre-engineered metal structure in conformance with the MBMA. The building shall be sized to provide a nominal gross floor space of 800 sq. ft.

2.2.14 Salt Handling Shaft Hoist House (384)

This building shall be designed as a one story pre-engineered metal structure in conformance with the MBMA. The building shall be sized to provide a nominal gross floor space of 4,500 sq. ft.

2.2.15 Training Building (489)

The Training Building shall be designed as a one-story pre-engineered metal structure in compliance with the MBMA. The Training Building shall provide classrooms, offices and supporting facilities for training activities.

2.2.16 Air Intake Shaft Hoist House (362)

This building shall be designed as a one story pre-engineered metal structure in conformance with the MBMA. The building shall be sized to provide a nominal gross floor space of 1,200 sq. ft.

2.2.17 Air Intake Shaft Winch House (363)

This building shall be designed as a one story pre-engineered metal structure in conformance with the MBMA. The building shall be sized to provide a nominal gross floor space of 725 sq. ft.

2.2.18 Warehouse Annex (481)

This building shall be designed as a one-story pre-engineered metal structure in conformance with the MBMA. The building shall be sized to provide a nominal gross floor space of 12,400 sq. ft.

2.3 Operation

The buildings and structures are effectively passive and require no operating procedures.

2.4 Structural Requirements

Refer to Section 2.4.2 of Chapter G for the GC02 specific and general structural design requirements.

2.5 General Arrangement and Essential Features

The surface buildings and facilities shall be located and arranged to best accommodate and support the overall WIPP site operation.

The Guard and Security Building (458) and Gatehouse Building (475) shall serve as the central control area of the WIPP site security system in accordance with the Plant Protection System (PP00). These two buildings shall be located to control entry onto the WIPP site.

2.6 Maintenance Requirements

Refer to Section 2.6 of Chapter G.

2.7 In-Service Inspections

Refer to Section 2.7 of Chapter G.

2.8 Instrumentation and Control

There are no general or special instrumentation and control requirements.

2.9 Interfacing system Requirements

Refer to Section 2.9 of chapter G for the interfacing system requirements.

2.10 Quality Assurance Requirements

Refer to Section 2.10 of Chapter G for the general quality assurance requirements.

2.11 Codes and Standards

Refer to Section 2.11 of Chapter G for the governing codes and standards.

2.12 Reliability Assurance

Refer to Section 2.12 of Chapter G for the general reliability assurance requirements.

3.0 DESIGN DESCRIPTION

3.1 Summary

Refer to Section 3.1 of Chapter G for summary design descriptions.

3.2 Detailed System Description

The design descriptions are limited to the permanent buildings defined in the following paragraphs and shown on Figure 3.1-1 in Chapter G. There are a number of temporary trailer complexes, installed on the site, meeting State and Federal requirements; however, the quantity, location, and use are subject to change.

3.2.1 Safety and Emergency Services Building (452)

The S&ESB provides spaces for laboratories, offices and garages for the emergency vehicles and equipment, emergency medical treatment, mine rescue operations, emergency operations center, and laboratories such as industrial hygiene, low level counting, dosimetry, and environmental and health operations.

3.2.2 Warehouse Building (453)

The Warehouse Building provides space for personnel and material.

3.2.3 Water Pumphouse (456)

The Water Pumphouse provides space and mountings for the domestic water pumps and the fire water pumps. The domestic water distribution system and the fire protection water distribution system are separated to ensure that the fire protection water source is always available. The building also provides space for water chlorination equipment and storage of chemicals.

The two water storage tanks (457) are located adjacent to the Pumphouse.

3.2.4 Guard and Security Building (458) and Gatehouse (475)

The Guard and Security Building and Gatehouse provide the initial control point for all site visitors and contains both public and site telephones. The guard area also provides space for guards and the communication equipment required to register visitors and control their access into controlled areas.

3.2.5 Engineering Building (486)

The Engineering Building provides space for permanent offices, modular offices, files, reproduction equipment, conference rooms, lobby, and rest room facilities. Private offices exist as required around the periphery.

3.2.6 Core Storage Building (459)

This building provides for the storage of drilling cores obtained from the underground or from any surface geologic drilling operations. The east side of the building and the annex (459A) contain office space, and is separated by a 2 hr-fire rated wall.

3.2.7 Compressor Buildings (463 and 485)

Two Compressor Buildings are provided which house two air compressors each. Positive displacement (piston) pumps, located in Building 463 which is near the SB, provide back-up compressed air service. Compressors, located in Building 485 which is near the salt handling shaft, provide primary air supply.

3.2.8 Armory Building (473)

The Armory Building provides space for the storage and office space. (The need for firearms was eliminated.)

3.2.9 Hazardous Material Buildings (474)

These buildings provide storage for hazardous material of various types as dictated by Federal requirements such as RCRA, CERCLA and SARA. These include six separate buildings or facilities as follows: hazardous waste storage buildings (2), storage building for new oil and grease, gas bottle storage shed, hazardous materials storage building and dock for used oil.

3.2.9.1 Hazardous Waste Storage Building (474A)

This building (shed) provides space for storage of hazardous waste.

3.2.9.2 Hazardous Waste Storage Building (474B)

This building (shed) provides space for storage of hazardous waste.

3.2.9.3 Storage Building (474C)

This building provides space for the storage of new oil and grease in 55-gallon drums and small containers.

3.2.9.4 Gas Bottle Storage Area (474D)

This facility provides and open air and covered area on a concrete slab for the storage of pressurized tanks of argon, nitrogen, hydrogen, acetylene, etc.

3.2.9.5 Hazardous Material Storage Building (474E)

This building provides space for storage of hazardous material on shelving in three rooms. The material can be in containers or, for example, in used storage batteries, etc.

3.2.9.6 Waste Oil Retainer (474F)

This facility can accommodate several 55 gallon drum containers of used oil that are categorized as hazardous waste. The drums are stored on a 5 ft by 14 ft steel grating above a spill collection pit. The size of the spill collection pit is about 5 ft by 14 ft by 2 ft high.

3.2.10 Auxiliary Warehouse Building and Lots (455)

The auxiliary warehouse-maintenance provides space for maintenance and storage for site facilities and equipment.

3.2.11 Effluent Monitoring Instrument Shed, Station B (365)

The Station B shed houses the two CAMs and associated equipment which measure and record the radioactivity in the air exhausting the EFB exhaust duct (RM00).

3.2.12 Electrical Calibration Shop (482)

This building provides space for housing equipment used for calibration of various electrical equipment.

3.2.13 Underground Services Office Building (384A)

Counter space and an office facility are provided above ground for the U/G personnel.

3.2.14 Salt Handling Shaft Hoist House (384)

The Salt Handling Shaft Hoist House provides foundation and space for the large electric motor, double spools, electrical power conditioning equipment and controls which power and control the operation of the hoist cables.

3.2.15 Training Building (489)

The Training Building provides space for training rooms, permanent offices, modular offices, records storage area and library, instructor audio/video work area, storage, laboratory, reception and restroom facilities.

3.2.16 Air Intake Shaft Hoist House (362)

The Air Intake Shaft Hoist House (Facility 362) provides space, shelter, and concrete mounting pads for air intake shaft conveyance rope spool and drive.

3.2.17 Air Intake Shaft Winch House (363)

The Air Intake Shaft Winch House (Facility 363) provides space, shelter and concrete mounting pads for the galloway rope spools. Two spools are used for the ropes to lift the galloway.

3.2.18 Warehouse Annex (481)

The Warehouse Annex (Facility 481) provides space and shelter for long-term storage of materials not subject to daily warehousing activities. The stored material shall consist of steel hoist ropes on spools, large transformers, motors, shaft assembly guides, cutter heads, and spare parts of mechanical and electrical equipment, cables and wires.

3.2.19 Miscellaneous Structures

3.2.19.1 Telephone Huts

One Telephone Building (468) is located within the property protection area, providing for telephone equipment at the site.

3.2.19.2 Miscellaneous Foundations

Structural foundations are provided for such facilities as the meteorological towers, satellite dishes, and electric substations.

3.2.20 TRUPACT Trailer Shelter (245)

The TRUPACT trailer shelter provides shade for TRUPACTS while in the staging area.

3.2.22 MgO Storage Shelter (246)

The MgO Storage Shelter provides space for the storage of MgO, which is used in the waste emplacement process.

3.3 System Performance Characteristics

The GC02 subsystems is passive. The subject facilities shall maintain configurational integrity under normal operating and environmental conditions and requirements as set forth in Section 1.0 and Section 2.0 of Chapter G and Part II, Chapter II.

3.4 System Arrangement

3.4.1 Safety and Emergency Services Building (452)

The S&ESB is located along the south side of the main east/west road, east of the SB. This building is about 80' by 119'. The four overhead doors for emergency vehicles open onto the concrete pad to the main roadway.

3.4.2 Warehouse Building (453)

The Warehouse Building is located on the north side of the main west to east roadway with a paved area in front including a loading ramp. The loading ramp is in front of a large overhead door entrance. On the north and east sides, there are personnel doors.

3.4.3 Water Pumphouse (456)

The Water Pumphouse is located at the southwest corner of the site adjacent to the two water tanks and south of the Guard and Security Building.

3.4.4 Guard and Security Building (458) and Gatehouse (475)

The Guard and Security Building and Gatehouse are located at the main entrance to the controlled area.

3.4.5 Engineering Building (486)

The Engineering Building is located on the north side of the main east/west site road.

The arrangement of the offices in the Engineering Building is shown on Figure GC II-1.

3.4.6 Core Storage Building (459)

This building is located north of the main east/west road and north of the Warehouse/Shops Building.

3.4.7 Compressor Buildings (463 and 485)

The South Compressor Building (463) is located south of the east/west main street and west of the SB.

The North Compressor Building (485) is located east of the Salt Shaft Hoist House.

3.4.8 Armory Building (473)

The Armory Building is located on the north end of the Guard and Security Building near the gatehouse.

3.4.9 Hazardous Material Buildings (474)

The Hazardous Material Buildings and structures are located in a fenced in area at the southwest corner of the site, south of the Pumphouse. A locked gate at the entrance controls access to allow only authorized personnel.

3.4.10 Auxiliary Warehouse Building (455)

The Auxiliary Warehouse Building (455) is located north of the main west to east road and east of the warehouse building with paved access from the main street.

3.4.11 Effluent Monitoring Instrument Shed, Station B (365)

The Station B Shed is located directly below the filtered air exhaust duct approximately 10 ft from the exhaust end. The location of this building relative to the EFB is shown on Figure CF I-1.

3.4.12 Electrical Calibration Shop (482)

This building is located southwest of the EFB and west of the Exhaust Shaft.

3.4.13 Underground Services Office Building (384A)

The Underground Services Office Building (384A) is located adjacent to the Salt Handling Shaft with location as shown on Figure G -3.

3.4.14 Salt Handling Shaft Hoist House (384)

The Salt Handling Shaft Hoist House is located north of the Salt Handling Shaft and east of the north-south road to the Salt Storage Area located as shown on Figure G.

3.4.15 Training Building (489)

The Training Building is located north of the main west to east road and east of the engineering building with paved access from the main street. The arrangement of the offices in the Training Building is shown on Figure GC II-2.

3.4.16 Air Intake Shaft Hoist House (362)

The Air Intake Shaft Hoist House is located north of the air inlet shaft near the west end of the site security enclosure. It is located adjacent to and north of the Air Inlet Winch House.

This building enclosure is approximately 30 ft by 40 ft with an opening for the rope from the air intake shaft to the drum with a double access door on the north side and a 3' wide door on the west side.

3.4.17 Air Intake Shaft Winch House (363)

The Air Intake Shaft Winch House is located adjacent to and south of the Air Inlet Shaft Hoist House. This enclosure is about 29 ft by 25 ft. The enclosure is open on the south side (toward the shaft) to allow the two ropes from the Air Inlet Shaft Tower to enter the enclosure and reel onto the drums.

3.4.18 Warehouse Annex (481)

The Warehouse Annex is located east from the Training Building (489) along the Security fence line. This building enclosure is approximately 152 ft by 82 ft with overhead main entrance door on the south side and man emergency exit door on the north side.

3.4.19 Miscellaneous Structures

3.4.19.1 Telephone Hug (468)

The Telephone Hut is located adjacent to and west of the SB.

3.4.19.2 Miscellaneous Foundations

Refer to Section 3.5.10 of this chapter.

3.4.20 TRUPACT Trailer Shelter (245)

The TRUPACT trailer shelter is located south of the RH Bay of the Waste Handling Building.

3.4.21 MgO Storage Shelter (246)

The MgO Storage Shelter is located southwest of the TRUPACT Maintenance Facility and outside the "controlled area" of the Waste Handling Building.

3.5 Component Design Description

3.5.1 Safety and Emergency Services Building (452)

The S&ESB building is a two story pre-engineered metal building 80 foot wide (E/W) and 90 foot long (N/S) on the upper floor with the lower floor extending another 29 foot to the north.

This building provides office, laboratory space and garage for the environmental safety and health activities, and Dosimetry Laboratories.

The second floor provides office space, bathroom facilities and a electrical/mechanical room. The offices provide space for Safety and Plant Protection, Regulatory and Environmental Programs, Radiation Safety and Emergency Programs, and Environmental Analysis personnel. There are stairways at the northwest and southeast corners of the building, and on the west side a personnel elevator accommodating the handicapped.

The lower floor consists of several areas as follows:

At the north end, an area 80 foot by 29 foot provides a garage for four vehicles such as ambulances and fire engines. Four over head garage doors face the main east/west street.

On the concrete ramp in front and between the doors, there are electrical outlets and an area for recharging batteries on carts.

Just south of the garage on the east side, there are areas for emergency medical treatment such as nursing and health care including treatment and testing. This area is about 2,144 square ft.

