






Document title: **Facility Description for Balance  
of Facilities**

<b>NOTE: The following SD sections are considered preliminary if left unchecked.</b>
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# History Sheet

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## Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers
BOD	Basis of Design
BOF	Balance of Facilities
BSII	Bechtel Systems and Infrastructure, Inc.
dba	Units - A-weighted decibels
DFLAW	Direct Feed Low-Activity Waste
DOE	US Department of Energy
DX	Direct Expansion
DWP	Dangerous Waste Permit
EMF	Effluent Management Facility
EPA	US Environmental Protection Agency
°F	Units - degrees Fahrenheit
FACP	Fire Alarm Control Panel
FCR	Facility Control Room
FD	Facility Description
FDC	Fire Department Connection
FDD	Facility Design Description
FHA	Fire Hazard Analysis
FM	Factory Manual
ft	Units - feet
HLW	High-Activity Waste
HVAC	Heating, Ventilation, and Air conditioning
HPR	Highly protected risk
IBC	International Building Code
ICD	Interface Control Document
ICN	Integrated Control Network
IDLH	Immediately Dangerous to Life and Health
IESNA	Illuminating Engineering Society of North America
in	Units - inches
kV	Units - kilovolts
kVA	Units – kilovolts-amps
Lab	Analytical Laboratory
LAW	Low-Activity Waste
lb	Units - pounds
LOSS	Large On-site Sewer System

MCR	Main Control Room
M&TE	Measuring & Testing Equipment
NDNR	Non-Dangerous, Non-Radioactive
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
ORD	Operations Requirement Document
PDSA	Preliminary Documented Safety Analysis
PEL	Permissible Exposure Limit
PES	Programmable Electronic Systems
PPE	Personal Protective Equipment
PT	Pretreatment
PTF	Pretreatment Facility
RCRA	Resource Conservation and Recovery Act
RFAR	Radio Fire Alarm Reporter
RIO	Remote Input/Output
RPP	River Protection Project
SC	Safety Class
SC-x	Seismic Category -I/-II/-III/-IV
SCR	Standby Control Room
SD	System Description
SDD	System Design Description
sec	Units - seconds
SIS	Safety Instrumented System
SR	Service Request
SRD	Safety Requirements Document
TOC	Tank Operations Contractor
TEDF	Treated Effluent Disposal Facility
THM	Trihalomethane
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriters Laboratory
UPS	Uninterruptible Power Supply
V	Units - volts
VAC	Units – volts alternating current
VDC	Units – volts direct current
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
WTP	Hanford Tank Waste Treatment and Immobilization Plant

For system designators, see Section 2, *SCOPE*.

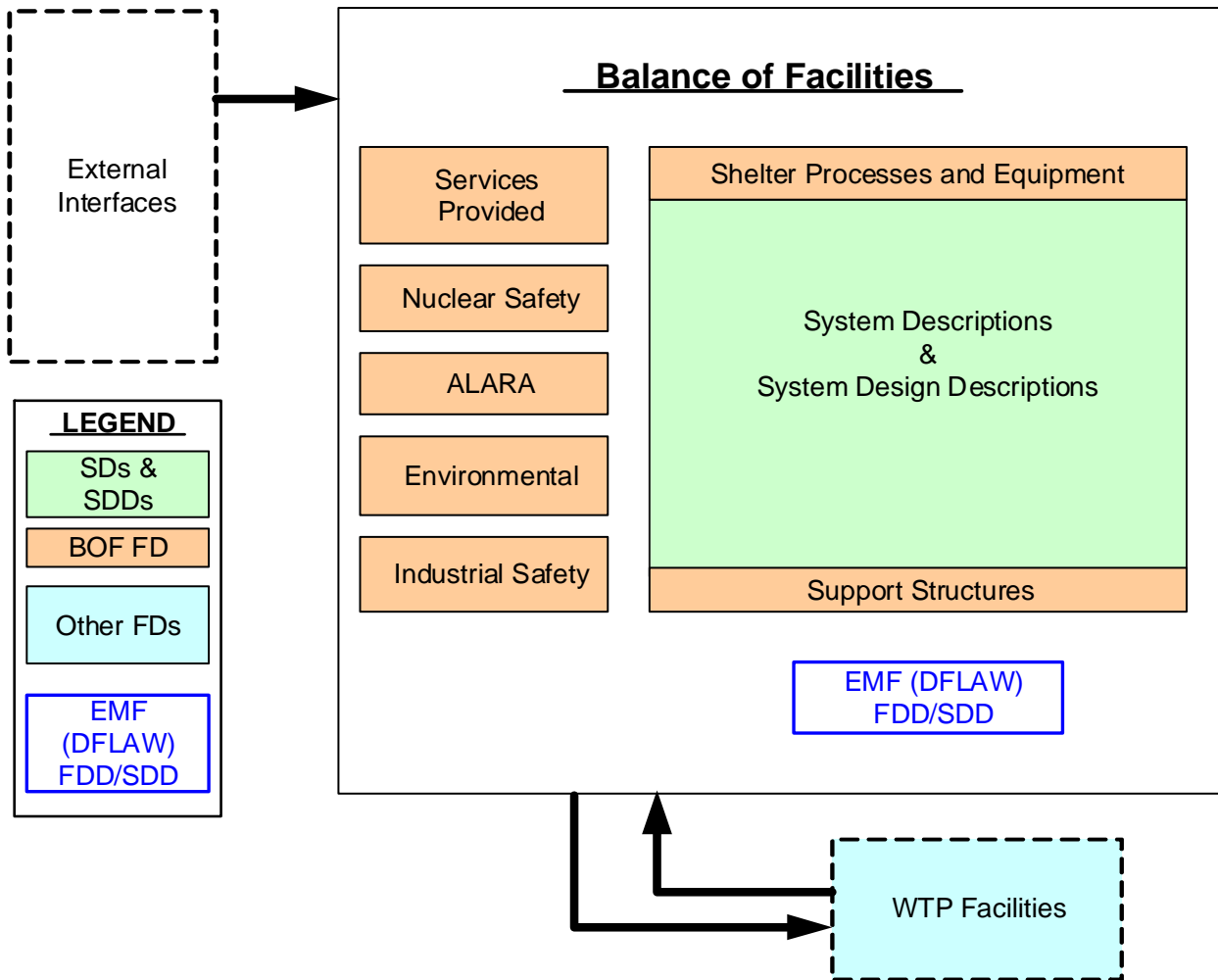
# 1 Introduction

The Balance of Facilities (BOF) is a collection of support facilities that provide chemicals, services, utilities, and civil infrastructure for the process facilities (Pretreatment [PT] Facility, High-Level Waste [HLW] Facility, Low-Activity Waste [LAW] Facility), Effluent Management Facility [EMF] and the Analytical Laboratory (Lab) in support of the Hanford Tank Waste Treatment and Immobilization Plant (WTP). The EMF is an effluent management and dangerous waste management facility that is considered part of BOF. The EMF is a unique facility in BOF because it is designed to treat and recycle dangerous and radioactive waste effluent; the safety basis for the EMF is captured with LAW in the LAW PDSA.

# 2 Scope

Figure 2-1 illustrates the scope of this facility description (FD).

**Figure 2-1 Scope of Balance of Facilities Description**



The BOF comprises all site structures (Table 2-1) outside of the process buildings (PT, HLW, LAW, and Lab facilities). These buildings include chemical storage, electrical and mechanical utilities, administration, workshops, and support facilities. Facility descriptions for the process facilities (PT, HLW, LAW) and Lab are provided in separate individual facility design descriptions (FDD).

In addition, BOF includes the EMF. However, information from this BOF FD is not to be used for the EMF design. Requirements for the design of the EMF can be found in its combined FDD/system design description (SDD) – 24590-BOF-3ZD-25-00001, *WTP Direct Feed Low Activity Waste (DFLAW Facility and Systems Design Description)*. Requirements from the BOF FD are applicable to the areas around the EMF (e.g. roads). In any cases of conflict for the EMF design, the DFLAW FDD/SDD document takes precedence over this FD.

The BOF contains numerous individual systems that provide services to the PT, HLW, LAW, Lab, and other BOF buildings, including EMF. This document is not intended to repeat information contained in individual system descriptions, but to compile those remaining requirements relating to personnel access, building and facility locations, roads, parking, walking areas, pads for dumpsters and storage, civil design, and architectural design. The current WTP Plot Plan is 24590-BOF-P1-50-00001, *RPP-WTP Plot Plan*.