An area about 24 by 59 ft adjacent and south of the emergency medical treatment area is provided for the emergency operations center.

On the east side of the first floor, an area 26 ft by about 26.5 ft is provided for mine rescue operations. This area is south of the emergency operations and north of the analytical laboratories.

The Health Physics Laboratory is provided a area about 26 by 26 ft adjacent and west of the mine rescue area.

The Industrial Safety group is provided a 19 ft wide area along the west central area between the lobby and the south west door.

The Analytical Laboratory (including the Dosimetry Laboratory on the east end and the Industrial Hygiene Laboratory on the west end) is along the south side of the building with an area about 13 ft wide by 57 ft long.

Bathrooms are also located on the first floor in the central area adjacent to the lobby at the northwest door.

Space and support for the automatic sprinkling system is provided.

3.5.2 Warehouse Building (453)

The Warehouse/Shops building is a pre-engineered metal building mounted on a concrete pad. It is shown as Building 453 on Figure G-3. The building is approximately 79' wide by 162' long.

An unloading dock with an overhead door is provided on the south side with a ramp to allow unloading of trucks at floor level. The building provides office space for maintenance personnel and a warehouse.

Space and support for the automatic wet pipe sprinkler and portable fire extinguishers are provided.

3.5.3 Water Pumphouse (456)

The Water Pumphouse is a one story metal structure. It is constructed of structural steel columns and trusses which form a rigid frame to which insulated metal siding is attached.

The building contains mounting pads for three domestic water pumps with electric motors. There are two main fire water pumps, one driven by an electric motor and one by a diesel engine, and one electric jockey pump.

The Water Pumphouse also provides support and mounting for the suction and discharge piping of all pumps. Also, mountings for HVAC equipment are provided.

The building provides space and supports for a wet pipe sprinkler system, and portable fire extinguisher.

3.5.4 Guard and Security Building (458) and Gatehouse (475)

The Guard Post Area is a protected area with tinted windows permitting observation of activities to the north, west and east and with partial views to the south. The walls are protected with at least .25" steel panels covered with aluminum panels. All steel frames, glazing and doors meet the UL752 requirements for high-small arms rating. The space between the inner and outer wall surface is filled with blanket insulation.

Other facilities in the building are:

39.0 Lunch rooms and food preparation area

40.0 Auditorium

41.0 Lobby

42.0 Display area

43.0 Administrative offices

44.0 Visitors waiting area

45.0 Locker and toilet facilities

Space and supports for an automatic wet-pipe sprinkler system and portable fire extinguishers are provided. The kitchen is equipped with a dry chemical extinguisher system.

For a description of the Gatehouse, see Section 2.2.4 of this Chapter.

3.5.5 Engineering Building (486)

The Engineering Building is a one story pre-engineered metal structure on concrete slab. This building is designed in accordance with UBC provisions for Seismic Zone 1 and for a basic snow load of 10 pound per square foot.

Enclosed offices and modular office space is provided for engineering personnel as shown on Figure GC II-1. Space for supporting functions are provided as follows:

46.0 Engineering file room

47.0 Multiple conference rooms

48.0 Reproduction facilities

49.0 Electrical and mechanical equipment rooms

50.0 Toilet and janitorial storage rooms

51.0 Lobby and entry area

Some of the features of this building include:

52.0 Carpeting

53.0 Suspended ceiling

54.0 Fluorescent lighting

55.0 Automatic wet-pipe sprinkler system

56.0 Portable fire extinguishers

57.0 Modular offices

3.5.6 Core Storage Building (459)

The Core Storage Building (459) is a one story pre-engineered metal structure about 60 by 100 ft and is connected by an enclosed passageway to a trailer office facility (459A) adjacent to the east side.

The Core Storage Building (459) has a floor space of about 6,000 square ft with the east half used as office space. The west side (about half) of the building provides space for storage. This building is designed in accordance

with UBC provisions for Seismic Zone 1 and a basic snow load of 10 pound per square foot.

The floor of the building is a 6" reinforced concrete foundation.

3.5.7 Compressor Buildings (463 and 485)

North Building (485) provides space and mountings for two north compressors. South Building (463) provides space and mounting for two south compressors.

The Compressor Buildings are one story pre-engineered metal buildings. Both are insulated for noise absorption with Building 485 using a flexible blanket type insulation and Building 463 using a sprayed on foam type insulation.

Building 463 has a fire detection systems of smoke detectors audible outside the building and portable fire extinguisher are mounted inside the buildings.

3.5.8 Armory Building (473)

The Armory Building is a one-story structure. It is constructed of concrete blocks with both vertical and horizontal reinforcements and with the center cavities of the blocks filled with concrete to form a hardened structure. The floor of the building is a concrete slab. The armory building is not presently used as a armory. It is used for office space by Security.

The building is provided with sprinkler protection from the system in building 458.

3.5.9 Hazardous Material Building (474)

The Hazardous Material Buildings are situated around an asphalt paved area. This group of structures is enclosed in a fenced-in area, with a locked gate. These two buildings, two sheds, a covered storage area and a grate covered pit are shown on Figure GC II-3 are described in the following paragraphs. An emergency personnel shower and eye wash facility is provided between the oil storage pit and shed 474A, and adjacent to building 474C.

The buildings and sheds are equipped with wet pipe automatic sprinkler systems.

3.5.9.1 Hazardous Waste Storage Shed (474A)

This storage shed is mounted on a concrete foundation on the north side of the paved area. Three swinging doors are mounted on the south side of the shed. A wet pipe sprinkler system is provided.

3.5.9.2 Hazardous Waste Storage Shed (474B)

This shed is mounted on eight concrete piers. Three swinging type doors are located on the south side of the building facing the paved asphalt area. On the north side of the shed, three equally spaced valves are located at the bottom of the shed.

A wet pipe sprinkler system is provided.

3.5.9.3 Storage Building (Oil and Grease) (474C)

The Storage Building for New Oil and Grease is a one story pre-engineered metal structure with a storage space of about 900 square foot. A roll-up metal door is in the center of the front of the building with a personnel door on southeast front of the building. A wet pipe sprinkler system is provided.

3.5.9.4 Gas Bottle Storage Shed (474D)

The Gas Bottle Storage Shed is a concrete platform with gas bottle storage racks. The platform provides about 490 square foot floor space. A metal canopy cover is over this platform.

Assorted storage includes tanks of argon, nitrogen, hydrogen and acetylene, etc.

3.5.9.5 Hazardous Material Storage Building (474E)

The Hazardous Material Storage Building is a one-story pre-engineered metal structure with a total storage space of about 570 square ft. There are three bays of about 190 square ft each provided with shelving for storage. Masonry walls separate the bays.

The floors are sloped slightly downward from back to front with a sump in front. A roll-up overhead door provides access to each bay. A stairway from the asphalt level leads to a platform in front of each door.

A wet pipe sprinkler system is provided.

3.5.9.6 Waste Oil Retainer (474F)

Capability to store used (waste) oil in containers is provided. The waste oil retainer is a concrete vault with outside dimensions of about 6 ft by 16 ft and a wall thickness of 8". A 1.5" thick steel grating covers the top.

3.5.10 Auxiliary Warehouse Building and Storage Lots (455)

The building is a one-story pre-engineered metal structure (455) on a concrete foundation providing space for general maintenance activities. This building is designed in accordance with UBC provisions for Seismic Zone 1 and for a basic snow load of 10 pounds per square foot. The building is equipped with wet-pipe automatic sprinklers.

3.5.11 Effluent Monitoring Instrument Shed, Station B (365)

The Station B Instrument Shed is a prefabricated steel shed 11 ft wide by 10 ft long by 9 ft tall with double 2'-6" doors in the west wall. The shed elevation and arrangement plan is shown in Figure GC II-4. The steel siding is insulated to help control inside temperature. The shed is mounted on a concrete slab 8" thick. Attached between the shed roof and the bottom of the exhaust duct are three probe transport lines, one inlet for each of two CAMs and one outlet returning the sampled air from both CAMs to the exhaust duct. (ref. RM00)

3.5.12 Electrical Calibration Building (482)

This facility consists of two single story pre-engineered metal buildings. The larger building has dimensions of about 30 by 40 ft and is used to house equipment for performing electrical calibration.

3.5.13 Underground Services Office Building (384A)

This building is a one story pre-engineered metal structure with a nominal floor space of about 800 square ft and mounted on a concrete foundation. This building is designed in accordance with the UBC provisions for Seismic Zone 1 and a basic snow load of 10 pounds per square foot.

3.5.14 Salt Handling Shaft Hoist House (384)

This is a one story pre-engineered metal structure with an opening on the south side to allow the Salt Handling Shaft Hoist rope to pass through to the drum. The foundation is constructed to provide mountings for the double spool and the large electric motors. A fire water sprinkler system is provided.

3.5.15 Training Building (489)

The Training Building is a one story pre-engineered metal building 76 ft wide (E/W) and 136 ft long (N/S) on concrete slab.

The building is designed in accordance with UBC provisions for Seismic Zone 1 and a snow load of ten pounds per square foot. This building provides training facilities and offices.

Enclosed and modular office space is provided for training personnel as shown on Figure GC II-3; space for supporting functions are provided as follows:

58.0 Training Rooms 1 thru 4

59.0 Records storage area and library

60.0 Laboratory

61.0 Reproduction room

62.0 Electrical and Mechanical rooms

63.0 Toilets and janitorial room

64.0 Offices

Some of the features of this building include:

65.0 Carpeting

66.0 Suspended ceiling

67.0 Fluorescent lighting

68.0 Automatic wet-pipe sprinkler system

69.0 Portable fire extinguishers

70.0 Modular offices

3.5.16 Air Intake Shaft Hoist House (362)

The Air Intake Shaft Hoist House is a pre-engineered insulated metal structure about 40 ft in the east-west direction by 30 ft in the north-south

direction. It is mounted on the building's concrete foundation. A concrete foundation about 16 ft square is provided above the building foundation for the hoist drum. There are cable channels of 6", or more, cast in the concrete foundation.

Mountings for the hoist brake, electric and control consoles, switches and fire alarms are provided.

3.5.17 Air Intake Shaft Winch House (363)

The Air Intake Shaft Winch House is an un-insulated metal structure about 25' by 29' with the one side open toward the Air Intake Shaft (AIS). Ropes from the Hoist Tower enter the open side to the two winch drums. Two concrete pads 6" high, for the two drums, are located so that the drum on the east side of the building is 8'-9" farther from the hoist than the other.

3.5.18 Warehouse Annex (481)

The Warehouse Annex is a one-story pre-engineered, insulated metal building 152 ft long (in N-S direction) and 82 ft wide on concrete foundations. The building is designed with UBC provisions for Seismic Zone 1 and a snow load of ten pounds per square foot. This building provides space for long-term storage of heavy items that require only infrequent short-term maintenance. There are no offices and no personnel permanently located in this facility.

3.5.19 Salt Hauling Trucks Shed (243)

The Salt Hauling Trucks Shed is a one-story pre-engineered, non-insulated metal building with an open end facing East. It is providing shelter and space for light maintenance of trucks and other heavy equipment. The nominal dimensions of this facility are 40 ft long and 72 ft wide (N-S direction), constructed on an existing concrete foundation slab. This building is designed in accordance with UBC provisions for Seismic Zone 1 and basic snow load of 10 pounds per square foot.

3.5.20 Miscellaneous Structures

Foundations for miscellaneous facilities and structures such as electric substations and satellite dishes include the following:

Utility substation foundations:

71.0 Plant substation structural slab (Facility 253)

71.1.1 This is a finished reinforced slab 63 ft by 19 ft over structural back fill with the top surface at elevation 3,413.7.

72.0 Area substation #1 and #4 structural slab

72.1.1 Two slabs within a fence with dimensions of 8'-6" and 11'-6" by 23'-1" (for #1) and 25'-10" (for # 4) at elevation 3,410.5.

73.0 Area substation #2 structural slab

73.1.1 Two slabs within a fence 8'-6" by 9'-8" and 10'-6" by 27'-8" at elevation 3,409.5.

74.0 Area substation #3 structural slab

74.1.1 Two slabs within a fence 9'-8" by 24'-0" and 11'-6" by 38'-4" at elevation 3,410.5.

75.0 Area substation #5 structural slab

75.1.1 A slab 12'-0" by 25'-0" with elevation at 3413.0'. PVC conduit is embedded into the slab and extends underground north and south of the slab to allow routing of cable from the slab. Steel mounting channels are embedded into the top of the concrete slab using 0.5" studs.

76.0 Satellite Dish Antenna, east from the Training Building, 12' by 12' concrete slab.

3.5.21 TRUPACT Trailer Shelter (245)

The TRUPACT trailer shelter is a one-story, three-sided, pre-engineered, non-insulated metal structure, with the open side facing north. The structure's three sides extend down to 4 ft above grade. The structure is 173 ft wide and 40 ft deep (N-S direction) and is erected on concrete footers. The shelter provides shade for loaded TRUPACTS while in the staging area prior to being taken in the WHB for processing. This reduces the hazard to personnel of working with hot surfaces and also reduces the heat load on the WHB's HVAC system.

3.5.22 MgO Storage Shelter (246)

The MgO Storage Shelter is a one-story, three-sided, pre-engineered, non-insulated metal structure, with its open side facing north. The structure is 90 ft wide and 40 ft deep (N-S direction) and has a concrete foundation, floor slab, and apron. The shelter provides storage space for MgO used in the waste emplacement process.

3.6 Instrumentation and Control

There are no instrumentation and control requirements for the general surface facilities identified under Subsystem GC02.

3.7 System Interfaces

Refer to Section 3.7 of Chapter G which documents the subsystem primary and secondary interfaces.