**Table 2-1 List of BOF Structures and Respective Identification Numbers**

11; 11S	Wet chemical storage facility; wet chemical storage facility support building
21; 21S	Glass former storage facility (GFSF) and GFSF blend building; GFSF control building
23	Anhydrous ammonia tank facility
24	LAW switchgear building
25	LAW effluent process building
25A	LAW effluent drain tank building
26	LAW effluent utility building
27	LAW effluent electrical building
33	Future immobilized high level waste (IHLW) canister storage facility
51	Administration building
52	Warehouse
54; 54S	Non-dangerous, non-radioactive effluent facility; NLD Wastewater THM Air Strippers
56	Maintenance shop
58	Simulator building (Hanford Building number 6095)
59	Personnel access facility
81	Fuel oil facility (design requirements covered by ETX SD)
82	Chiller/compressor plant
83; 83S	Cooling tower facility; cooling tower support building
84A; 84B	Fire water pump house facility A; fire water pump house facility B
85	Steam plant facility
86	Water treatment building
87	Switchgear building
87S	Standby diesel generator facility
89	Emergency turbine generator facility
90A; 90B	Dangerous waste storage pad A; dangerous waste storage pad B
91	BOF switchgear building

The BOF systems are described in system descriptions and are referenced for their specific scope, function, requirements, description, operations, maintenance, interfaces, and test and acceptance criteria. These individual systems are as follows:

- anti-foam reagent system (AFR)
- ammonia reagent system (AMR)
- autosampling system (ASX)
- breathing service air system (BSA)
- C1 ventilation system (C1V)
- cathodic protection electrical system (CPE)
- chilled water system (CHW)
- communications electrical system (CME)
- demineralized water system (DIW)
- diesel fuel oil system (DFO)
- DC electrical (125 V) system (DCE)
- domestic (potable) water system (DOW)
- emergency turbine generator system (ETX)
- environmental monitoring system (EMJ)
- facility network infrastructure system (FNJ)
- fire protection water system (FPW)
- fire detection and alarm system (FDE)
- fire service water storage and distribution system (FSW)
- glass formers reagent system (GFR)
- grounding and lightning protection electrical system (GRE)
- heat trace electrical system (HTE)
- high pressure steam system (HPS)
- HLW lag storage and feed blending process system (HLP)
- instrument service air system (ISA)
- lighting electrical system (LTE)
- low pressure steam system (LPS)
- low voltage (480, 208, 120 V) electrical system (LVE)
- medium voltage (13.8, 4.16 kV) electrical system (MVE)
- miscellaneous gases system (MXG)
- miscellaneous reagents system (MXR)
- nitric acid reagent system (NAR)
- non-radioactive liquid waste disposal system (NLD)
- plant cooling water system (PCW)
- plant data warehousing and reporting system (DWJ)
- plant service air system (PSA)
- process control system (PCJ)
- process service water system (PSW)

- programmable protection system (PPJ)
- radioactive liquid waste disposal system (RLD)
- radioactive solid waste handling system (RWH)
- raw water system (RWW)
- sanitary disposal system (SND)
- security electrical system (SCE)
- stack discharge monitoring (rad and nonrad) system (SDJ)
- sodium hydroxide reagent system (SHR)
- sodium nitrite reagent system (SNR)
- sodium permanganate reagent system (SPR)
- standby diesel generator system (SDX)
- steam condensate water system (SCW)
- strontium nitrate reagent system (STR)
- storm water disposal system (SWD)
- training simulator system (TSJ)
- treated LAW concentrate storage process system (TCP)
- uninterruptible power electrical system (UPE)
- waste feed receipt process system (FRP)

The BOF systems dedicated to the EMF are described in its FDD/SDD (24590-BOF-3ZD-25-00001) are referenced for their specific scope, function, requirements, description, maintenance, interfaces, and test and acceptance criteria. The EMF contains the following individual systems:

- active confinement ventilation system (ACV)
- direct feed LAW effluent management facility process system (DEP)
- direct feed LAW effluent management facility vessel vent process system (DVP)

Within the WTP, the BOF interfaces with the PT, HLW, LAW, and Lab facilities. Interfaces with external entities (providers) are raw water; potable water; electricity; roads; sanitary disposal; and non-radioactive, non-dangerous liquid effluent. The physical interface points are generally at the WTP fence line.

## 3 Functions

### 3.1 Control Access

The BOF includes fences, gates, and roads to provide limited access to facilities within the WTP site.

### 3.2 Shelter Processes and Equipment

Buildings within the BOF provide protected space for processes, utilities, and maintenance equipment. The buildings provide the enclosure necessary to withstand natural phenomena and to allow for environmental control of temperature, humidity, and pressure within various spaces of the buildings.

### 3.3 Confine Hazardous Materials

Some buildings or structures also provide protection for personnel and the environment from unwanted releases of hazardous materials. Systems within the BOF receive, store, and transport hazardous materials such as ammonia, fuel oil, nitric acid, and water treatment chemicals. BOF structures help to mitigate the consequences of spills.

### 3.4 Support Structures

Buildings and structures within the BOF provide structural support and anchors for processes, utilities, and maintenance equipment and activities.

## 4 Requirements

### 4.1 Requirement Documents

Facility requirements are derived from the following top-level project documents:

- 24590-WTP-DB-ENG-01-001, *Basis of Design (BOD)*
- 24590-WTP-ICD-MG-01-003, *ICD 03 - Interface Control Document for Radioactive Solid Waste*
- 24590-WTP-ICD-MG-01-005, *ICD 05 - Interface Control Document for Nonradioactive, Nondangerous Liquid Effluent*
- 24590-WTP-ICD-MG-01-009, *ICD 09 - Interface Control Document for Land for Siting*
- 24590-WTP-PSAR-ESH-01-002-02, *Preliminary Documented Safety Analysis to Support Construction Authorization; PT Facility Specific Information (PDSA - PTF)*
- 24590-WTP-PSAR-ESH-01-002-03, *Preliminary Documented Safety Analysis to Support Construction Authorization; LAW Facility Specific Information (PDSA - LAW)*
- 24590-WTP-RPP-ESH-01-001, *Radiation Protection Program for Design and Construction, Radiation Protection Program (RPP)*
- 24590-WTP-RPT-OP-01-001, *Operations Requirements Document (ORD)*
- 24590-WTP-SRD-ESH-01-001-02, *Safety Requirements Document Volume II (SRD)*
- US Department of Energy (DOE) Contract DE-AC27-01RV14136, *Hanford Tank Waste Treatment and Immobilization Plant (DOE 2000)*
- WA7890008967, *Dangerous Waste Permit of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste (WTP Dangerous Waste Permit)*
- WTSC99-1036-42-17, *Geotechnical Investigation River Protection Project – Waste Treatment Plant (Shannon & Wilson 2000)*
- 24590-WTP-COR-MGT-15-00001, *Engineering, Procurement, and Construction Code of Record*

### 4.2 Deleted

### 4.3 Deleted

### 4.4 Deleted

### 4.5 Deleted



## **4.6 Service Provided (Production)**

The following requirements pertain to the service provided by the facilities.

### **4.6.1 Control Personnel Access to the Facilities**

#### **4.6.1.1 Control Over Personnel Access**

The design shall provide control over personnel access to each facility. Exterior access points shall be limited to the minimum number required to support the function of the facility. [Section 13.2, ORD]

#### **4.6.1.2 Fencing**

The WTP site perimeter shall be fenced to manage access and protect individuals from exposure to radiation and/or radioactive material. [Section 5.2, BOD] [ALARA]

#### **4.6.1.3 Deleted**

### **4.6.2 Site Design Parameters**

#### **4.6.2.1 Roads**

##### **4.6.2.1.1 Roads Between Facilities**

Roads shall be provided between each of the major facilities for movement of supplies, equipment, and emergency vehicles. [Section 13.3, ORD]

##### **4.6.2.1.2 Width of Road Pavement**

The pavement shall be nominally 24 ft wide, except for the dedicated service roads to the loading and unloading areas, which shall be nominally 12 ft wide. [Section 13.3, ORD]

##### **4.6.2.1.3 Road Shoulders**

A minimum shoulder shall be provided on each side of roads. [Section 13.3, ORD]

##### **4.6.2.1.4 Vertical Road Clearance**

The minimum vertical road clearance shall be approximately 17 ft over the traveled roadway. [Section 13.3, ORD]

##### **4.6.2.1.5 Parking Size and Location at Facilities**

The BOF shall provide paved parking for at least four vehicles at each building near main maintenance shop area access. [Section 13.3, ORD]

##### **4.6.2.1.6 Deleted**

##### **4.6.2.1.7 Deleted**

##### **4.6.2.1.8 Bollard Posts**

Bollard posts shall be installed at doorways with expected vehicle travel and in the BOF yard near roadways to

protect service piping and components (such as fire hydrants and pipe bridges). [Section 13.1, ORD]

#### 4.6.2.1.9 Deleted

#### 4.6.2.1.10 Topographic Data

Topographic data provided in 24590-CM-SRA-CY20-00002-01-01, *Topographic Survey - WTP Sites* (prepared by Rogers Survey, Inc., January 2002) is used as the basis for grading design. [Section 10.1.5.2, BOD]

#### 4.6.2.1.11 Earthwork

Temporary and permanent earthwork slopes, excavations, and structural fill are in accordance with requirements in RPP-WTP *Geotechnical Investigation report* (WTSC99-1036-42-17 (Shannon & Wilson 2000)). [Sections 10.1.5.1, 10.1.5.3, BOD] [ALARA]

#### 4.6.2.1.12 Handicapped Access

Handicapped access shall conform to federal regulations and ANSI A117.1. Parking areas shall include provisions for both handicapped parking and curb ramps in accordance with ANSI A117.1 and the MUTCD (DOT-FHWA 2001). [Section 10.1.5.4, BOD]

#### 4.6.2.1.13 Layout and Geometry of Roads

Road layout and geometry shall account for operation and maintenance activities. [Section 10.1.5.4, BOD]

#### 4.6.2.1.14 Design of Asphalt Pavement

Design of asphalt pavement shall be based on the recommendations contained in RPP-WTP *Geotechnical Investigation report* (WTSC99-1036-42-17 (Shannon & Wilson 2000)). [Sections 10.1.5.1, 10.1.5.4, BOD]