4.0 OPERATION

The operation of the Hazardous Material Storage area is defined in the WIPP Controlled Operating Procedures.

The WIPP Operating Procedures shall prescribe operational prerequisites, precautions, sequences, and constraints as relative to the following buildings:

77.0 New Oil and Grease Storage (474C)

78.0 Gas Bottle Storage Shed (474D)

79.0 Hazardous Material Storage (474E)

80.0 Hazardous Waste and Hazardous Waste Staging Area (474A and 474B)

Refer to the general section for all other operating procedures.

5.0 SYSTEM LIMITATIONS, SET POINTS, AND PRECAUTIONS

None required.

6.0 OFF-NORMAL EVENTS AND RECOVERY

The following are considered to be off-normal events for the general surface facilities:

81.0 Loss of electrical power (SDD ED00)

82.0 Fire (SDD FP00)

83.0 UBC Zone 1 earthquake

84.0 Site Specific wind load

Refer to the WTS Controlled Operating Procedures for the associated recovery sequences.

7.0 MAINTENANCE

Refer to Section 7.0 of Chapter G for information regarding the general maintenance approach and the general requirements for corrective maintenance, preventative maintenance, in-service inspection, and surveillance. The subject maintenance program should address the following for all GC02 building and associated features.

7.2 General

85.0 Inspect and replace any damaged insulation if visible on building walls and ceilings.

86.0 Inspect and replace any corroded equipment mounting attachments.

87.0 Inspect and repair any damaged or leaking roofing.

88.0 Inspect and repair any damaged toilet or sink equipment or plumbing.

7.3 Compressor Buildings

89.0 Replace or add to the wall sound insulation to maintain acceptable external sound level.

7.4 General Surface Facilities

90.0 Conventional industrial plant building preventive maintenance shall be used, as applicable, for all buildings and facilities in this subsystem.

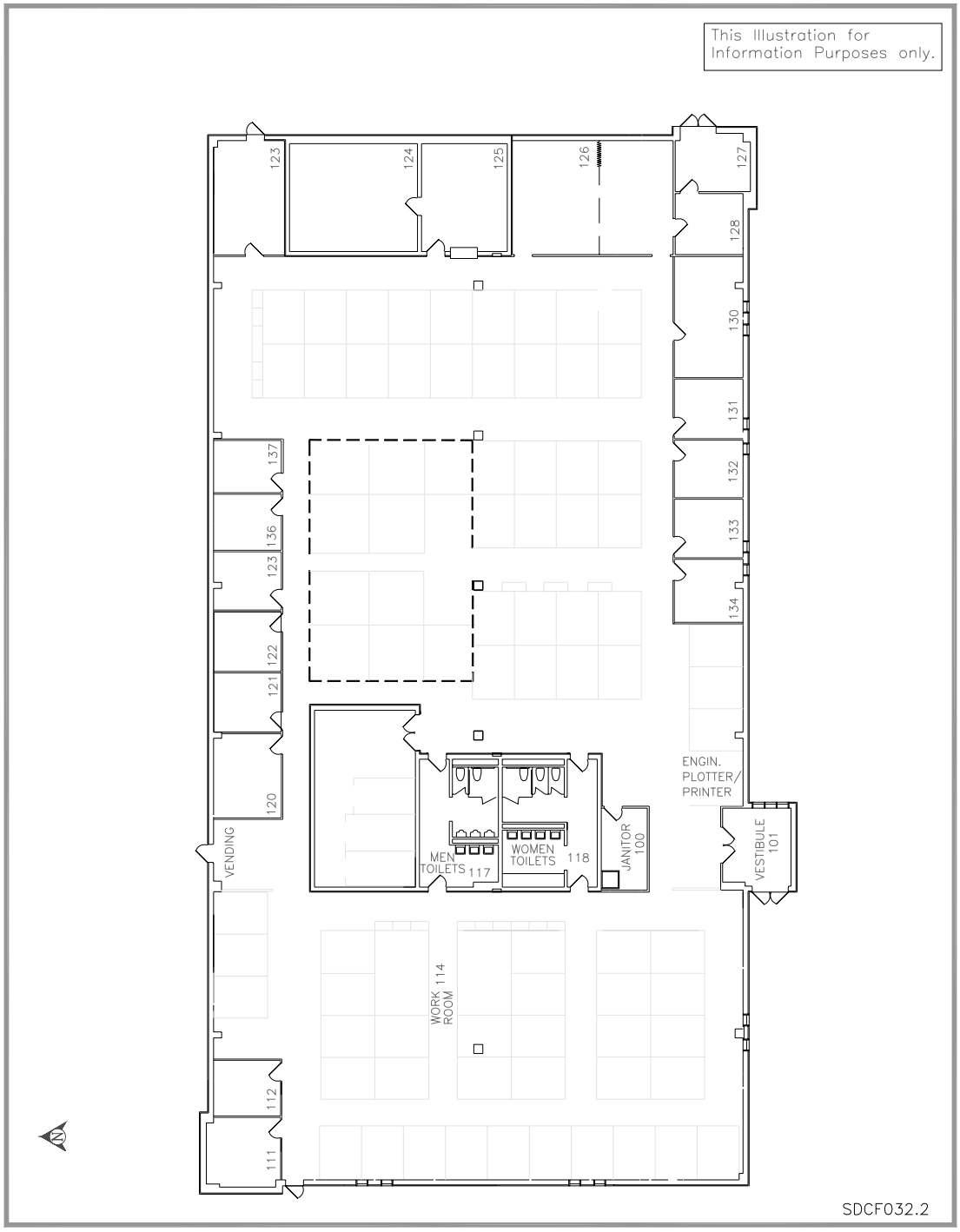

FIGURE GC-II-1 Engineering Building - Floor Plan

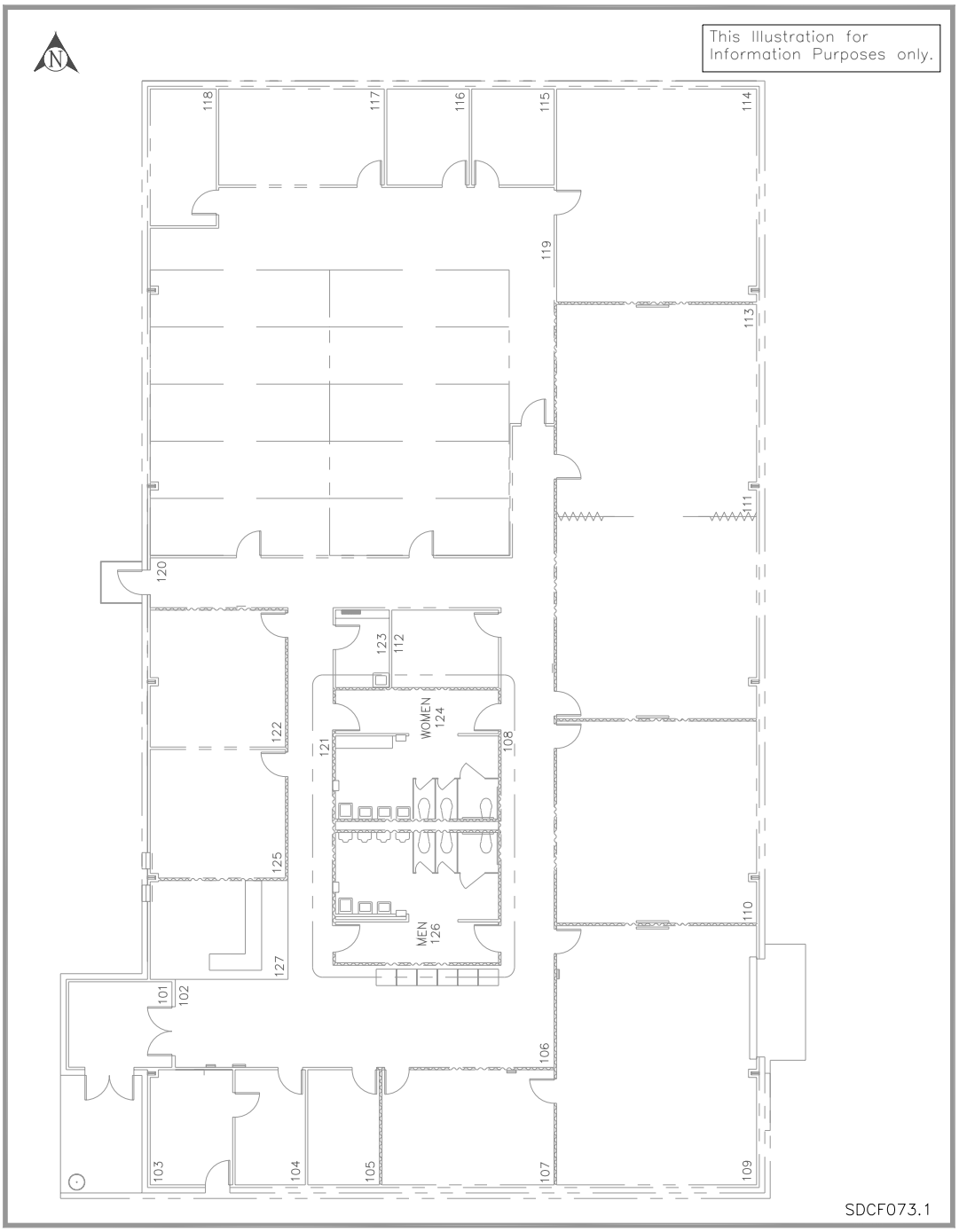

FIGURE GC-II-2 Training Building - Floor Plan

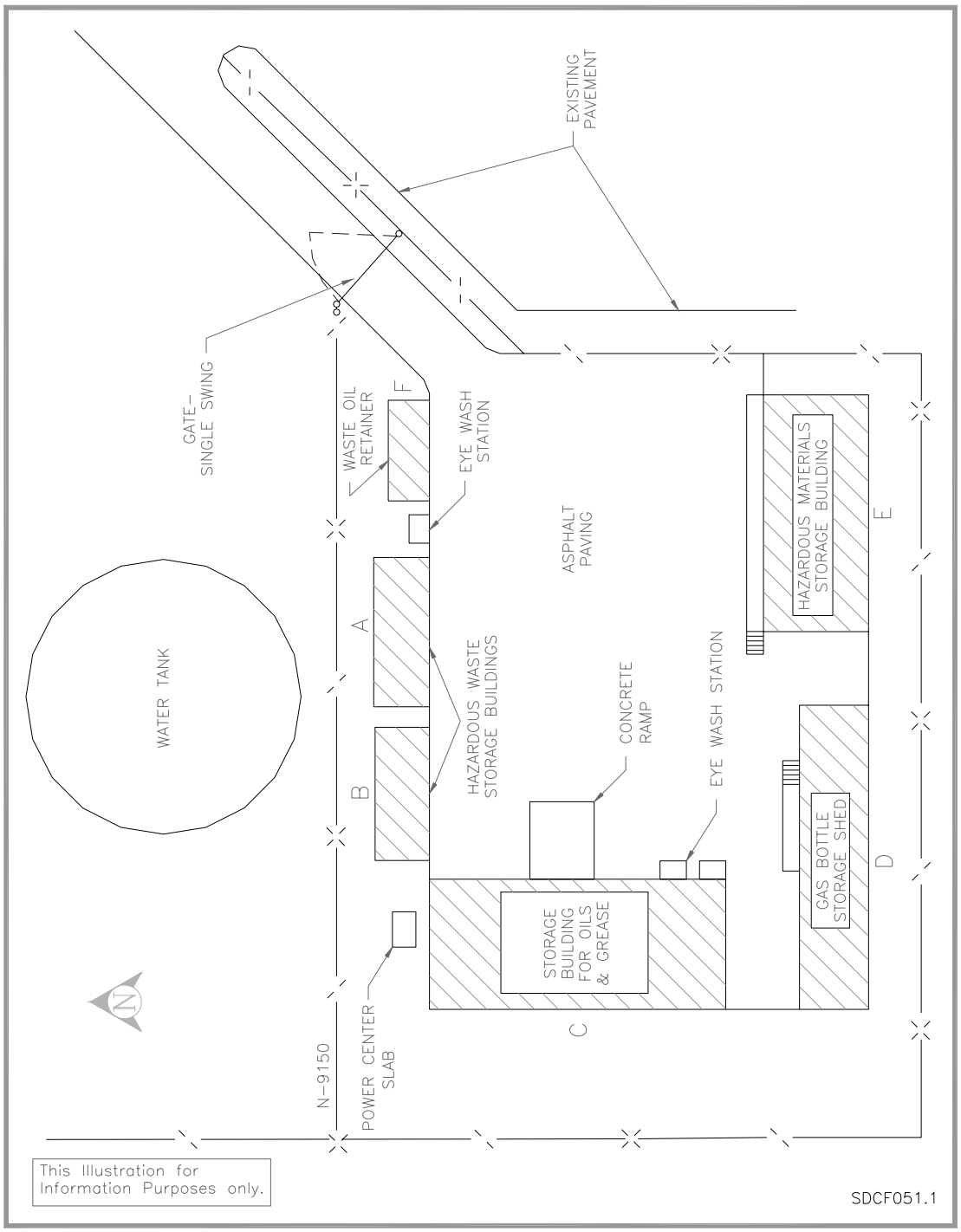

FIGURE GC-II-3 Hazardous Materials Area Buildings (474)

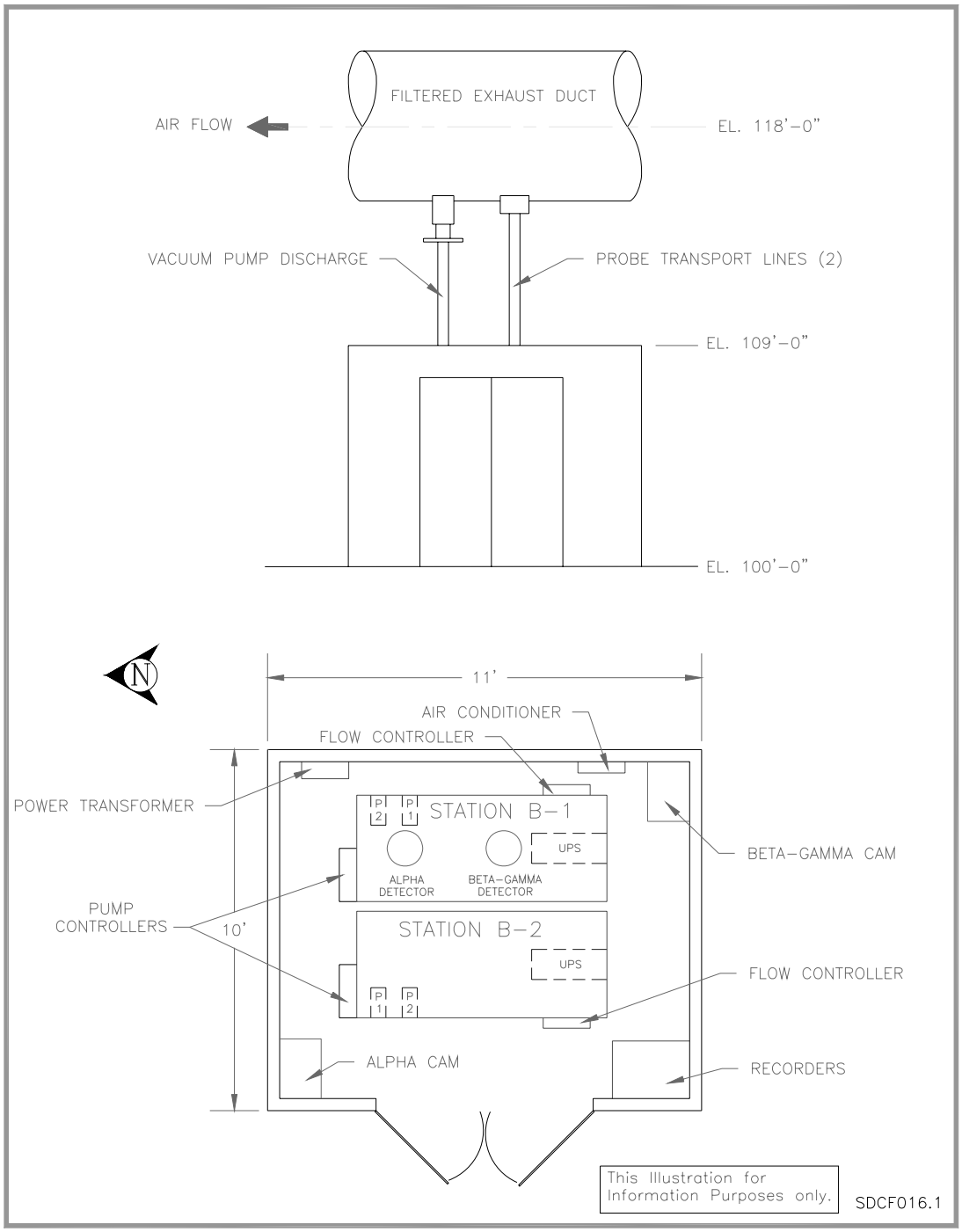

FIGURE GC-II-4 Effluent Monitoring Instrument Shed, Station B

Part II, Chapter III

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Chapter II-III

Subsystem GC03, Sanitary Sewage System

1.0 PRIMARY FUNCTIONS

The primary function of the Sanitary Sewage System is to provide for collection, treatment, and disposal of solid and liquid effluent.

2.0 DESIGN REQUIREMENTS

2.1 General

Refer to Chapter G for Design Requirements

2.2 Subsystem General Requirements

The Sanitary Sewage Treatment Facility shall be designed for processing an average daily flow rate of Sanitary Sewage of at least 23,000 gpd.

Collection of the sanitary waste shall be through a buried gravity flow system. The flow rate shall be based on an average flow of 50 gpcd (gallons per capita day) through the lagoon. The instantaneous design peak flow rate shall be 230 gpm.

The Waste Stabilization Lagoons (Facultative) shall be designed to meet the ASCE (American Society of Civil Engineers) and the WPCF (Water Pollution Control Federation) design criteria as follows:

- Hydraulic retention time — 7 – 30 days
- Hydraulic loading — 0.5 – 1.5 in/day
- BOD_5 loading — 15 – 50 lb/day
- BOD5 removal efficiency — 80 – 95%
- Optimum Temperature — 20˚ C
- Temperature range — 0 - 50˚ C
- Algal concentration — 40 -160 mg/l
- Coliform removal — Greater than 99%
- TSS effluent quality — 25 – 50 mg/l
- Oxygen source — Algal
- Lagoon depth — 3 – 6 ft
- Mode of operation — Series or parallel

The Sewage Treatment Facility shall be located on the southwest side of the WIPP site and shall be surrounded by a chain link security fence topped by barbed wire with a double-swing vehicle gate provided by the Plant Protection System (PP00). The Sewage Treatment Facility shall consist of a

stabilization lagoon (two primary and two secondary cells) and three evaporation ponds.

An additional evaporation pond, H-19, shall be located approximately 1.5 miles southeast from the WHB. The pond can receive up to 8,000 gal. of non-hazardous brine, or overflow water from the lagoons if reported and approved by the NMED.

The discharge of any effluent (sewage, brine, or other fluid) shall comply with the state of New Mexico Water Quality Control Commission requirements of WQCC-82 Part 3 and amendments providing regulations in regard to discharge of effluent or leachate. The regulations forbid discharge of effluents that can move directly or indirectly into ground water unless the discharge is made pursuant to a discharge plan approved by the state of New Mexico director of Water Quality Control Commission.

The Sanitary Sewage Treatment Facility shall include and provide the following:

91.0 Lagoons (primary and secondary cells)
92.0 Evaporation ponds
93.0 Piping
94.0 H-19 Evaporation Pond

2.2.1 Lagoons

A facultative lagoon system shall be provided consisting of two trains of equally sized primary cells and two equally sized polishing cells with series operational capability. Both the primary and polishing cells shall be designed with side slope ratios of 3:1 and shall have a length to width ratio of 3:1 to prevent short circuiting and to increase the average hydraulic detention time.

Embankment tops to the lagoon shall have a minimum width of 10 ft to permit access of maintenance vehicles. A minimum freeboard of 2 ft shall be maintained at all times. The embankment shall be protected as necessary to prevent erosion due to precipitation and wave action.

One influent manhole shall be provided to facilitate the removal of grit. Manholes shall be made large enough to provide personnel access to all equipment. For the gravity flow-line of the influent upstream of the manhole, the invert shall be above the maximum operating level of the lagoon and shall have sufficient slope to maintain a minimum flow velocity of 2 ft/sec in the pipe.

The four cells shall be provided with synthetic liners to ensure that no effluent shall be discharged or allowed to leak outside of the cells.

2.2.2 Evaporation Ponds

Three evaporation ponds shall be provided to completely evaporate the discharge of sewage effluent into the ponds. All evaporation ponds shall be provided with synthetic liners to ensure that no effluent shall be discharged or allowed to leak outside of the evaporation ponds. A minimum freeboard of 2 ft shall be maintained at all times. No minimum water level is required to be maintained.

A fourth evaporation pond shall be provided to receive and evaporate the discharge of underground brine and brine water from observation well pumping. No effluent shall be discharged or allowed to leak unless it is being discharged pursuant to the WIPP Sewage System Discharge plan. The WIPP Sewage System Discharge Plan shall be approved by the state of New Mexico.

The evaporation pond, H-19, shall be approximately 150 ft square, about 4 ft deep and provided with a synthetic liner to prevent effluent discharge. A minimum freeboard of 2 ft shall be maintained at all times. No minimum water level is required to be maintained.

2.2.3 Treatment Facility Piping

The lagoon primary and polishing cells shall be complete with interconnecting drain pipes, valves, and fittings to facilitate isolating and draining particular cells. Weir boxes shall be provided to control the water level in each of the cells during normal operation. Anti-seep collars shall be provided to prevent seepage and scouring around the pipe penetrations and level control structures.

2.2.4 Collection Piping

Gravity flow piping shall be used to transport sanitary waste from the WIPP buildings to the treatment facility. Vitrified clay piping for the collection systems shall start at a point 5 ft outside of all building wall lines and shall have suitable gaskets.

2.2.5 Synthetic Liner Material

The synthetic liner material (geomembrane) shall be chlorosulfonated polyethylene (CSPE), polyvinyl chloride (PVC), high density polyethylene (HDPE) or other material suitable for use at a sanitary waste installation. The material shall have low permeability and high resistant to chemicals and ultraviolet radiation.

2.3 Operation

The Sanitary Sewage System operating equipment shall be provided with operating procedures.

2.4 Structural Requirements

There are no general structural design requirements for the Sanitary Sewage System. Refer to 2.2 for evaporation pond requirement.

2.5 General Arrangement and Essential Features

The Sanitary Sewage System shall be located outside of the WIPP site property protection area because of the space requirements for the sewage lagoon and evaporation ponds and to allow for additions to be made later.

2.6 Maintenance Requirements

Refer to Section 2.6 of Chapter G.

2.7 In-Service Inspections

Refer to Section 2.7 of Chapter G.

2.8 Instrumentation and Control

None applicable.

2.9 Interfacing System Requirements

Refer to Section 2.9 of Chapter G for the interfacing system requirements.

2.10 Quality Assurance Requirements

Refer to Section 2.10 of Chapter G for the general quality assurance requirements.

2.11 Codes and Standards

Refer to Section 2.11 of Chapter G for the governing codes and standards.

2.12 Reliability Assurance

Refer to Section 2.12 of Chapter G for the general reliability assurance requirements.

3.0 DESIGN DESCRIPTION

3.1 Summary

Refer to Section 3.1 of Chapter G for summary design descriptions.

3.2 Detailed System Description

The Sanitary Sewage System collects, treats and disposes of solid and liquid effluent. The sewage treatment plant utilizes a biological treatment process using facultative stabilization lagoons.

The process uses two primary cells, followed by two polishing cells , followed by an effluent pond. The water in the effluent pond either evaporates or flows to two additional evaporating ponds as needed to maintain freeboard.

Chlorination of the sewage lagoon effluent is no longer required. The operation and maintenance of the chlorinators has been discontinued.

A 4" FAS-Line (polyethylene pipe) is installed from the Sanitary Sewage Facility to evaporation pond H-19 for the purpose of transferring water, when needed. When it is necessary to transfer water to H-19, a portable pump is installed at the lagoons and connected to the pipe.

3.3 System Performance Characteristics

Subsystem GC03 is a passive system operating 24-hour per day at a capacity of 23,000 gallons per day, or a peak rate of 230 gpm.

3.4 System Arrangement

The sewage stabilization lagoons are located within a fenced area outside the property protection area to the southwest side of the site. The entrance to this fenced area is through a gate on the unpaved road from the south access road. The location is shown on Figure GC-III-1.

3.5 Component Design Description

The Sanitary Sewage System is capable of collecting and processing an average daily flow rate of 23,000 gallons per day with an instantaneous peak flow rate of 230 gallons per minute.

Gravity lines are used to transport sanitary wastes from the individual facilities in the various plant buildings to the stabilization lagoons. These lines enter the distribution box at the east end of the lagoons. The vitrified clay piping for

the collection starts about five ft out of the building wall line with a gasketed connection to the piping from the building.

The lagoon area, as shown on Figures GC-III-2 and GC-III-3, is approximately 220 ft wide and 1000 ft long.

The lagoon system consists of two equally sized primary (settling) cells and two equally sized polishing cells in series. The fluid from the two polishing cells flows via a wye connection into a chlorinator (that the operation of, has been discontinued) and on into a single effluent (evaporation) pond where the water is allowed to evaporate or flow out of pipes in a wye connection to two 200-foot-long evaporation ponds. If necessary at certain times of the year, due to evaporative losses and low use, one set of the primary and polishing cells may be used.

The flow is metered by means of a V-notch or rectangular weir.

The primary cells and the polishing cells have a maximum depth of five ft with a two-foot freeboard. The first effluent pond (evaporation pond A) has a maximum depth of three ft with a two-foot freeboard. The remaining effluent ponds (evaporation ponds B and C) have a maximum depth of four ft with a two-foot freeboard.

The primary cells and the polishing cells are lined with 60 mil, high density polyethylene (HDPE) material. The thee evaporation ponds are lined with 30 mil, very low density polyethylene (VLDPE) material. The embankment tops have a width sufficient for access of maintenance vehicles, with a freeboard of three ft above normal operating level. The side slope ratio of 3:1 is provided.

Weir boxes and pinch valves are installed to control flows between the various cells and ponds.

Evaporation pond H-19 is lined with 36 mil, chlorosulfonated polyethylene (CSPE) material, commonly referred to as Hypalon.

3.6 Instrumentation and Control

There is no electrical instrumentation or control associated with the Sanitary Sewage System.

Data monitoring is performed by grab samples as required by the environmental compliance group. Samples are analyzed on and off site and data supplied to the state of New Mexico as required.

3.7 System Interfaces

Refer to Section 3.7 of Chapter G which documents the subsystem primary and secondary interfaces.

4.0 OPERATION

Refer to WIPP site Controlled Operating Procedures for the Sanitary Sewage System.

5.0 SYSTEM LIMITATIONS, SET POINTS, AND PRECAUTIONS

The following operating limits for the sewage ponds parameters are based upon pond color, wave action, and plant growth as follows. These should be observed and monitored on a weekly basis.