#### 4.6.2.1.15 Deleted

#### 4.6.2.1.16 Power Line Clearances

Minimum power line clearances shall be determined based on voltage and line type. [Section 10.1.5.4, BOD]

#### 4.6.2.1.17 Loading Over Culverts and Pipes

Loading over culverts and pipes shall be HS20-44 in accordance with AASHTO, *Standard Specifications for Highway Bridges* (AASHTO 1994). [Section 10.1.5.4, BOD]

#### 4.6.2.1.18 Signs and Marking on Pavements

Signs and marking on pavements shall be provided as necessary. [Section 10.1.5.4, BOD]

#### 4.6.2.1.19 Travel Routes for the Melter Transporter

Travel routes for the melter transporter shall be identified on site road drawings, and designed for the special loading and clearance requirements to be defined by the WTP melter group. [Section 10.1.5.4, BOD]

#### 4.6.2.1.20 **General Parking**

The BOF shall provide sufficient parking area(s) for employee and visitor vehicles. Consideration shall be given to additional parking lots for personnel assigned to the facilities to minimize walking in adverse weather. [Section 13.1, ORD]

#### 4.6.2.1.21 **Walking Areas**

Designated walking areas in parking lots and sidewalks shall be provided. [Section 13.1, ORD]

#### 4.6.2.1.22 **Underground Duct Banks and Manhole Systems**

Concrete-encased underground duct banks and manhole systems shall be installed throughout the WTP site for the pulling and protection of power, control, and instrumentation cables. Cables between the DOE 230 kV and 13.8 kV substation and the WTP main switchgear room in the switchgear building, and between the WTP main switchgear room and each stand-alone building, shall be installed in the underground duct bank system. Twenty percent spare capacity shall be provided for underground duct banks where feasible. [Sections 8.2.2.1, 8.3.1, 8.15, BOD]

### 4.6.3 **Structures**

#### 4.6.3.1 **General Requirement for the BOF Structures**

##### 4.6.3.1.1 **Deleted**

##### 4.6.3.1.2 **Deleted**

##### 4.6.3.1.3 **Size of Facilities**

Facilities shall be provided for those items of plant and equipment that require maintenance/repair and the size of the facility shall be determined by the largest item. [Section 9.2, ORD]

##### 4.6.3.1.4 **Storage Areas**

General storage areas shall be provided at appropriate BOF facilities for supplies and equipment needed to operate the plant and for process by-products awaiting permanent disposal. Specific provisions shall include:

- Clean and used regulated and non-regulated clothing storage (four types).
- Storage facilities for miscellaneous operations support equipment and supplies in each major area of each facility depending on the level of support required.
- Weather protected storage for low-level waste in cardboard cartons.

[Section 10.3.5, ORD] [ALARA]

##### 4.6.3.1.5 **Storage Pads**

Storage pads shall be provided for low level waste drums awaiting pickup. [Section 13.1, ORD] [ALARA]

4.6.3.1.6 **Deleted**

4.6.3.1.7 **Deleted**

4.6.3.1.8 **BOF Design Requirements**

The following design requirements shall be followed:

- Use of overhead pipes and wires shall be minimized to prevent obstructions across roads or construction accesses.
- Raised sidewalks shall be provided between all facilities to minimize pedestrian traffic on vehicle roads and to enable runoff of rain and snow melt.
- Crosswalks shall be clearly marked as necessary.
- Adequate drainage systems shall be installed for rain runoff and snowmelt.
- Adequate facility drainage systems shall be provided.
  - Floor drains or sumps shall be provided in areas requiring eyewash and safety shower stations to collect water drainage from these stations during use and testing.
  - All building floor drains shall be routed to a collection vessel or sump via a piping system
  - The design shall not assume that drums or other portable containers will be used routinely for removing anticipated sump contents during normal operations. Provisions shall be made, using installed mechanical pumps, to remove vessel or sump contents to a pipe effluent system for treatment and/or disposal.

[Section 10.2, ORD]

4.6.3.1.9 **BOF Control Rooms**

During full WTP operating configuration, the main control room (MCR) in the PT Facility shall be the standby control room (SCR) for the BOF facilities. BOF buildings shall be centrally controlled from the LAW Facility control room (FCR), but also feature control stations at key locations for more localized control when needed for specific operations. During the DFLAW configuration, the SCR for the BOF facilities shall be provide at the Lab Facility. [Section 11.1, ORD]

4.6.3.1.10 **Integrated Monitoring Control**

To allow for integrated control of the BOF facilities, remote process monitoring and control capability shall be included in the FCRs and the MCR. Remote monitoring and data recording shall be used where possible, to minimize the life cycle costs of field monitoring. [Section 11.1, ORD]

4.6.3.1.11 **Deleted**

4.6.3.1.12 **Deleted**

4.6.3.1.13 **Deleted**

4.6.3.1.14 **Manage Simulants**

The BOF design shall provide for managing simulants and reagents during cold commissioning of each facility. Provisions shall include the storage, makeup and delivery, and disposal systems, including appropriate levels of

containment for the chemicals concerned. Provisions shall be made to support simulant testing of each facility independent of others, such as HLW and LAW independent of PT. [Section 19.6, ORD]

#### 4.6.3.1.15 **Sampling and Analysis Systems**

Sampling and analysis systems shall be in place for both temporary and installed plant systems to demonstrate control of the simulants and reagents and provide test results. [Section 19.6, ORD]

#### 4.6.3.1.16 **Minimize Noise Exposure Levels**

For acoustic hazard controls, plant spaces shall be designed to allow continuous occupancy under ACGIH limits without personal protective equipment (PPE). Where this is not practical, the design shall minimize noise exposure levels to allow continuous occupancy with PPE up to the use of double hearing protection (i.e., less than 109 dBA). Equipment within rooms shall be designed to be below 109 dBA when equipment is in operation. Rooms with equipment that require PPE for entry shall be considered "high-noise areas" for compliance with the ORD, Section 12.5, Communications. [Section 8.1.5, ORD]

#### 4.6.3.1.17 **Dumpster Pads**

The BOF shall include conveniently located dumpster pads for waste dumpsters. [Section 13.1, ORD]

#### 4.6.3.1.18 **Frost Depth**

The frost depth is 24 in. below grade. The top of the pipe or bottom of the foundation shall be below this depth, except for the following special requirements (unless otherwise prescribed by the applicable governing codes or standards):

- 4 ft, 0 in. minimum for fire water yard piping
- 3 ft, 0 in. minimum for potable water system
- 3 ft, 0 in. minimum for rad waste transfer lines
- 2 ft, 6 in minimum for plant service air system
- 2 ft, 6 in minimum for ammonia reagent piping
- 2 ft, 6 in minimum for diesel fuel oil piping
- 1 ft, 0 in minimum for CMP culverts

[Section 10.1.5.7, BOD] [ALARA]

### 4.6.4 **Structural Basis of Design**

#### 4.6.4.1 **Deleted**

#### 4.6.4.2 **Structural Design Parameters**

Structural design parameters are as follows:

- The design parameters for soil shall be as recommended in RPP-WTP *Geotechnical Investigation report* (WTSC99-1036-42-17 (Shannon & Wilson 2000)).
- Depth of frost penetration below grade shall be as stated in (BOD) Section 10.1.5.7 (see section 4.6.3.1.18, *Frost Depth*, in this document above).
- Earthquake design parameters shall be in accordance with 24590-WTP-DC-ST-04-001, *Seismic Analysis and*

*Design Criteria.*

[Section 10.1.5.1,10.2.6, BOD]

#### **4.6.5 Structural Design Features**

##### **4.6.5.1 Deleted**

##### **4.6.5.2 Moved to 4.10.6.3**

#### **4.6.6 Structural Design Methods**

##### **4.6.6.1 Structural Design Methods**

Structural design methods shall include the following:

- Reinforced concrete shall be designed by the strength design method.
- Structural steel shall be designed by the allowable stress design method.
- Masonry shall be designed by the allowable stress design method.

[Section 10.2.5, BOD]

#### **4.6.7 Structural Design Loads**

The following structural loads shall be addressed during BOF design.

##### **4.6.7.1 Dead Loads**

###### **4.6.7.1.1 Dead Loads Composition**

Dead loads shall include the weight of structure, built-in partitions, permanent equipment, piping, raceways, heating, ventilation, and air conditioning (HVAC) ductwork, and other permanent static loads. [Section 10.2.7, BOD]

###### **4.6.7.1.2 Effects of Differential Settlement**

Effects of differential settlement shall be included with the dead loads. [Section 10.2.7, BOD]

###### **4.6.7.1.3 Effects of Creep and Shrinkage**

Effects of creep and shrinkage shall be included with the dead loads. [Section 10.2.7, BOD]

##### **4.6.7.2 Live Loads**

###### **4.6.7.2.1 Live Loads Composition**

Live loads shall include floor and roof area loads, dynamic loads from equipment, movable loads, laydown loads, cranes, monorails, forklifts, elevators, and moving vehicles. Minimum live loads shall comply with the applicable codes identified in the SRD. [Section 10.2.7, BOD]

#### 4.6.7.2.2 **Snow Design Loads**

Snow design loads for SC-IV structures shall be based on 15.0 lb/ft<sup>2</sup> ground snow load, with an importance factor of I=1.0, from HNF-SD-GN-ER-501, *Natural Phenomena Hazards, Hanford Site, Washington* (NUMATEC 1998) [Section 10.2.7, BOD]