5.3 Limitations

Pond color is used as a quick check of pond conditions, since the color of the primary cells is directly related to pH and dissolved oxygen.

The following color limits shall be used as visual guide to the condition of the cells:

95.0 A dark sparkling green color = Good; high pH and high dissolved oxygen content.

96.0 Dull green to yellow = Poor; pH and DO are dropping; blue-green type algae are becoming predominant.

97.0 Tan to brown = Fair, if due to a predominance of a brown type algae.

98.0 Gray to black = Very bad, pond is septic with anaerobic conditions prevailing.

Since good wave action when the wind is blowing is desirable on the pond, plant growth in the water or along the bank should be prevented. The absence of good wave action can be an indicator of anaerobic conditions or an oily surface.

If discharged, the sewage effluent shall meet the State of New Mexico Ground Water Quality Control Commission Standard Regulations.

Waste stabilization lagoons (facultative) operation shall remain within the limits of design as stated in Section 2.2

5.4 Precautions

The following precautions shall be taken by the operating personnel:

99.0 All cuts, abrasions, and similar injuries shall be promptly cleaned and treated by the Emergency Services Technician or WIPP site nurse.

100.0 No eating, drinking, or smoking is permitted within the sewage lagoon fenced perimeter.

101.0 Only authorized personnel shall be allowed entry into the fenced area of the sewage lagoons.

102.0 The gate in the lagoon fence shall remain locked any time the area is unoccupied.

103.0 Any operating personnel shall have a current tetanus immunization with records on file at the health services office.

104.0 Operating personnel shall have protective clothing to be worn except when performing routine discharging and maintenance.

6.0 OFF-NORMAL EVENTS AND RECOVERY

The following are considered to be off-normal events for the Sanitary Sewage System:

105.0 High or low water levels

106.0 Water leaks from the primary cells

Refer to the WIPP Site Controlled Operating Procedure which prescribe recovery sequence and constraints for the subject Sanitary Sewage System off normal events.

7.0 MAINTENANCE

7.1 Maintenance Approach

Refer to Section 7.1 of Chapter G for information regarding the general maintenance approach. Also presented in Chapter G are the WIPP generic corrective maintenance, preventive maintenance, and in-service inspections. The Sanitary Sewage System specific maintenance requirements are presented in the following subsection.

7.2 Corrective Maintenance

Inspect and repair any malfunctioning sewage equipment or facilities such as valves, piping, plastic liners, earthworks, weirs, etc.

7.3 Preventive Maintenance

Refer to WIPP Site Controlled Operating Procedures for operation and maintenance of the sewage lagoon system. Frequency of sampling shall conform to the requirements of New Mexico Water Quality Control Commission Regulations.

7.4 In-Service Inspection

Standard sewage treatment plant In-Service-Inspection shall be carried out on a periodic basis as required by State and Federal regulations.

Testing of quantities and quality of influent and effluent shall be performed by an independent testing laboratory. The results shall conform to the requirements of New Mexico Water Quality Control Commission Regulations.

Evaluation of the performance of the evaporation ponds during low evaporation periods, as well as the potential use of single settling ponds (primary and secondary cells) during high evaporation or low use periods shall be monitored to ensure that operation is within the required limits.

Inspection activity shall be included to preclude overflow of the evaporation ponds.

The liners of the lagoons shall be observed for cracks and signs of deterioration and reported. Evaluation is to be made whether continued operation would impact State and Federal limits. Any indication of faulty operation of valves should be identified and corrected.

The sewage lagoon shall be monitored on a quarterly basis to document compliance with Discharge Plan, DP-831 and to ensure hazardous materials are not being discharged into the lagoon. Samples from all the ponds are to be analyzed for the constituents described in Discharge Plan DP-831.

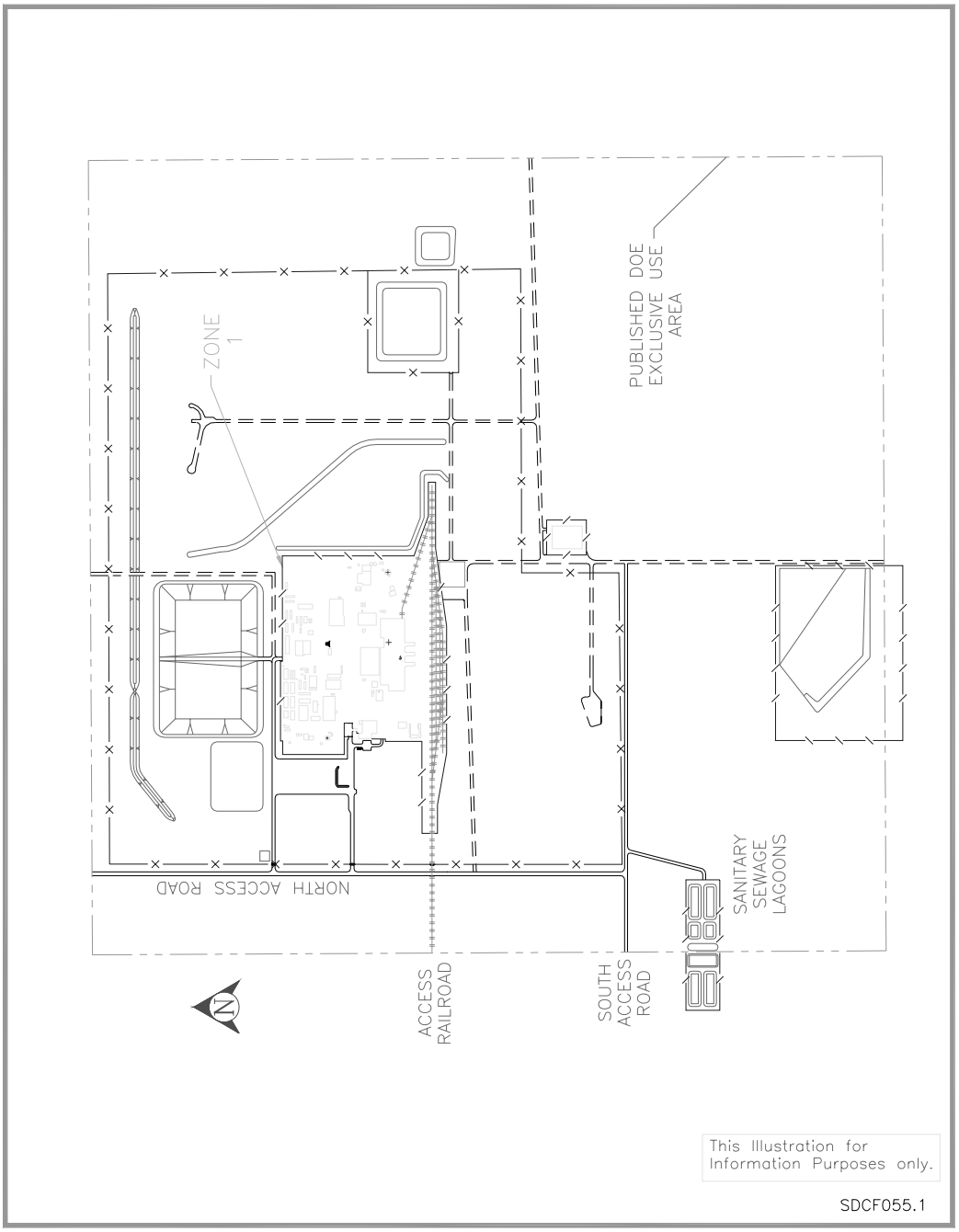

FIGURE GC-III-1 Sanitary Sewage Lagoons Location

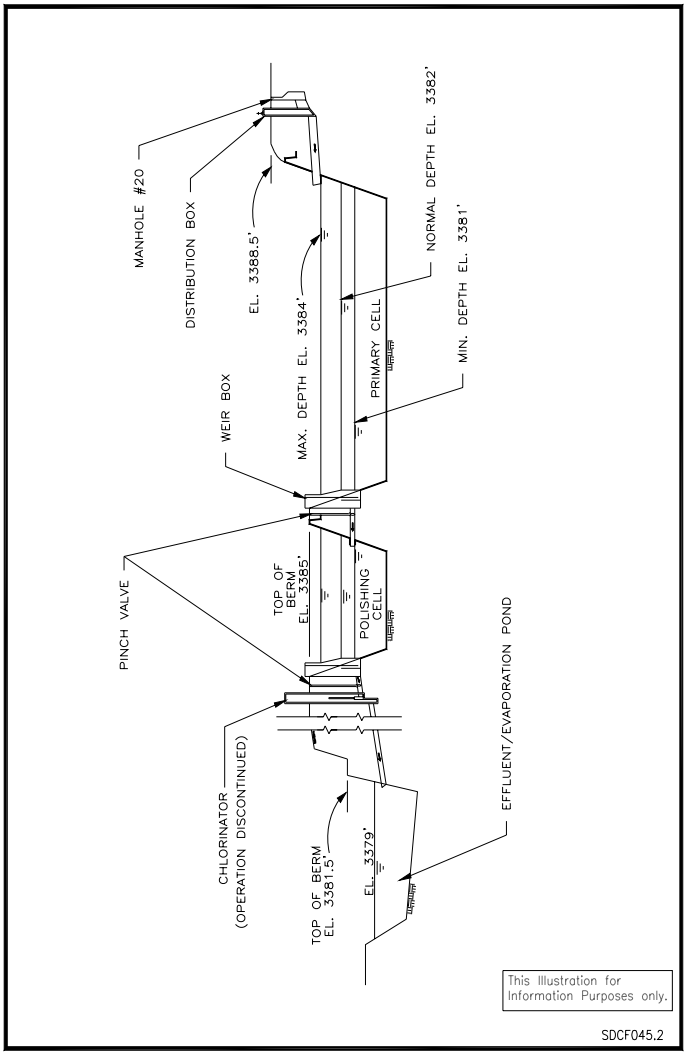

Figure GC-III-2, Sanitary Sewage Lagoons - Section

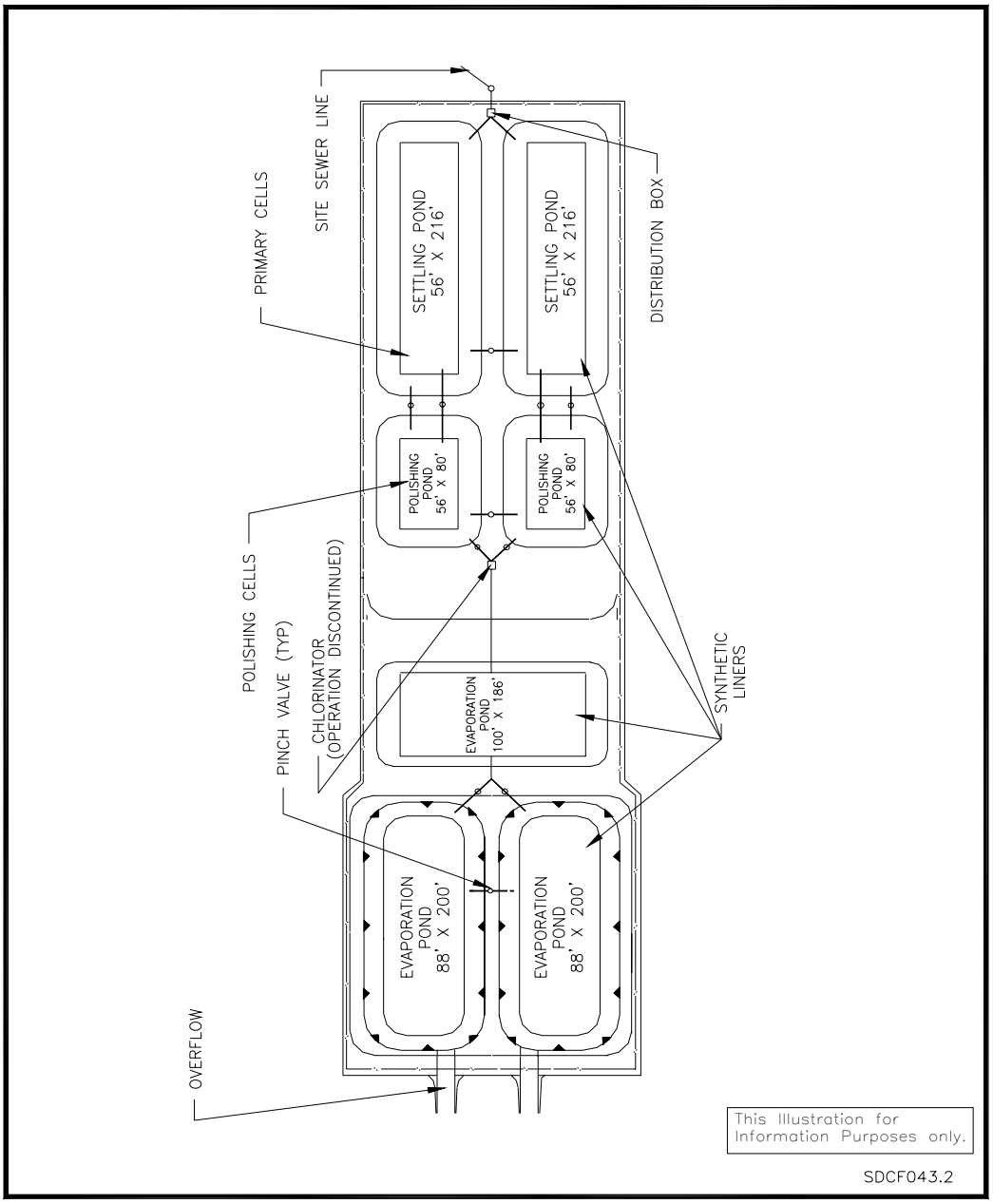

Figure GC-III-3, Sanitary Sewage Lagoons – Plan

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Part II, Chapter IV

Subsystem GC04, Fuel System

1.0 PRIMARY FUNCTIONS

The primary functions of the Fuel System (Facility 480) are as follows: provide a fuel system for receipt, storage, leak prevention and detection, and dispensing of unleaded gasoline for surface mobile equipment and of diesel fuel for surface and underground equipment, both mobile and stationary.