#### 4.6.7.2.3 **Static Lateral Loads**

Static lateral earth pressures for all structures shall be calculated using the lateral earth pressure coefficients recommended in RPP-WTP *Geotechnical Investigation report* (WTSC99-1036-42-17 (Shannon & Wilson 2000)). Active lateral earth pressures shall be used in the stability evaluation of structures. [Sections 10.1.5.1,10.2.7, BOD]

#### 4.6.7.2.4 **Wind Loads**

Wind loads shall be evaluated in accordance with the provisions of the applicable codes identified in the SRD. SC-IV structures shall withstand straight wind loads of 85 mi/h 3-sec gusts at 33 ft above ground, with an importance factor of I = 1.00, and Exposure Category C. The WTP is not required to be designed for tornado hazards. [Section 4.8, 10.2.7, BOD]

#### 4.6.7.2.5 **Earthquake Loads**

Earthquake loads shall be evaluated in accordance with 24590-WTP-DC-ST-04-001, *Seismic Analysis and Design Criteria*. SC-IV structures shall withstand seismic loads from the Uniform Building Code (UBC), “Static Force Procedure,” with an importance factor of I = 1.0 for structures, and I<sub>p</sub> = 1.0 for systems and components. [DOE-STD-1020-94][Section 10.2.7, BOD]

#### 4.6.7.2.6 **Volcanic Ash Load**

SC-IV structures shall withstand volcanic ash loads of at least 3 lb/ft<sup>2</sup>. [Section 10.2.7, BOD]

#### 4.6.7.2.7 **Flooding Loads**

Design of SC-IV structures shall account for precipitation of 1.8 in. for 6 hours. [Section 10.2.7, BOD]

#### 4.6.7.2.8 **Thermal Loads**

Thermal loads during normal operating and accident conditions shall be calculated using temperature gradients. [Section 10.2.7, BOD]

#### 4.6.7.2.9 **Fluid Loads**

Fluid loads shall include loads caused by the weight of fluids with defined densities and maximum heights. [Section 10.2.7, BOD]

#### 4.6.7.2.10 **Piping Loads**

Piping reaction loads due to normal operation shall be considered. [Section 10.2.7, BOD]

#### 4.6.7.2.11 **Exterior Wall, Door, Window, and Louver Assemblies**

Exterior wall, door, window, and louver assemblies shall be designed to withstand wind and wind-driven missile design loads as specified in (BOD) Section 10.2, Structural. [Section 10.3.4.10, BOD]

#### 4.6.7.2.12 Reinforced Concrete Load Combinations

Load combinations for the design of SC-III and SC-IV structures shall be based on the applicable codes in the SRD for SC-III structures. [Section 10.2.8.1, BOD]

#### 4.6.7.2.13 Structural-Steel Load Combinations

Load combinations for the design of SC-III and SC-IV structures shall be based on the applicable code in the SRD for SC-III structures. [Section 10.2.8.2, BOD]

#### 4.6.7.2.14 Soil Bearing Capacity

The load combinations prescribed in the SRD shall be used to verify the allowable soil bearing capacity. [Section 10.2.8.4, BOD]

#### 4.6.7.2.15 Stability Against Sliding and Overturning

The structures shall be evaluated for stability against sliding and overturning. [Section 10.2.9, BOD]

#### 4.6.7.2.16 Deflection Limits for Reinforced Concrete and Structural Steel

Limitations for deflection of concrete and structural-steel elements shall meet requirements in the applicable design code referenced in the SRD. [Section 10.2.10, BOD]

### 4.6.8 Seismic Design

#### 4.6.8.1 Building Separation

Building separation limits shall meet requirements in Seismic Analysis and Design Criteria (24590-WTP-DC-ST-04-001). [Section 10.2.12, BOD]

#### 4.6.8.2 Seismic Proportioning and Detailing

For seismic proportioning and detailing of concrete elements, structural-steel members, and masonry elements shall be in accordance with the Seismic Analysis and Design Criteria (24590-WTP-DC-ST-04-001). [Section 10.2.13, BOD]

#### 4.6.9 Deleted

##### 4.6.9.1 Deleted

##### 4.6.10 Deleted

#### 4.6.11 Architectural Design Philosophy

##### 4.6.11.1 Exterior Building Materials

Selection and placement of exterior building material types, treatments, colors, and roof slopes shall reflect a coordinated WTP site aesthetic to create a visually unified project campus. [Section 10.3.4, BOD]



#### 4.6.11.2 Facility Colors

In accordance with 24590-WTP-ICD-MG-01-009, *ICD 09 - Interface Control Document for Land for Siting*, facilities shall have minimal visual impact by using a neutral/ acceptable color. [Section 10.3.4, BOD]

#### 4.6.11.3 Building Materials

Building material products, salient features, sizes, and manufacturers (when necessary) shall be consistent throughout the WTP for ease of procurement and maintenance, and to reduce storage and handling requirements. Of particular importance are building envelope materials, roofing systems, interior finish materials, doors and door hardware/keying, signage, conveying systems, and plumbing fixtures. [Section 10.3.4, BOD]

#### 4.6.11.4 Material Durability

Durable materials shall be selected for those interior and exterior areas subject to equipment movement and operations of potential impact. [Section 10.3.4, BOD]

#### 4.6.11.5 Room and Door Numbering

Room and door numbering systems that are consistent across all facilities throughout the WTP site shall be developed. [Section 10.3.4, BOD]

#### 4.6.11.6 Design Life

Architectural materials shall support an operational design life of 40 years with normal maintenance. [Section 10.3.4.3, BOD]

#### 4.6.11.7 Design Life Provisions

Provisions will be made for the safe recovery, replacement, and/or redundancy of components subject to extreme service conditions to achieve a 40 year design life. [Section 14.1, ORD]

#### 4.6.11.8 Deleted

#### 4.6.11.9 Deleted

#### 4.6.11.10 Dedicated Areas

##### 4.6.11.10.1 Equipment Test Facilities

Facilities shall be provided to test equipment after repair. [Section 9.2, ORD]

##### 4.6.11.10.2 Electrical and Instrument Rooms

Electrical and instrument equipment rooms shall have the following capabilities:

- Telephone communications
- Connection points for engineer workstations for software and equipment maintenance in the instrument rooms
- Connection points for computerized access to WTP information networks, and direct actuation for drives through motor control centers

[Section 11.7, ORD]

#### 4.6.11.11 Large On-site Sewer System (LOSS) Required Setbacks

The design of the LOSS shall have the minimum horizontal setbacks as shown below:

Non-public well or suction line: 100 ft  
Public drinking water well: 100 ft  
Public drinking water spring: 200 ft  
Spring or surface water used as drinking water source: 100 ft  
Pressurized water supply line: 10 ft  
Properly decommissioned well: 10 ft  
Surface water - Marine water: 100 ft  
Surface water - Fresh water: 100 ft  
Building foundation: 10 ft  
Property or easement line: 5 ft  
Interceptor/curtain/drains/drainage ditches - Down-gradient: 30 ft  
Interceptor/curtain/drains/drainage ditches - Up-gradient: 10 ft  
Down-gradient cuts or banks with at least five feet of original undisturbed soil above a restrictive layer, due to a structural or textural change: 25 ft  
Down-gradient cuts or banks with less than five feet of original undisturbed soil above a restrictive layer, due to a structural: 50 ft

[Section 14.17 Table 14-3, BOD]

#### 4.6.12 Building Occupancy

##### 4.6.12.1 Deleted

##### 4.6.12.2 Deleted

##### 4.6.12.3 Deleted

##### 4.6.12.4 Operations Staffing Accommodation

For continuing operations, the following office space shall be required for these types of staff or functions in each of the three processing facilities

- Facility Operations Manager
- Facility Manager
- Facility Engineering Manager
- Shift Technical Engineer
- Maintenance/Electrical Supervisor
- Analytical Manager (Laboratory only)
- Outage Manager
- Shift Manager
- Operations Supervisor
- Maintenance Supervisor
- Shift Work Control Planner
- Document control and records storage
- Work release area (work authorization, lockouts, locks, key control)
- Shift turnover room (space for off-going and on-coming crews and pre-job briefings), adjacent to control rooms

- Spare offices for needs such as commissioning manager and turnaround offices for support personnel

**NOTE:** Staffing estimates are provided in the ORD for design of parking, office, lunchroom, breakroom, conference room and change room space. The estimates provided are a preliminary estimate of the staffing level required to commission and operate DFLAW and do not include staffing required for HLW and PT. As the design evolves; these numbers may change.