2.0 DESIGN REQUIREMENTS

2.1 General

Refer to Chapter G for General Design Requirements.

2.2 Subsystem General Requirements

2.2.1 The Fuel System shall comply with the requirements of the State of New Mexico Environmental Improvement Board's "Underground Storage Tank Regulations," EIB/USTR 1-14.

2.2.2 Two 8,000 gallon double wall fuel tanks of fiberglass reinforced epoxy materials that are leak tested in conformance with API 1615 shall be provided; one tank for unleaded gasoline and the other for diesel fuel storage. The tanks shall be installed below ground. Each tank shall be provided with a liquid leak sensor for in-service interstitial monitoring. A method for measuring fuel level in the tanks and periodically testing for water in the tanks shall be provided. The tanks shall be UL Listed.

2.2.3 Two fuel dispensers shall be provided; one for dispensing unleaded gasoline and the other for diesel fuel.

2.2.4 The fuel dispensers shall be mounted outdoors and shall be UL listed. Each dispenser shall be provided with a UL listed fuel pump, a strainer, a positive displacement meter, a non-computing register with power reset, and an on/off switch for controlling the pump. The unleaded dispenser shall deliver fuel at a rate of not more than 10 GPM in accordance with 40 CFR Part 88.22.

2.2.5 Piping from tanks to the dispensers shall be double wall construction, of glass fiber reinforced epoxy resin materials, in accordance with ASTM D2196, Type 1, Grade 1, or approved equal. Liquid leak detection shall be provided for the interstitial pipe space. Fuel and vent piping materials shall be in accordance with NFPA 30.

2.3 Operation

2.3.1 Fuel shall be received from tanker trucks via local distributors.

2.3.2 Diesel fuel for underground mobile equipment shall be supplied from the surface dispenser to a portable trailer mounted tank for transfer to underground.

2.3.3 The fuel storage tanks and piping shall be monitored for fuel leakage at least every 30 days.

2.4 Structural Requirements

There are no general structural design requirements for the fuel systems.

2.5 General Arrangement and Essential Features

The Fuel System shall be located within the site's Property Protection Area, but away from normal vehicle flow so that refilling tank trucks does not impede normal traffic.

2.6 Maintenance Requirements

Refer to Section 2.6 of Chapter G.

2.7 In-Service Inspections

Refer to Section 2.7 of Chapter G.

2.8 Instrumentation and Control

2.8.1 An emergency, manually operated, shutoff, to interrupt electrical power to the dispensers, shall be provided at a location remote from the fuel dispensers.

2.8.2 A fuel leak detection system shall be provided to detect leakage of fuel from the fuel storage tanks and the interconnecting piping between the tanks and the dispensers.

2.8.3 The pump of each dispenser shall operate only when the dispenser nozzle has been removed and the on/off switch on the dispenser has been activated.

2.8.4 Each dispenser nozzle shall stop the flow of fuel in the event of a overfill of the vehicle or equipment fuel tank.

2.8.5 Each fuel storage tank shall be provided with a means of stopping filling operations when the tank is 95% full.

2.9 Interfacing System Requirements

2.9.1 Refer to Section 2.9.1 of Chapter G for general information concerning interfacing systems requirements.

2.9.2 Primary System Interface Requirements

2.9.2.1 The Compression Air System (CA00) shall provide compressed air for vehicle service

2.9.2.2 The Water Distribution System (WD00) shall provided water for vehicle service.

2.9.2.3 The Fire Protection System (FP00) shall provide a portable fire extinguisher suitable for Class B and C fires.

2.9.2.4 The Electrical Distribution System (ED00) shall provide power to operate the fuel dispensers and the leak detection system.

2.9.3 Secondary System Interface Requirements

2.10 Quality Assurance Requirements

Refer to Section 2.10 of Chapter G for the general quality assurance requirements.

2.11 Codes and Standards

The following Code of Federal Regulation applies to the fuel system pumping rate:

40 CFR Part 80.22	Chapter I – Environmental Protection Agency Subchapter C – Air Programs Part 80 – Regulation of Fuels and Fuel Additives Subpart B – Controls and Prohibitions

Refer to Section 2.11 of Chapter G for the general governing codes and standards.

2.12 Reliability Assurance

Refer to Section 2.12 of Chapter G for the general reliability assurance requirements.

3.0 DESIGN DESCRIPTION

3.1 Summary

Refer to Section 3.1 of Chapter G for summary design descriptions.

3.2 Detailed System Description

The Fuel System stores and distributes unleaded gasoline and diesel fuel for all site surface vehicles, as well as providing diesel fuel for the underground fuel storage facility. Fuel is supplied by tanker trucks from local distributors.

3.3 System Performance Characteristics

There are no specific performance characteristics associated with the Fuel System.

3.4 System Arrangement

The Fuel System is located as shown on the plot plan, Figure G-3, on the north side of the main east/west road and west of the road to the salt pile. A large concrete pad and fuel dispenser island is located over the two fuel tanks. The system's leak detection panel is located at the north end of the facility, between the fuel tank vent pipes.

3.5 Component Design Description

3.5.1 Fuel Storage Tanks

One diesel fuel storage tank with a nominal capacity of 8,000 gallons and one unleaded gasoline storage tank with a nominal capacity of 8,000 gallons are installed below the surface of the ground.

Each tank is of double wall fiberglass reinforced epoxy materials and is compatible with petroleum products having a specific gravity of 1.1 and an upper limit of surface temperature of 150 degrees F. Each tank is provided with two manways, however, the manways are not accessible due to the facility's concrete pad. Each manway cover has three 4" penetrations. These penetrations are used for the installation of the following at each tank: a fill pipe (drop tube), a vapor recovery connection (currently not used), tank vent piping, and fuel suction piping. A foot valve is installed in the suction piping. A ball-type float valve is provided at the vent piping penetration to restrict venting when the tank level reaches 95% during filling operations.

Each tank also has a separate penetration containing an "abandoned-in-place" level element.

Liquid leak sensors are installed between the walls of the tanks for interstitial monitoring of any leakage. Leak sensors are also provided in the space between the walls of the double wall piping. The leak sensors provide continuous monitoring inputs to the leak detection panel. (See 3.5.3)

Each tank is UL Listed. The serial numbers for the tanks are: diesel - 615285, unleaded - 615548.

3.5.2 Fuel Dispensers

Fuel dispensers for both unleaded gasoline and diesel fuel are provided and equipped with a strainer, a positive displacement meter, a non-computing register and a pump with an on/off switch. In addition, an emergency shut off valve is installed in the fuel supply line to each dispenser to stop the flow of fuel in the event of fire or severe physical damage to the dispenser. These dispensers are enclosed in heavy duty stainless steel cabinets. The dispenser nozzles are the automatic type without the hold-open clip and are provided with a swivel joint. The unleaded fuel dispenser is provided with a flow restrictor upstream of the hose to limit flow to less than 10 GPM.

3.5.3 Leak Detection Panel

A leak detection panel is provided for monitoring the Fuel System for fuel leakage as required by EIB/USTR 1-14. The panel, housed in a weatherproof enclosure, is mounted between the vent pipes for the two fuel tanks. The microprocessor-based panel receives inputs from the four liquid leak sensors installed between the double walls of the tanks and the fuel dispensers' suction piping. The panel provides a local audible alarm, as well as a paper printout.

Note: This panel is intended to be used with in-tank probes, in addition to the liquid leak sensors, to form a complete tank monitoring system. In-tank probes are currently not installed in the fuel storage tanks.

3.5.4 Miscellaneous Components

3.5.4.1 A concrete pad is installed over the buried fuel tanks. Access ports are provided in the concrete pad to provide access to the following: the fill pipe connection, the vapor recovery connection, the abandoned-in-place level element, the tank and piping liquid leak sensors, the vent pipe extractor valve (allows removal of the float valve), and the suction piping extractor valve.

3.5.4.2 A hose reel cabinet, providing compressed air and water for vehicle service, is located approximately 40 ft west of the fuel dispensers.

3.5.4.3 A card reader is installed at the fuel island and is connected to the two fuel dispensers. The card reader has the ability to control the use of the dispensers and to record fuel usage.

3.6 Instrumentation and Control

3.6.1 120 volt electrical power is supplied to the two fuel dispensers and the leak detention panel from a mini power center located east of Building 455.

3.6.2 Two emergency shutoff buttons, one for the unleaded gasoline dispenser and one for the diesel fuel dispenser, are located approximately 40 ft west of the dispensers.

3.7 System Interfaces

Refer to Section 3.7 of chapter G and Section 2.9 of the chapter which documents the subsystem primary and secondary interfaces.

4.0 OPERATION

Refer to the WIPP Site Controlled Operating Procedure for the operational sequence and controls for the subject fuel system.

Specific operating requirements relative to the subject Fuel System:

107.0 The operation of the Fuel System is per standard industrial and/or commercial practice.

108.0 The Fuel System shall be monitored for leakage using its leak detection panel at least every 30 days.

5.0 SYSTEM LIMITATIONS, SET POINTS, AND PRECAUTIONS

5.1 Limitations

The fuel delivery rate from the unleaded fuel dispenser is restricted to less than 10 GPM.

5.2 Precautions

No smoking, sparks, or other sources of ignition shall be allowed within 25 ft of the fuel system.

5.1 Set points

There are no set points associated with the fuel system.

6.0 OFF-NORMAL EVENTS AND RECOVERY

The following are considered to the off-normal events for the fuel system:

109.0 Fire (SDD FP00)

110.0 Fuel leakage

111.0 Leak Detection Equipment out-of-service

Refer to the WIPP Site Controlled Operating Procedures for fuel system recovery scenarios as required to mitigate or control the off-normal event sequences.

7.0 MAINTENANCE

7.1 Maintenance Approach

Refer to Section 7.1 of Chapter G for information regarding the general maintenance approach and requirements. The following are fuel system specific maintenance requirements.

7.2 Corrective Maintenance

Corrective maintenance shall be performed on an as-needed basis. Corrective maintenance which affects the integrity of the fuel storage tanks, piping, leak detection equipment, etc. shall be performed by a qualified, commercial vendor.

7.3 Preventive Maintenance

No preventive maintenance shall be performed on the fuel dispensers. They shall be operated until failure occurs, then repaired.

The fuel dispensers shall be tested annually for fuel delivery by a qualified, commercial vendor.

7.5 In-Service Inspection

The Fuel System does not require any specific in-service inspection beyond those performed by system operators during routine system usage, and the annual CAS/CAMP inspection.

The Fuel System shall be monitored for leakage using its leak detection panel at least every 30 days.

Part II, Chapter V

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Part II, Chapter VI

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Part II, Chapter VI

Subsystem GC06, External Surface Facilities System

1.0 PRIMARY FUNCTIONS

The primary functions of the External Surface Facilities is to provide buildings and surface facilities external to the security fenced area and within the site boundary as needed for housing various equipment and supporting facility operations.

2.0 DESIGN REQUIREMENTS

2.1 General

Refer to Chapter G for general design requirements.

2.2 Subsystem Design Requirements

The following external surface facilities outside the WIPP Property Protected Area (surrounded by a chain link security fence provided by the Plant Protection System PP00) shall be provided:

112.0 Northwest Atmospheric Monitoring Station (471)

113.0 Port-a-Camp, Reusable Parts Yard and Grouting Yard

114.0 45 Meter Radio Communication Tower and Shed

115.0 50 Meter Meteorological Tower and Instrument Shed

116.0 Telephone Hut

2.2.1 Atmospheric Monitoring Station (AMS) Shed (471)

The Atmospheric Monitoring Station (AMS) Shed shall be designed as a one story structure to provide space to house atmospheric air quality monitoring and meteorological monitoring instrumentation equipment of system EM00. The AMS shed area shall be provided with a barbed wire type fence surrounding the yard where the monitoring instrument sensor equipment is located. A 10 meter steel tower for mounting meteorological instrument sensors shall also be provided.

The AMS shed shall be located approximately 1,000 meters northwest of the mine Exhaust Shaft on the WIPP site. This location is known as the Far Field.

2.2.2 Primary Meteorological Instrument Building and Tower (472)

The meteorological instrument building shall be designed as a one story structure to provide space to house meteorological monitoring instrumentation equipment of system EM00, UPS power supply of system ED00, and a LPU of system CM00. In addition space shall be provided on the roof of the building to mount the meteorological precipitation monitor of system EM00. A 50 meter steel tower for mounting meteorological instrument sensors shall be provided.

The meteorological instrument building shall be located approximately 500 meters northeast of WHB.

2.2.3 Port-a-Camp Area, Reusable Parts yard and Grouting Yard

Space, known as the Port-a-Camp area, shall be provided to collect and temporarily store miscellaneous non-hazardous excess and/or used materials.

The Port-a-Camp area shall be located southeast of the WIPP facility and shall be surrounded by a chain link fence with a locked entry gate.

2.2.4 Reusable Parts Yard

A fenced storage area shall be provided south east of the WIPP site to store various equipment and components that were removed from service or are not being used, as well as new material that is available for use.

The storage area shall be surrounded by a chain link fence with a locked entrance gate.

A grouting yard shall be provided for various materials needed for underground operations.

2.2.5 Radio Communications Tower and Instrument Shed (477)

The 45 meter radio communications tower shall facilitate above ground site radio communications.

The shed shall contain base radio communication equipment and required electric power.

2.2.6 Telephone Hut

A fenced area shall be provided around the hut, to accommodate a dish antenna required for the site telephone system.

2.3 Operation

The buildings and structures are effectively passive and require no operating procedures.

2.4 Structural Requirements

Refer to the Section 2.4.2 of Chapter G for the GC06 general structural design requirements.

2.5 General Arrangement and Essential Features

The external surface facilities shall be located outside of the security fence on the WIPP site.

2.6 Maintenance Requirements

Refer to section 2.6 of Chapter G.

2.7 In-Service Inspections

Refer to Section 2.7 of Chapter G.

2.8 Instrumentation and Control

There are no general or special instrumentation and control requirements.

2.9 Interfacing System Requirements

Refer to Section 2.9 of Chapter G for the interfacing system requirements.

2.10 Quality Assurance Requirements

Refer to Section 2.10 of Chapter G for the general quality assurance requirements.

2.11 Codes and Standards

Refer to Section 2.11 of chapter G for the governing codes and standards.

2.12 Reliability Assurance

Refer to Section 2.12 of Chapter G for the general reliability assurance requirements.

3.0 DESIGN DESCRIPTION

3.1 Summary

Refer to Section 3.1 of Chapter G for summary design description.

3.2 Detailed System Description

Miscellaneous buildings, facilities, structures, and foundations are provided for such facilities as the Meteorological Instrument Building (472) and tower, Radio Communication Shed (477) and tower, the AMS Shed (471) and tower.

Two storage lots outside the perimeter fence are provided for storage of miscellaneous material and components. These lots are fenced with locked gates. Typical material stored in these lots include drums containing non-hazardous used oil and chemicals, reusable material, piping, used U/G mobile equipment, and raw materials. Mobile containers and an open steel roofed structure provides weather protection for a portion of the material.

3.3 System Performance Characteristics

The Subsystem CF06 facilities are passive. The subject facilities shall maintain configurational integrity under normal operating and environmental conditions and requirements as set forth in Section 1.0 and Section 2.0 of Chapter G and Part II, Chapter IV.

3.4 System Arrangement

The External Surface Facilities include those features which are within the WIPP site but outside the security fence, and not a part of another subsystem (e.g. Subsystem GC03 Sanitary Sewage System is not included).

3.4.1 Northwest Atmospheric Monitoring Station (471)

Approximately 1,000 meters northwest of the WHB is a prefabricated 8 by 16 foot metal building anchored to a concrete slab. The 8 foot high shed houses air quality monitoring equipment. Adjacent to the north side of the building is a 10 meter meteorological tower.

3.4.2 Primary Meteorological Station and 50 Meter Tower (472)

Approximately 500 meters northeast of the WHB is a 12 foot square, 8 foot high pre-engineered metal building mounted on a concrete slab. Another 100 meters east is a 50 meter meteorological tower. There are various meteorological instruments attached to the tower.

3.4.3 Port-a-Camp, Reusable Parts yard and Grouting Yard

South of the site are three storage yards, fenced with locked gates. These lots are from approximately one to five acres in size.

3.4.4 45 Meter Radio communications Tower and Instrument Shed (477)

The location of these features is identified on Figure GC-VI-1.

Approximately 300 meter northeast from the Air Intake Shaft is a 12' x 8' pre-engineered metal shed mounted on a concrete slab and a 45 meter steel tower. This facility is providing means to the above ground radio communications. The shed is holding base communication equipment and electric power.

Approximately 100 meters southwest of the communications tower is a telephone hut which is a pre-fabricated concrete structure, 12 ft by 16 ft, housing antenna and telephone related equipment. The area is fenced with a locked gate.

3.5 Component Design Description

3.5.1 Atmospheric Monitoring Station Shed (471)

Approximately 1000 meters northwest of the WHB is a pre-fabricated 8 by 16 foot metal building anchored to a concrete slab. The 8 foot high shed houses air quality monitoring (EM02) equipment. Adjacent to the north side of the building is a 10 meter meteorological tower.

3.5.2 Meteorological Instrumentation Building (472) and Tower

Approximately 500 meters northeast of the Exhaust Shaft is a 12 foot square, 8 ft high pre-engineered metal building mounted to a concrete slab. Two hundred and fifty ft off the northwest corner of the building is a concrete pad and the 50 meter meteorological tower.

3.5.3 Port-a-Camp Area, Reusable Parts Yard, and Grouting Yard

The three waste storage lots outside the security fence are enclosed in a fenced area with locked gates. The material and equipment is stored on pallets, racks or in mobile storage containers. On the west side of the smaller lot, a loading ramp is located.

The smaller lot, also called the "port-a-camp", is used for storage of non-hazardous used oil, piping, and other materials. The large lot, divided into three sections, contains useable or reusable materials.

3.5.4 Radio Communications Tower and Instrument Shed (477)

The tower is mounted on a deep pile concrete foundation with three guy wires spaced at 120 degrees and anchored to concrete foundations. The shack is a steel structure on a concrete foundation.

3.5.5 Telephone Hut

This facility is enclosed by a fence, is constructed using pre-cast concrete panels, and contains dish antenna.

3.6 Instrumentation and Control

There are no instrumentation and control requirements for the external surface facilities identified under Subsystem GC06.

3.7 System Interfaces

Refer to Section 3.7 of Chapter G which documents the subsystem primary and secondary interfaces.

4.0 OPERATION

The External Surface Facilities are passive hence, require no operating procedures for the Subsystem GC06 portion of the installation.

5.0 SYSTEM LIMITATIONS, SET POINTS, AND PRECAUTIONS

None required.

6.0 OFF-NORMAL EVENTS AND RECOVERY

The off-normal events for this subsystem are the same as those described in Section 6.0 of Part II, Chapter II.

7.0 MAINTENANCE

Refer to Section 7.1 of Chapter G for information regarding the general maintenance approach.

7.1 Other Maintenance

The Subsystem GC06 specific maintenance requirements are:

117.0 Conventional industrial plant building preventive maintenance shall be used, as applicable, for all buildings, facilities, and equipment in the subsystem.

118.0 Survey the facilities and structures of the system for general condition and report on any observed abnormalities.

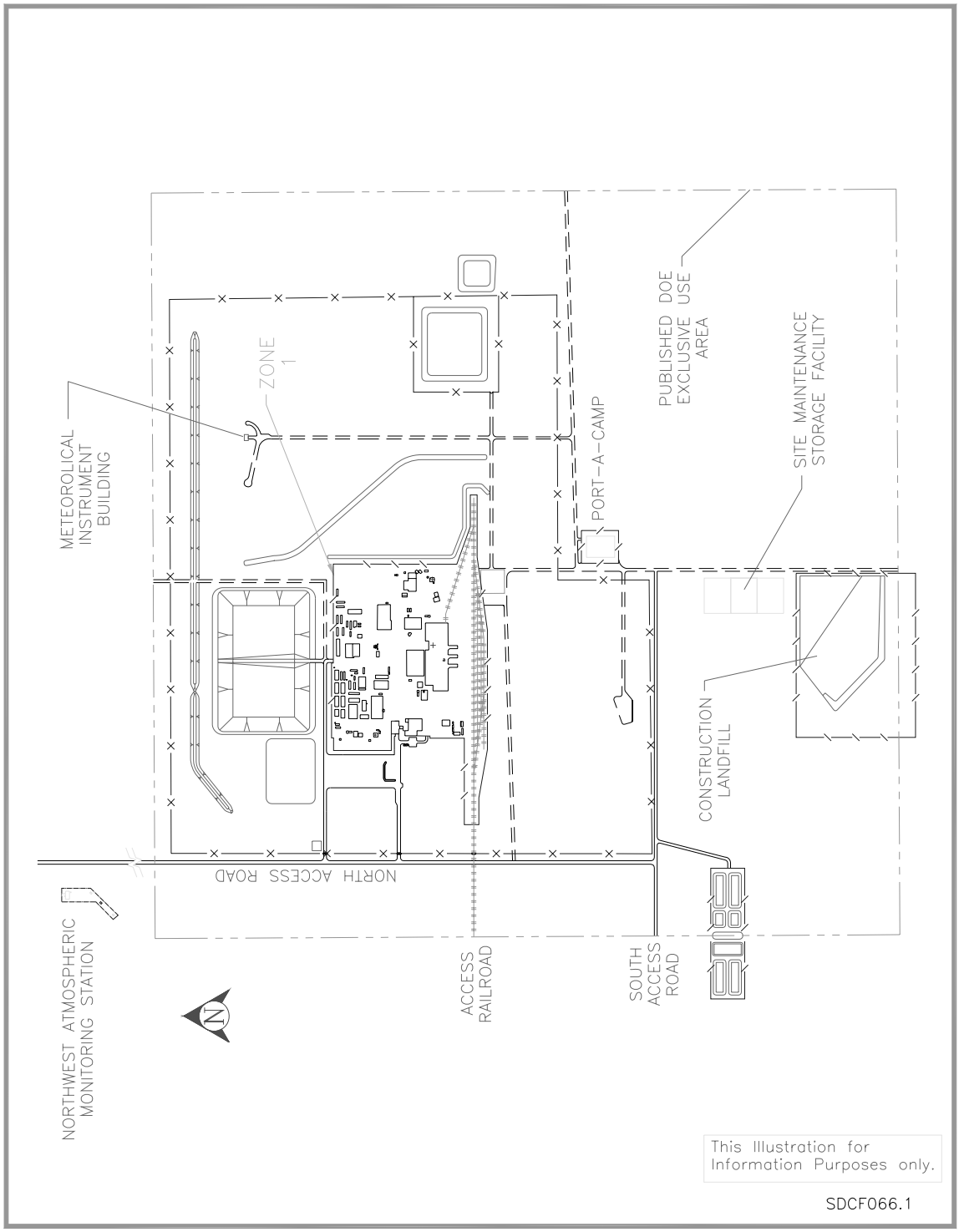

FIGURE GC-VI-1 External Surface Facilities

Part II, Chapter VII

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Part II, Chapter VII

Subsystem GC07, Surface Miscellaneous Mobile and Lifting Equipment

1.0 PRIMARY FUNCTIONS

The primary function of the Surface Miscellaneous Mobile and Lifting Equipment (GC07) is to provide equipment for personnel surface mobility and material handling/lifting capability.

2.0 DESIGN REQUIREMENTS

2.1 General

Refer to Chapter G for general design requirements.

2.2 Subsystem Design Requirements

Manufacturer's standard equipment and vehicles shall be used, meeting established parameters for lifting and transportation capacities. Applicable equipment structural, mechanical, electrical, safety and operational features shall conform, as a minimum, to the requirements of ASME B30, B56.1, B56.6, ANSI A92.5, A92.6, NFPA 10, 17, 505, 1901, SAE J321B, UL 583, Fed. Spec. (KKK-A-1822A), 29 CFR Part 1910, 29 CFR Part 1926, and DOE STD-1090-96.

119.0 and Rescue	Ambulance Truck	Federal Specification for the "Star of Life Ambulance" (GSA KKK-A-1822A)
120.0 Truck	Surface Fire	NFPA 1901 Standard for Pumper Fire Apparatus
121.0 Platforms	Aerial	ANSI A92.5, A92.6, Elevating Work Platforms
122.0	Diesel Forklifts	29 CFR Part 1910 Occupational Safety and Health Standards; 29 CFR Part 1926 Safety and Health Regulations for construction; NFPA 10 Standard for Portable fire Extinguishers; NFPA 17 Standard for Dry Chemical Extinguishing Systems; ASME B56.1 Low Lift and High Lift Trucks, DOE-STD-1090-96

123.0 Forklifts	Electric	ASME B56.1 Low Lift and High Lift Trucks; NFPA 505 Fire Safety standard for Powered Industrial Trucks Including type Designations, Areas of Use, Maintenance, and Operation; UL 583 Standard for Safety for Electric-Battery-Powered Industrial Trucks
124.0 Loader	Front End	ASME B56.1 Low Lift and High Lift Trucks; 29 CFR Part 1926 Safety and Health Regulations for Construction; SAE J 321B Tire Guards for Protection of Operator of Earthmoving Haulage Machines, Recommended Practice.
125.0	Mobile Cranes	ASME B 30, 29 CFR Part 1-910, DOE-STD-1090-96, ASME B 56.7-1987, Safety Standard for Industrial Crane Trucks

2.3 Operation

The Surface Miscellaneous Mobile and Lifting Equipment (GC07) shall be provided with operating procedures.

2.4 Structural Requirements

There are no general structural design requirements associated with the miscellaneous mobile equipment. The lifting equipment structural design requirements are presented in 2.2 as set forth in the specified codes and standards.

2.5 General Arrangement and Essential Features

Manufacturer's standard equipment and vehicles shall be used, meeting established parameters for lifting and transportation capacities.

2.6 Maintenance Requirements

Refer to Section 2.6 of Chapter G.

2.7 In-Service Inspections

Refer to Section 2.7 of Chapter G.

2.8 Instrumentation and Control

The Surface mobile equipment includes electrical and hydraulic controls and instrumentation that are provided directly as a part of the equipment from the manufacturer.

2.9 Interfacing System Requirements

Refer to Section 2.9 of Chapter G for the interfacing system requirements.

2.10 Quality Assurance Requirements

Refer to Section 2.10 of Chapter G for the general quality assurance requirements.

2.11 Codes and Standards

Refer to Section 2.11 of Chapter G for the governing codes and standards.

2.12 Reliability Assurance

Refer to Section 2.12 of Chapter G for the general reliability assurance requirements.

3.0 DESIGN DESCRIPTION

3.1 Summary

Refer to Section 3.1 of Chapter G for summary design descriptions.

3.2 Detailed System Description

The Surface Miscellaneous Mobile and Lifting Equipment is provided to achieve surface mobility, material handling/lifting capability, and the ability to perform the operational needs of the daily surface personnel activities.

3.3 System Performance Characteristics

None required.