The staffing levels to support commissioning and operations are as follow:

	DFLAW		PT		HLW		Total	
	Base <sup>1</sup>	Cont <sup>2</sup>	Base <sup>1</sup>	Cont <sup>2</sup>	Base <sup>1</sup>	Cont <sup>2</sup>	Base <sup>1</sup>	Cont <sup>2</sup>
<b>On-site Head Count</b>								
• Manual head count	374	449	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>
• Non-manual head count	670	804	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>
• Total on-site head count	1044	1253	162 <sup>3</sup>	194 <sup>3</sup>	150 <sup>3</sup>	180 <sup>3</sup>	1356 <sup>3</sup>	1627 <sup>3</sup>
<b>On-site Parking Basis</b>								
• Day manual head count	252	302	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>
• ½ shift manual head count	62	74	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>
• Day non-manual head count	527	632	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>
• ½ shift non-manual head count	72	86	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>
• Total count for parking <sup>5</sup>	913	1094	95 <sup>3</sup>	114 <sup>3</sup>	89 <sup>3</sup>	107 <sup>3</sup>	1097 <sup>3</sup>	1315 <sup>3</sup>

- 1) Base staffing level. The staffing profile for DFLAW is from 24590-WTP-IFT-PC-15-0488 LBL/DFLAW Completion.
- 2) Base staffing level plus contingency. A contingency of 20% is added to the staffing estimates for visitors and oversight based on recommended contingency from ERPI-NP-4350 Human Engineered Design Guidelines for Maintainability.
- 3) PT and HLW staffing estimates use figures from 24590-WTP-CE-PC-02-001 (sensitive), *May 2002 Project Forecast*. They are provided in this table as a basis for civil and architectural design purposes. Once PT and HLW are re-baselined for commissioning and operation, the staffing numbers will be updated.
- 4) Number not provided as part of *May 2002 Project Forecast* estimate
- 5) The total head count for parking is the maximum number of personnel expected to be on site at one time, which occurs Monday through Friday for 1 hour when night shift is turning over to day shift.

[Section 6.5.1, ORD]

#### 4.6.12.5 BOF Lunchrooms

Lunchrooms shall be provided for each of the major processing plants, BOF, and the administrative building, the first two shall be sized to accommodate both rotating shift and day shift personnel. The EMF is not considered a major processing plant, and therefore, lunchrooms are not required in the EMF. The rooms shall be equipped with refrigerators, sinks, counters, and storage cabinets for kitchen supplies. Kitchen appliances are not to be built-in to facilitate easy repair and replacement. There shall also be space provided for an ice machine, microwaves, and multiple food and beverage vending machines. [Section 10.3.2, ORD]

#### 4.6.12.6 Personnel Offices and Miscellaneous Rooms

Personnel offices and miscellaneous rooms (such as conference rooms, restrooms, and janitor closets) shall be provided in each of the three processing buildings, in appropriate BOF buildings (TBD), the Analytical Laboratory, and the Administrative building. As a sub-facility of LAW, the EMF shall utilize LAW offices and miscellaneous room to provide this capability. Provisions shall include the following:

- With the exception of field personnel such as operations and maintenance personnel, all other personnel shall be provided individual (for management and supervisory personnel) or shared offices in each of the three processing facilities and the BOF.
- Areas shall be provided in each processing building, adjacent to the control room, for rotating shift turnover

briefings and pre-job meetings. Similar space shall be provided for BOF operations.

- Areas provided in each processing building and BOF for watch-stander rooms. Provisions shall include space for chairs, tables to read prints and maintain narrative logbooks, bookcases for procedures and reference materials, and communications. In addition, the area shall contain a computer for use by operators.
- A work release office for each of the three processing facilities and BOF for control of ongoing work and storage of locks and tags. The office shall accommodate up to six personnel.
- The administration building shall contain offices, restrooms, conference rooms, a lunchroom, centralized reproduction room, mailroom, and a supply room. In addition, there shall be space provided in the administration building for all staff necessary for support of the plant not housed in the processing buildings. The design shall include office space sufficient for the exclusive use of eight full time DOE personnel and temporary space for ten transient DOE personnel. There shall be three conference rooms separated by folding partitions such that the rooms may be enlarged as necessary. Each of these rooms shall incorporate space for 25 people, including model displays, and other visitor briefing material. An elevator shall be provided for freight and handicapped access.

[Section 10.3.3, ORD]

#### 4.6.12.7 Deleted

#### 4.6.13 Deleted

#### 4.6.14 Fire Protection

##### 4.6.14.1 Deleted

##### 4.6.14.2 Deleted

##### 4.6.14.3 Deleted

##### 4.6.14.4 Deleted

##### 4.6.14.5 Portable Fire Extinguishers

Portable fire extinguishers shall be placed in easily accessible locations along routes of travel near door exits and corridors. [Section 13.5.2, BOD]

##### 4.6.14.6 Use Non-combustible Material

Buildings shall be constructed of non-combustible or fire-resistive material. Membrane roof assemblies shall be Class I as listed by Factory Mutual. [Section 10.3.4.7, BOD]

##### 4.6.14.7 Deleted

##### 4.6.14.8 Deleted

##### 4.6.14.9 Deleted

#### 4.6.15 Deleted

## 4.6.16 Off-Normal or Upset Conditions Immediately Dangerous to Life and Health (IDLH)

### 4.6.16.1 Atmospheric monitoring for gaseous hazards

Atmospheric monitoring for gaseous hazards must be provided for rooms or areas where there is a potential for the gas concentration to exceed the Permissible Exposure Limit (PEL) due to a single failure or misoperation.

Atmospheric monitors will include the following:

- Local indication with audible and visual alarms at a level below the PEL
- Remote indication and alarm status to allow for identification of atmospheric hazard prior to room entry.
- Capability to reset alarms from outside of the affected room

[Section 8.1.4.3, ORD]

### 4.6.16.2 Added to 4.6.16.4

### 4.6.16.3 Added to 4.6.16.4

### 4.6.16.4 Personnel Protection from Hazardous Gases

Where sufficient warning cannot be provided to personnel for self-evacuation prior to concentrations of hazardous gases reaching the immediately dangerous to life and health (IDLH) concentration (i.e., 30 minutes from the start of the initiating event), the associated rooms are to be considered inaccessible to personnel while the hazard is present in the system piping and shall include the following design provisions:

- Facility design shall maintain the room breathing zone below the Immediately Dangerous to Life and Health (IDLH) concentration during maintenance and operation activities, such as instrument tubing break or mis-operation of vent valves.
- If the facility design cannot prevent reaching IDLH concentrations, the time from the event to reaching IDLH concentration in the room shall be greater than 30 minutes.
- Where the system design cannot provide 30 minutes for identification and evacuation, the affected room must be considered inaccessible to personnel while the hazard is present in the system piping.
  - Maintenance requirements and plant availability must be evaluated to ensure Contract requirements are met by the design with this limitation on access.
  - Systems with gaseous hazards shall be capable of eliminating the hazard by isolation, vent, purge, or decay, and verifying elimination or reduction below a hazardous threshold, prior to entry.
  - Rooms containing these systems shall include access controls (e.g., locks or other controls providing similar safeguards against inadvertent entry).

[Section 8.1.4.4, ORD]

## 4.6.17 Interior Finishes

### 4.6.17.1 Interior Finish for Fire Protection

Interior finish materials shall be Class A in accordance with ASTM E84. Interior floor coverings shall be Class I in accordance with ASTM E648. [Section 10.3.4.7, BOD]

#### 4.6.17.2 Deleted

#### 4.6.17.3 Coatings

Special protective coatings/sealants shall be applied to surfaces where required by environmental permits or regulations. [Section 13.4, ORD] [ALARA]

#### 4.6.18 Energy Conservation

##### 4.6.18.1 Deleted

##### 4.6.18.2 Additional Energy Conservation Measures

Additional energy conservation measures shall include the following:

- Exterior windows in conditioned buildings shall meet shading coefficient requirements defined in ASHRAE 90.1 by means of tinted insulated glass.
- Exterior openings shall be weather stripped to minimize air leakage.
- Personnel, equipment, and vehicular exterior access doors in conditioned buildings shall be insulated.
- Vestibules shall be provided at all building entrances, where possible, to maintain positive or negative air pressure.

[Section 10.3.4.8, BOD]

#### 4.6.19 Structure Accessibility

##### 4.6.19.1 Provisions for the Physically Handicapped

Facilities shall provide access for the physically handicapped—except those housing nuclear waste treatment and vitrification processes—and activities deemed to be unsafe or unsuitable for the physically handicapped. [Section 10.3.4.9, BOD]

##### 4.6.19.2 Facilities Exempted from Handicapped Accessibility Requirements

Facilities exempted from accessibility requirements include the maintenance shops and support facilities. [Section 10.3.4.9, BOD]

##### 4.6.19.3 Deleted

#### 4.6.20 Building Appurtenances

##### 4.6.20.1 Weather Protection for Bays and Docks

Loading bays and docks shall be weather protected for safe receipt and shipment of supplies, waste, and equipment. [Section 13.1, ORD]

##### 4.6.20.2 Awnings

Awning-type structures shall be provided at personnel exterior doors located below eaves for icicle protection. [Section 13.1, ORD]

### 4.6.20.3 Drains for Chemical Receiving Areas

Areas for receiving truck shipments of chemicals shall be equipped with suitable drain systems (in accordance with the *Resource Conservation and Recovery Act of 1976* [RCRA]) to collect spills, safety showers, and eye wash stations. [Section 13.1, ORD]

### 4.6.20.4 Doors

Doors shall meet life safety codes for the force required to open them during normal and adverse ventilation conditions. [Section 13.1, ORD]

### 4.6.21 Deleted

#### 4.6.21.1 Deleted

### 4.6.22 Electrical, Controls, and Instrumentation

#### 4.6.22.1 Electrical Receptacles and Connectors

##### 4.6.22.1.1 Plugs

Plugs shall be used for power and instrumentation instead of hard wiring where practical. [Section 9.1, ORD]

##### 4.6.22.1.2 Convenience Receptacles

In general, 120 V AC convenience receptacles shall be located in the process areas so that adequate coverage may be obtained with 50-ft extension cords. [Section 16.1, ORD]

##### 4.6.22.1.3 Welding Receptacles

Welding receptacles shall be located where in-place repair of process equipment might be required (to be determined). [Section 16.1, ORD]

##### 4.6.22.1.4 Actuators and Valves Wiring Connectors

Electrical and control wiring to actuators and valves shall use connectors where practical, if 110 volts or less, to facilitate maintenance. [Section 16.1, ORD]

##### 4.6.22.1.5 Higher Risk Areas Wiring Connectors

In higher risk areas, design shall be provided for wire connectors that cannot be reconnected incorrectly after maintenance is completed. This applies to locations where there are multiple wires and the possibility exists to mix the wires. [Section 16.1, ORD] [ALARA]

#### 4.6.22.2 Local Control Stations

In addition to the control rooms and the caveface, other local control points shall be located for the following purposes:

- Control of services and feed material receipt
- Startup and shutdown of services and utilities equipment (where appropriate)

[Section 11.6, ORD]

#### 4.6.22.3 Control and Monitor

Systems used to control and monitor plant processes and equipment shall include the following provisions as appropriate:

- Devices operated at local control points shall be subject to independent protection interlocks.
- Direct actuation for drives via a maintenance control switch.