3.4 System Arrangement

The Surface Miscellaneous Mobile and Lifting Equipment, when not in use, are parked on the parking lot to the northwest of the Compressor Building #463, the Warehouse #453, south of building #411, and throughout the site.

3.5 Component Design Description

All Surface Miscellaneous Mobile and Lifting Equipment will be manufacturer's standard equipment, meeting established parameters for lifting and transportation capacities. Structural, mechanical, electrical, safety and operational features shall conform, as a minimum, to the applicable requirements.

3.5.1 Personnel Vehicles

The personnel vehicles are storage battery electric powered rubber tired vehicles with two to six personnel capacity.

3.5.2 Special Mobile Equipment

126.0 Forklifts
127.0 Cranes
128.0 Surface Fire Trucks
129.0 Rescue Truck
130.0 Ambulance
131.0 Tractors
132.0 Front End Loader
133.0 Mobile welders
134.0 Aerial Platforms
135.0 Mobile Air Compressor
136.0 Mobile Motor/Generator Sets
137.0 Other Miscellaneous Surface Equipment

3.6 Instrument and Control

There are no instrumentation and control requirements (other than that provided by the original manufacturer) for the equipment identified under Subsystem GC07.

3.7 System Interfaces

Refer to Section 3.7 of Chapter G which documents the subsystem primary and secondary interfaces.

4.0 OPERATION

This operations section is intended to cover the major active powered equipment such as:

138.0 Forklifts
139.0 Carts

140.0 Crane, Loader, Tractor, Articulating Work Platform, etc.
141.0 Fire Truck, Rescue Truck, Ambulance

Operations shall be per the manufacturers operating manual or per WIPP Site special equipment standard operating procedures.

5.0 SYSTEM LIMITATIONS, SET POINTS, AND PRECAUTIONS

Surface Miscellaneous Mobile and Lifting Equipment (GC07)

5.1 Limitations

Equipment shall be operated in accordance with the manufacturer's operating procedures and recommendations.

5.2 Precautions

Equipment shall be operated only by personnel properly trained and qualified for the specific piece of equipment being operated.

6.0 OFF-NORMAL EVENTS AND RECOVERY

None applicable

7.0 MAINTENANCE

7.1 Maintenance Approach

Refer to Section 7.1 of Chapter G for information regarding the general maintenance approach.

7.2 Other Maintenance

The following maintenance requirements shall apply to the Subsystem GC07 equipment. (Any additional O & M requirements shall also apply.)

142.0 Inspect and repair any malfunctioning components or equipment.

143.0 Standard maintenance practices and equipment shall be used according to manufacturer's recommendations.

144.0 Continuous in-service-inspection of the Surface Miscellaneous Mobile and Lifting Equipment should be made to ensure safe operation at all times. This includes braking systems, signaling device and lights on personnel carriers and transporters, cables/hydraulic systems on lifting equipment, and fire truck pumping systems.

145.0 Electric powered equipment safety checks are necessary to ensure all safety requirements are met including proper grounding, insulation adequacy, etc.

146.0 Inspection of all mobile equipment to ensure safe operation should be initiated. As a minimum, the following items should be monitored (as applicable):

147.0 Brakes and steering
148.0 Signals (horns)
149.0 Lights
150.0 Backing warning signals
151.0 Electrical powered equipment grounding and cable quality

Part I & II, Appendices

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APPENDICES – STATEMENT OF INTENT

NOTICE

The appendices that follow are for information only and are not part of the Controlled Document.

Some of the information provided is controlled in various component indices and no attempt to duplicate these is intended here

APPENDIX A – REFERENCES

1.	DOE/WIPP 91-057	WIPP Supplementary Roof Support System Underground Storage Area, Panel 1, Room 1, Revision 0, Dated Oct. 1991
2.	DOE/WIPP 89-022	Waste Isolation Pilot Plant Waste Retrieval Plan, Revision 1, Date to be determined
3.	W GOCO Manual	Westinghouse Conduct of Maintenance Manual, Revision 0, Dated August 7, 1992

APPENDIX B – ACRONYMS AND DEFINITIONS

ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADT	Average Daily Traffic
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
AREA	American Railroad Engineering Association
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BOD	Biological Oxygen Demand
BNSF	Burlington Northern Santa Fe
CAM	Continuous Air Monitor
CE	Cognizant Engineer
CERCLA	Comprehensive Environment Response, Compensation, Liability Act
CFR	Code of Federal Regulations
CH	Contact-Handled
COD	Coliform Oxygen Demand
CM	Cognizant Manager
CMR	Central Monitoring Room
DBA	Design Basis Accident
DBE	Design Basis Earthquake
DBT	Design Basis Tornado
DHV	Design Hourly Volume
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EFB	Exhaust Filter Building
EMS	Effluent Monitoring System
EPA	U.S. Environmental Protection System
EPDM	Ethylene Propylene Diene Monomer
FOSS	Facility Operations Shift Supervisor
HEPA	High Efficiency Particulate Air Filter
HVAC	Heating, Ventilation, Air Conditioning
LPU	Local Processing Unit
MBMA	Metal Buildings System manual
MPH	Miles Per Hour
NFPA	National Fire Protection Association

NMSHD	New Mexico State Highway Department
NRC	Nuclear Regulatory Commission
PMP	Probable Maximum Precipitation
PVC	Polyvinyl chloride
QA	Quality Assurance
RCA	Radiological Controlled Area
RCRA	Resource Conservation and Recovery Act
RMA	Radiological Materials Area
RH	Remote-Handled
SARA	Superfund Amendment and Re-Authorization Act
SB	Support Building
S&ESB	Safety and Emergency Services Building
SDD	System Design Description
SPDV	Site and Preliminary Design Validation
SSC	Systems, Structures, and Components
SWB	Standard Waste Box (4' x 4' x 3' high)
TRU	Transuranic
UBC	Uniform Building Code
U/G	Underground
WIPP	Waste Isolation Pilot Plant
WHB	Waste Handling Building
WTS	Washington TRU Solutions LLC

DEFINITIONS

Canister	A container, usually cylindrical, for remote-handled waste, spent fuel, or high-level waste; affords physical containment, but not shielding. Waste remains in its canister during storage.
Caliche	A hard, crusty, whitish rock that accumulates near the surface when calcium carbonate (calcite) and other minerals fill pore spaces in gravel.
Cask	A shielded shipping container.
CH-TRU	Contact-Handled Transuranic waste is packaged TRU waste whose external surface dose rate does not exceed 200 mrem per hour.

CMS	Central Monitoring System. A computer system that monitors the WIPP facility instrumentation; operated from the Central Monitoring Room.
Container	A disposable containment vessel for contact handled low-level waste.
DBE	Design Basis Earthquake would cause a maximum ground acceleration of 0.1 g in two horizontal and one vertical direction.
DBT	The characteristics of a design basis tornado are as follows: Maximum wind speed 183 mph Translational Velocity 41 mph Tangential Velocity 124 mph Radius of Max Wind 325 ft Pressure Drop 0.5 lb/sq. in. Rate of Pressure drop 0.09 lb/sq. in/sec Return Period 106 years
DOE	The Department of Energy, of the U.S. Government, established in 1978 as a successor of ERDA and the AEC.
Dose	A general term indicating the amount of energy absorbed per unit mass from incident nuclear radiation.
High Radiation Area	Any area within a controlled area where an individual can receive a dose equivalent of 100 mrem or greater but less than 5 rem in one hour at 30 cm from the radiation source or from any surface through which the radiation penetrates.
Hot Cell	A heavily shielded compartment in which highly radioactive material can be handled, generally by remote means.
mrem	Unit of radiation exposure equal to one-thousandth of a roentgen equivalent man (rem).
Overpack	A waste container put around another container. In the WIPP, overpacks would be used on damaged or otherwise contaminated drums, boxes, and canisters that it would not be practical to decontaminate.
Radiation Area	Any area within a controlled area where an individual can receive a dose equivalent greater than 5 mrem but less than 100 mrem in 1 hour at 30 cm from the radiation source or from any surface through which the radiation penetrates.

Radioactive Material Area	Area of the WHB and underground storage area where radioactive materials are used, stored and/or being handled. The area is controlled by physical boundaries to allow limited access.
Radiological Controlled Area	For WIPP, this is the fenced-in area adjacent to and surrounding the WHB where incoming waste shipments are staged prior to entrance into the RMA.
Radiological Area	Any area within a controlled area where an individual can receive a dose equivalent greater than 5 mrem in one hour at 30 cm. from the radiation source or any surface through which radiation penetrates, or where airborne concentrations greater than 1/10th of the derived air concentrations are present (or are likely to be), or where limits in excess of those listed in 10 CFR Part 835 are present.
Shipping Package	A shipping container designed to meet all DOE and DOT requirements of shipping CH-TRU to the WIPP and to provide the protection specified in the NRC regulations.
Transuranic	Pertaining to elements with atomic numbers greater than 92, including, among others, neptunium, plutonium, americium, and curium.
TRU waste	Transuranic waste. Without regard to source or form, waste that is contaminated with alpha-emitting trans-uranium radio-nuclides with a half life greater than 20 years and specific activity greater than 100 nCi/g at the time of assay. Heads of field organizations can determine that other alpha contaminated waste, peculiar to a specific site, shall be managed as TRU waste.

APPENDIX C – EQUIPMENT LIST

For the latest list of equipment for this system, see the Equipment Register, which is a controlled document, routinely updated. The equipment in this system may be listed under any of the following systems or subsystems:

CF00
CF01
CF02
GC00
GC01
GC02
GC03
GC04
GC06
GC07

APPENDIX D – DRAWING LIST

For the latest list of drawings for this system, see the WIPP Drawing Register which is a controlled document routinely updated. The CF00 system and all subsidiary subsystems may be listed as follows:

CF00
CF01
CF02
GC00
GC01
GC02
GC03
GC04
GC06
GC07

APPENDIX E – LIST OF SDDs

SDD Number	System Title
AU00	Underground Facilities and Equipment
CA00	Compressed Air System
CF00	Plant Buildings, Facilities, and Miscellaneous Equipment
CM00	Central Monitoring System
ED00	Electrical Distribution
EM00	Environmental Monitoring System
FP00	Fire Protection System
HV00	Heating, Ventilation and Air Conditioning
PP00	Plant Protection System
PT00	Packaging and Transportation System
RM00	Radiation Monitoring
UH00	Underground Hoisting System
VU00	Underground Ventilation
WD00	Water Distribution
WH00	Waste Handling Equipment

PLANT DESIGN REQUIREMENTS DOCUMENT

GPDD	General Plant Design Description

APPENDIX F – INTERFACES

A list of interfacing systems are provided in Appendix F-1 for primary interfaces and in Appendix F-2 for secondary interfaces.

APPENDIX F-1 – PRIMARY INTERFACE LIST

Interfacing System	Description
CA00	Provide compressed air at as nominal 110 psi for operation of the 140-ton Road Cask Unloading Room Shield Door, and track seals on double leaf doors. Provide inflatable air for vertical lift door periphery seals and 140-ton Shield Door periphery seal.
CM00	Provide telephone service, the PA and intercom systems, as required, for the Special Structures (CF01), Waste Handling Building (CF02), all the other surface buildings (GC00).
ED00	Provide normal electrical power and diesel backup electrical power, lighting, grounding, and cabling for system CF00 and system GC00.
FP00	Provide an automatic wet-pipe sprinkler system, dry chemicals, halone, portable extinguishers, and an alarm system as required on site drawings and/or NFPA standards.
HV00	The WHB ventilation system shall be designed to provide the WHB room pressures necessary to support the WHB in performing its containment function.
RM00	Provides a high radiation alarm signal for interlocking with entry doors where required for personnel safety.
VU00	Limit the differential pressure on the Waste Shaft Tower.
WD00	Provide water to each building on site for domestic, process, and irrigation needs.

APPENDIX F-2 – SECONDARY INTERFACE LIST

Interfacing System	Description
CA00	Provide space, supports, and embedments for equipment and piping as required.
CM00	Provide space and mounting for pager phones, dial phones, public address system components, and LPUs. Provide the specific areas for CMR, computer room, EOC, and telephone hut.
ED00	Provide space, support and embedments for equipment as specified on site drawings, with consideration for penetrations and accessibility.
EM00	Provide equipment space and facility housing at the following locations: 152.0 Far field for air quality meteorological monitoring. 153.0 40 and 10 meter tower for meteorological monitoring. 154.0 Station A, surface building 155.0 Surface seismic detectors and electronics. 156.0 Surface locations for geomechanical monitoring equipment.
FP00	Provide structural support for the installation of the fire protection system equipment and suitable environmental conditions for the equipment.
HV00	Provide a DBE signal to be used in ventilation damper controls.
PP00	Provide sheltered space and a hardened area for the security control room and the gatehouse. Provide a 20 foot isolation zone on both sides of the site perimeter fence except where specifically waived. Storm drain openings that pass through the WIPP site PPA perimeter and are large enough to permit unauthorized entry shall have barricades installed.
RM00	Provide sheltered space and mounting surfaces for each RM00 installation.
VU00	Provide the shaft head pads, EFB and its supports, and air duct supports,

WD00 Provide housing space, support, and embedment for the water system components. Consideration given for accessibility and for support anchors required for maintenance.

WH00 Provide a number of specific areas (CH Bay, RH Bay, RCA, RMA, OP&RR, and Overpack Enclosure, and the necessary space and supports for hoists and cranes.

APPENDIX G – INSTRUMENTATION REQUIREMENTS

The only system instruments involved with this system are the five pressure gages mounted on the Cask Unloading Room Shield Door control panel. After initial calibration, these five gages need only be recalibrated on specific request. Component instruments supplied with an U/G machine package should be calibrated per vendor instructions or as specifically requested.