[Section 11.10, ORD]

#### 4.6.22.4 Maintenance Control

##### 4.6.22.4.1 Direct Control

Maintenance control (also called direct control) shall be available as a means of operating devices independent of the control systems from a local panel, pendant, or motor control center, where appropriate. It will be used in the event of control system failure or to perform operational tests as a result of equipment repair or maintenance.

[Section 11.12.3.6, ORD]

##### 4.6.22.4.2 Facilities for Maintenance

Facilities for maintenance shall include the following:

- Software diagnostics shall be provided sufficient to quickly determine the reason for control sequence hold-up or sequence trip.
- To aid in maintenance, sequences shall be capable of stepping through each step, provided that doing so does not create safety hazards.
- Local operator interface (LOI) panels, or connection ports to plug-in LOIs, shall be provided within easy access of maintenance areas for testing purposes.
- Control system documentation to support maintenance shall be available in key locations via the EDMS or comparable system. User friendly search and retrieval facilities shall be provided.

[Section 11.10, 11.12.6, ORD]

##### 4.6.22.5 Instrument cables

Instrument cables routed so that they:

- Do not interfere with the maintenance or removal of unrelated equipment
- Avoid hot environments and fire risk areas
- Are not subject to mechanical abuse

[Section 16.1, ORD]

#### 4.6.23 Accessibility for Maintenance

The facility layout shall meet the following requirements for maintenance accessibility.

##### 4.6.23.1 Provide Clearance for Maintenance and Operation

Adequate clearances shall be provided around equipment to accommodate maintenance and operation personnel, and any encumbrances such as protective garments, respirators, portable lifting devices, and alignment equipment for pumps, etc. [Section 9.1, ORD]



#### 4.6.23.2 Provide Clearance for Equipment Maintenance

Equipment and plant structural elements such as columns and beams shall be arranged with respect to one another to allow for access to equipment by maintenance personnel. [Section 9.1, ORD]

#### 4.6.23.3 Provide Space for Access to Staggering Dual Component Systems

Consideration shall be given to staggering dual components systems in each of two redundant trains to allow access to both systems rather than inboard or outboard configuration. [Section 9.1, ORD]

#### 4.6.23.4 Provide Space for Ladder/Scaffolding for Maintenance

Equipment, instrumentation, and electrical components located more than 5 ft from ground level shall have adequate space to allow for access with a ladder, portable manlift, or scaffolding for operation and maintenance. [Section 9.1, ORD]

#### 4.6.23.5 Provide Permanent Work Platform for Maintenance

Equipment, instrumentation, and electrical components that are 6 ft and over from floor level shall be provided with permanent work platform with fixed ladder/stair access to perform operation and maintenance.

The following pre-approved exceptions are granted (no ORD exception form required) provided readily available access by means of portable manlift or step ladder can be provided:

- Fan Coil Unit (FCU) filters and blower/blower motor grease fittings
- Heating, ventilation, and air-conditioning (HVAC) in-bleed assembly filters
- Lighting fixtures
- Emergency lighting and egress lighting fixtures
- Smoke detectors/environmental monitoring sensors
- Process and mechanical handling CCTV system cameras
- Control panel vortex cooling components
- Electrical switches or components manipulated once a month or less frequently

[Section 9.1, ORD]

Readily available access, as defined by section 9.1 of the ORD, is defined as accessibility where the floor below and space to the equipment is free of obstructions. Floor space must be sufficient for a portable manlift (36 by 70 inches) or step ladder (opening width of step ladder is height dependent).

The following pre-approved exceptions are granted (no ORD exception form required) and readily available access is not required for the following equipment, scaffold access to reach and operate/maintain the equipment is required:

- System vent valves
- Ventilation system manual volume dampers
- Fire Service Water sprinklers and sprinkler pipe header isolation valves
- System header isolation valves (located in pipe chases/pipe racks)
- Process sensing elements, transmitters and associated enclosures where indication and calibration is readily available below 6 feet.

#### **4.6.23.6 Provide Space for Equipment Transport**

Space shall be provided to allow transport of equipment to repair shops or for disposal. [Section 9.1, ORD]

##### **4.6.23.6.1 Provide Pathways for Equipment Removal**

Pathways shall be provided for removal of equipment to the maintenance areas. [Section 9.1, ORD]

##### **4.6.23.6.2 Provide Clearance for Operation and Maintenance**

Adequate corridors and equipment pull space shall be provided for performing operation and maintenance activities. [Section 10.2.14, BOD]

##### **4.6.23.6.3 Allow Access**

Instruments and any respective sensing line valving shall be positioned to allow access from the floor or permanent platform. [Section 11.16, ORD]

##### **4.6.23.6.4 Provide Adequate Headroom**

Adequate headroom shall be provided above valves and in-line instrumentation to facilitate removal. [Section 11.16, ORD]

##### **4.6.23.6.5 Protect Valves and Instruments**

Valves and instruments shall be protected from adverse environmental conditions such as excessive heat, corrosion, vibration, and mechanical damage. Where termination is made to a measuring element that has to be withdrawn, sufficient cable length shall be provided so that the element can be withdrawn without disconnecting. [Section 11.16, ORD]

##### **4.6.23.6.5.1 Provide Adequate Clearance**

Instrument system cabling, piping, containment, and equipment shall be designed to have adequate clearance from the building and building services (interference-free) to facilitate maintenance. [Section 11.16, ORD] [ALARA]

##### **4.6.23.6.5.2 Accessibility of In-plant Controls**

In-plant controls shall be easily accessible and shall not require double staffing (e.g., locate control equipment close to readouts that monitor change of state). [Section 11.16, ORD]

##### **4.6.23.6.5.3 Support Instrument Preventive Maintenance**

Provision shall be made in the facility design to perform instrument calibrations, preventive maintenance, and periodic functional testing of protective circuits while the plant is in normal operation. Consideration shall be given to performance of routine calibrations and preventive maintenance of equipment during normal operation. [Section 9.1, ORD]

##### **4.6.23.6.5.4 Deleted**

##### **4.6.23.6.5.5 Maintenance Facilities Features**

The central maintenance shop shall contain the following as appropriate:

- Space for hand/power tools, toolboxes, storage cabinets, and utilities (compressed air, water, and electrical power).
- Welding shop with layout burn tables, welding rod ovens, and both gas and electric welding.
- Measuring and Testing Equipment (M&TE) separate from the instrument shop. The M&TE shop must be temperature and humidity controlled.
- Individual work stations with the instrumentation to allow for the calibration of instrument and specialty items.
- Electrical shop with motor run test station, work benches, toolboxes, and storage cabinets for test equipment.
- Mechanical shop with drill press, hydraulic bearing press, grinders, work benches, pipe threading machine, band saw, cut off saw, tool boxes, test bench for valves and pressure relief valves, and storage cabinets.
- Computers for technicians to access maintenance systems and records.

[Section 9.2, ORD]

#### **4.6.23.6.5.6 Maintenance Facility C1 Shops**

Each facility C1 shop shall have supervisor's offices adjacent to them. [Section 9.2, ORD]

#### **4.6.23.6.5.7 Maintenance Facility Spare Parts**

There shall be space in maintenance facilities for a limited supply of spare parts, consumables, tools, and utilities (compressed air, water, and electrical power) used for repair of equipment. [Section 9.2, ORD]

#### **4.6.23.6.5.8 Deleted**

#### **4.6.24 Deleted**

#### **4.6.25 Draining**

A floor drain system shall be in areas such as bulges, galleries, and shops to dispose of leakage, fire water, or wash down liquids. [Section 13.1, ORD] [ALARA]

#### **4.6.26 Facility-Specific Requirements**

There are no specific requirements in the BOD or ORD for the following facilities and structures:

- Glass former storage facility (GFSF) and GFSF blend building 21; GFSF control building 21S
- Anhydrous ammonia facility 23
- Warehouse 52
- Non-dangerous, non-radioactive effluent facility 54, and motor control building
- Maintenance shop (combination shop) 56
- Simulator building 58
- Personnel access facility 59
- Chiller/compressor plant 82
- Fire Water Pump House A and B 84A and 84B
- Water treatment building and storage tanks 86
- Switchgear building 87

- Standby diesel generator area 87S
- Emergency turbine generator facility 89
- BOF switchgear building 91

#### 4.6.26.1 Deleted

#### 4.6.26.2 Administration Building 51

##### 4.6.26.2.1 Training Area for Plant Personnel

Administration building 51 shall have a dedicated area for training of plant personnel. The area shall include one standard classroom (space for 25 personnel) and one office. The room shall be furnished with all necessary equipment for training purposes. [Section 10.3.6, ORD]

##### 4.6.26.2.2 Deleted

#### 4.6.26.3 Cooling Tower Facility 83

Cooling tower facility 83 shall be located to minimize impacts of ice forming on roads and equipment during winter conditions, and condensation (scaling) on automobiles. [Section 10.2, ORD]

#### 4.6.26.4 Deleted

#### 4.6.26.5 Steam Plant 85

##### 4.6.26.5.1 Deleted

##### 4.6.26.5.2 Monitoring Equipment for Steam Plant 85

Sampling points shall be included in the discharge ducts of steam plant 85. Calculations and periodic sampling shall be used to account for aerial discharges from these support systems. [Section 9.4.15.3, BOD]

#### 4.6.26.6 Switchgear Building 87

##### 4.6.26.6.1 Provide Space for Switchgear Equipment

The WTP primary 13.8-kV power distribution system switchgear assemblies shall be located in the plant Switchgear Building 87. [Section 8.3.1, BOD]

#### 4.6.27 Deleted

#### 4.6.28 Radiological Waste Transfer Lines

##### 4.6.28.1 Underground Radiological Waste Transfer Lines

All underground radiological waste transfer lines shall be provided with adequate radiation shielding by soil, concrete, steel or other materials to comply with as low as reasonably achievable (ALARA) goals. [Section 10.1.5.8, BOD] [ALARA]

#### 4.6.28.2 Deleted

### 4.7 Nuclear Safety

There are no credited nuclear safety requirements in top-level design criteria documents for the following facilities and structures:

- Administration building 51
- Chiller/compressor plant 82
- Warehouse 52
- Non-dangerous, non-radioactive effluent facility 54, and motor control building
- Maintenance shop (combination shop) 56
- Cooling tower facility 83 and support building 83S
- Fire water pump house A and B; 84A, 84B
- Steam plant facility 85
- Water treatment building and storage tanks 86
- Switchgear building 87
- Standby diesel generator area 87S
- BOF switchgear building 91
- Simulator building 58
- Glass Former Storage Facility and Glass Former Storage Facility Blend Building 21; GFSF Control Building 21S
- Anhydrous Ammonia Facility 23

#### 4.7.1 Wet Chemical Storage Facility 11 and Support Building 11S

The following requirements pertain to the wet chemical storage facility 11 and support building 11S.

##### 4.7.1.1 Confinement of Acid Spills

The SS function of the nitric acid storage tank confinement area and the delivery truck bay confinement area is to limit the surface area of nitric acid spills to below the analyzed size to maintain the co-located worker exposure to below hazardous chemical exposure limits. [Section 4.4.43.1, PDSA – PTF]

##### 4.7.1.2 Acid Spill Confinement Area

The nitric acid storage tank confinement area and the delivery truck bay confinement area must limit the surface area of nitric acid spills to a value 25% less than that calculated in the accident analysis and must be designed to SC-III and PC-2. Spreading of the surface area caused by a leak through a berm wall must also be prevented. Leak prevention is addressed by an administrative control. [Section 4.4.43.2, PDSA – PTF]

#### 4.7.2 Deleted

#### 4.7.3 Deleted

#### 4.7.4 Deleted

#### 4.7.5 Deleted

4.7.6 Deleted

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4.7.11 Deleted

4.7.12 Deleted

4.7.13 Deleted

4.7.14 Deleted

4.7.15 Deleted

4.7.16 Deleted

## **4.8 Environmental Requirements**

### **4.8.1 Loading and Unloading Areas for Liquid Dangerous Waste Storage**

Treatment, storage, and disposal facilities which receive or ship manifested shipments of liquid dangerous waste for storage shall provide for and use an area(s) for loading and unloading waste shipments. The loading and unloading areas(s) must be designed to meet requirements in WAC 173-303-395(4).

1. Contain spills and leaks that might occur during loading and unloading (WAC 173-303-395(4)(a))
2. Prevent release of dangerous waste or dangerous waste constituents to ground or surface waters (WAC 173-303-395(4)(b))
3. Contain wash waters (if any) resulting from the cleaning of contaminated transport vehicles and load/unload equipment; and (WAC 173-303-395(4)(c))
4. Allow for removal, as soon as possible, of collected wastes resulting from spills, leaks and equipment cleaning (if any) in a manner which assures compliance with (b) of this subsection. (WAC 173-303-395(4)(d))

[Section 14.14, BOD]

### **4.8.2 Backfill Material for Underground Components**

Backfill material for tank systems or components that are placed underground shall be non-corrosive, porous, and homogeneous. Backfill material shall be placed completely around the tank system components and compacted so that the components are uniformly supported. (WAC 173-303-640[3][d]) [Section 14.10.1, BOD]

4.8.3 Deleted

### **4.8.4 General Security Provisions**

#### **4.8.4.1 Security Provisions**

The Hanford Site-wide RCRA Permit Condition II.M requires the WTP to comply with the security provisions of WAC-173-303-310(2).

A facility shall have the following:

- Signs posted at each entrance to the active portion, and at other locations, in sufficient numbers to be seen from any approach to the active portion. Signs must bear the legend, “Danger-Unauthorized Personnel Keep Out,” or an equivalent legend, written in English and it must be legible from a distance of at least 25 ft or more; and either, [WAC 173-303-310(2)(a)] [Section 14.15, BOD]
- A 24-hour surveillance system which continuously monitors and controls entry onto the active portion of the facility; or, [WAC 173-303-310(2)(b)] [Section 14.15, BOD]
- An artificial or natural barrier, or combination of both, which completely surrounds the active portion of the facility; with a means to control access through gates or other entrances to the active portion of the facility at all times. [WAC 173-303-310(2)(c)] [Section 14.15, BOD]

#### 4.8.4.1.1 Prevent Unauthorized Entry

##### 4.8.4.1.1.1 Totally Enclosed Treatment Facility, Elementary Neutralization, Wastewater Treatment Unit

In lieu of WAC 173-303-310(2), the owner or operator of a totally enclosed treatment facility or an elementary neutralization or wastewater treatment unit (as defined in WAC 173-303-040) must prevent the unknowing entry, and minimize the possibility for the unauthorized entry of persons or livestock into or onto the totally enclosed treatment facility or the elementary neutralization or wastewater treatment unit. (WAC 173-303-310(3)). [Section 14.15, BOD]

#### 4.8.5 Requirements for Container Storage Areas

A container is defined as any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled (which includes overpacked melter). The WTP container storage areas are identified in the dangerous waste permit, Table III.10.D.A, and shall include areas for the storage dangerous waste, mixed waste, and immobilized glass. [Section 14.11, BOD].

##### 4.8.5.1 Container Storage Area

The permittees shall construct container storage areas identified in Permit Table III.10.D.A (as approved/modified pursuant to Permit Condition III.10.D.10), as specified in all applicable drawings and specifications in Operating Unit 10, Appendices 9.4, 9.5, 9.7, 9.8, 10.4, 10.5, 10.7, 10.8, 10.9, 12.4, 12.5, 12.7, 12.8, and 12.9 of the Dangerous Waste Permit (DWP), as approved pursuant to Permit Condition III.10.D.10.b. [Section III.10.D.2.a., *WTP Dangerous Waste Permit*]

##### 4.8.5.2 Separate Dangerous Waste Container

Storage areas shall allow a minimum 30 in. of separation between rows of dangerous waste containers. (WAC 173-303-630[5][c]) [Section 14.11.1, BOD]

##### 4.8.5.3 Deleted

##### 4.8.5.4 Inspections of Containment

Storage areas shall be designed to allow inspections for the following:

- Leaking containers

- Deterioration of containers caused by corrosion or other factors
- Deterioration of the containment system caused by corrosion or other factors (WAC 173-303-630[6])

[Section 14.11.1, BOD]

#### 4.8.5.5 Protect Containers

All container storage areas and containment systems identified in the DWP Tables III.10.D.A through III.10.D.C (as approved/modified pursuant to Permit Condition III.10.D.10.) shall be designed to protect containers from contact with accumulated liquids (e.g., leaks, spills, precipitation, fire water, liquids from damaged or broken pipes). [WAC 173-303-630(7)(a)(i) and WAC 173-303-630(7)(c)(ii)]. [Section III.10.D.2.c., *WTP Dangerous Waste Permit*] [ALARA]

#### 4.8.5.6 Storage Areas

Storage areas for containers holding free liquids, or liquids that are designated as ignitable (D001) or reactive (D003) shall meet the secondary containment requirements of WAC 173-303-630(7). To achieve this, the following shall be conducted:

- Portable secondary containment racks or skids shall be specified and used in the applicable container storage areas to provide the appropriate containment.
- Run-on into the containment system shall be prevented, unless the Washington State Department of Ecology waives the requirement in the facility permit after determining that the design is sufficient to accommodate any run-on that might enter the system. (“Run-on” as defined by WAC 173-303-040 means any rainwater, leachate, or other liquid that drains over land onto any part of a facility.) (WAC 173-303-630[7][b])

[Section 14.11.1, BOD][ALARA]

#### 4.8.5.7 Exemption from Secondary Containment System

Storage areas for containers holding only wastes that do not contain free liquids and do not exhibit either the characteristic of ignitability (D001) or reactivity (D003) need not have a containment system provided (WAC 173-303-630[7][c]):

- The storage area shall be sloped or otherwise designed and operated to drain and remove liquid resulting from precipitation (WAC 173-303-630[7][c])
- The storage area shall be designed or managed to keep containers elevated or otherwise protected from contact with accumulated liquids (WAC 173-303-630[7][c])

[Section 14.11.1, BOD]

#### 4.8.5.8 Ignitable or Reactive Waste

Storage areas for ignitable (D001) or reactive (D003) waste shall meet the following requirements:

- Containers holding explosive reactive waste (meeting the definition in WAC 173-303-090[7][a][vi], [vii], or [viii]) shall be stored in a manner consistent with applicable codes.
- Container storage areas that maintain ignitable waste and reactive waste (other than reactive waste, which must meet the above requirement) shall be designed, operated, and managed in a manner consistent with applicable codes. Where no specific standards or requirements are specified in the UFC or in existing state or local fire



codes, applicable sections of National Fire Protection Agency (NFPA) pamphlet number 30 must be used. (WAC 173-303-630[8][b])

[Section 14.11.1, BOD]

#### 4.8.5.9 Provide Loading and Unloading Areas

Treatment, storage, and disposal facilities that receive or ship manifested shipments of liquid dangerous waste for treatment, storage or disposal shall provide for and use an area(s) for loading and unloading waste shipments. The loading and unloading areas(s) shall be designed, constructed, operated, and maintained in accordance with WAC 173-303-395(4). Examples of liquid dangerous wastes that may be manifested and shipped for offsite treatment and disposal are waste solvents, paints, adhesives, caustics, and acids. These wastes would originate from facility maintenance activities, laboratory activities, and wet chemical storage facility activities. [Section 14.14, BOD]

##### 4.8.5.9.1 Contain Spills and Leaks

Contain spills and leaks that might occur during loading and unloading. (WAC 173-303-395(4)(a)) [Section 14.14, BOD] [ALARA]

##### 4.8.5.9.2 Prevent Release

Prevent release of dangerous waste or dangerous waste constituents to ground or surface waters. (WAC 173-303-395(4)(b)) [Section 14.14, BOD]

##### 4.8.5.9.3 Contain Wash Waters

Contain wash waters (if any) resulting from the cleaning of contaminated transport vehicles and load/unload equipment. (WAC 173-303-395(4)(c)) [Section 14.14, BOD]

##### 4.8.5.9.4 Remove Collected Wastes

Allow for removal, as soon as possible, of collected wastes resulting from spills, leaks and equipment cleaning (if any) in a manner which assures compliance with (b) of subsection WAC 173-303-395(4)(d). [Section 14.14, BOD]

#### 4.8.5.10 Deleted

#### 4.8.6 Waste Management

The waste management design strategy shall incorporate the following requirements:

- The use and storage of hazardous materials shall be minimized by limiting their quantities through design restrictions. These materials shall be controlled and located so that an accident or release of the materials will not jeopardize the safe conditions in the WTP. Chemicals that have the potential to react shall be physically separated during storage.
- The design shall include appropriate disposal provisions for hydraulics fluids, oils, and refrigerants.
- Dangerous waste storage areas shall be provided in the waste accumulation areas of all facilities for both satellite accumulation areas and less-than-90-day storage areas. The location and space for waste segregation, packaging, and storage shall be clearly specified on plant layout drawings.

[Section 18, ORD]

#### 4.8.7 Wastewater Discharge

All discharges covered by ST 4511 shall implement the following BMPs (DOE 2005) where appropriate:

1. No wastewater discharge shall be allowed within a surface contaminated area (areas with dangerous waste or radioactive contaminants, or both). Surface contaminated areas are defined as those near-surface soils contaminated with dangerous or radioactive waste, or both.
2. No wastewater discharge shall be allowed within 300 feet horizontal radius of a known active or inactive crib, ditch, or trench used for disposal of dangerous or radioactive contaminants, or both. Cribs, ditches, and trenches were used to dispose of liquid effluents that might have contained dangerous or radioactive contaminants, or both.
3. No wastewater discharge shall be allowed to affect an ecologically sensitive area. Discharges will avoid or minimize impacts to areas where species of concern, as defined in the Hanford Site Biological Resources Management Plan (DOE 1996a), are located.
4. An alternative condition for storm water discharges is as follows:
  - The collection of storm water in any tank, sump, pit, or other engineered structure that is contaminated from past or present operations and could potentially contaminate the storm water with dangerous or radioactive contaminants, or both, shall be avoided. Further explanation of permit condition is offered in permits.
  - There shall be no discharges or run-off of wastewater to any surface waters of the state or to any land not owned by or under control of the permit holder, except as authorized or exempted by a wastewater discharge permit program.

[Section 14.7.3, BOD]

### 4.9 Industrial Safety

#### 4.9.1 Worker Safety and Health

WTP facilities shall be designed to incorporate worker safety and health. The intent is to reduce or prevent occupational injuries, illnesses, and accidents by providing a safe and healthy workplace during facility design, construction, and operation for workplaces. [Section 17.2, BOD]

#### 4.9.2 Design and Construction

Design and construction of the WTP site facilities, systems and components shall use the codes and standards identified in 24590-WTP-COR-MGT-15-00001, *Engineering, Procurement, and Construction (EPC) Code of Record*. The design shall be in accordance with these codes and standards for creating an environment to ensure worker safety and health. [Section 17.4, BOD]

#### 4.9.3 Environmental Exposure Limits

Industrial hygiene pertaining to thresholds limit values (TLV) for chemical substances, physical agents, and biological exposure indices shall meet the following:

- Additional standards applicable to Toxic and Hazardous Substances are included in Section 2.21 of the ACGIH 2005.

- The ACGIH TLVs shall be used when those limits are lower (more protective) than permissible exposure limits in 29 CFR 1910.
- When the ACGIH TLVs are used as exposure limits, contractors shall nonetheless comply with the other provisions of any applicable expanded health standard found in 29 CFR 1910.

[Section 17.9, BOD]

#### 4.9.4 Systems Containing Toxic and Hazardous Substances

When Process Safety Management threshold quantities of specific chemicals [listed in Appendix A of 29 CFR 1910.119] are exceeded, Engineering shall integrate facility design to ensure worker safety and health is maintained. The US Department of Energy has provided specific guidance for safety basis development addressing chemical hazards in CCN 281177, *Updated Safety Analysis Direction*. Safety shall be incorporated into the facility design irrespective of whether the Process Safety Management standard has been exceeded. Hazards identified via the performance of hazard analysis processes shall be incorporated into design specific criteria. [Section 17.18, BOD]

#### 4.9.5 Warning and Alarm Systems

Warning and alarm systems shall be designed to ensure that they can be heard at the local noise levels of the area they are intended to cover. Flashing lights shall be used in high noise areas. [Section 11.16, ORD]

#### 4.9.6 Plant Safety

In addition to those safety requirements in the Authorization Basis documents and those required by the Occupational Safety and Health Administration, plant safety requirements shall include:

- Providing monitoring equipment to areas with potential air quality problems (for example, carbon monoxide monitors in diesel rooms, ammonia monitors in ammonia storage areas, and carbon dioxide monitors in decontamination areas). See Section 8.1.4, Hazardous Gas Control, for additional details.
- Where inerting gases are used, oxygen monitors shall be considered
- Manual lifting of more than 40 pounds (NIOSH lifting guide, 1991) of equipment or materials as a part of routine operation shall be evaluated, taking into consideration the number of times to be lifted, location, how far load is to be carried, and other factors

[Section 8.1.1, ORD]

### 4.10 Global ORD requirements

#### 4.10.1 Utilities and Services

##### 4.10.1.1 Partial Outages

Each major facility shall have utilities designed to allow partial outages and preclude total facility utility outages during maintenance [Section 14.1, ORD]

#### 4.10.2 Components

##### 4.10.2.1 Valves

##### 4.10.2.1.1 Valve Lockout

Valves shall be designed/procured where possible to support lockout using commercially manufactured devices

other than chains. [Section 7.1, ORD]

#### 4.10.2.1.2 Valve Remote Operation

Remote operation of valves shall be provided where accessibility is difficult, and for valves used in routine operations. [Section 14.4, ORD] [ALARA]

#### 4.10.2.1.3 Valve Reach Rods

Valve reach rods, if necessary, shall be designed to be removed easily and, when reinstalled, only engage the valve in the correct alignment, using no more than two universals. [Section 14.4, ORD]

#### 4.10.2.1.4 Valve Chain Operators

When utilizing chain operators for remote operation of valves, the chain shall be 41" +/- 7" above the floor. If the chain operators are in walkways, a provision shall be installed to stow the chain out of the walkways when not in use. The chain shall be stowed < 72" above the floor. The chain operator must be stowed by attaching it to a wall or structural support. The chain operator will be routed so it does not contact SSC when used to operate the valve. [Section 14.4, ORD]

#### 4.10.2.1.5 Pressure Relief Valves

Pressure relief valves shall be configured using a full port three-way valve, dual PSVs, and drain valves on each leg (unless a redundant train is provided) to preclude a service outage when servicing any relief valve. The three-way valve shall have the following design provisions:

- Designed such that there is no position where the internal plug, disc, or ball would isolate or block both PSV's simultaneously.
- Capable of being locked (with use of either an integral or commercially available after market locking device) in a position that only allows one port to be fully open and the other port fully closed.

This configuration is required on vessels and systems that cannot be easily isolated, or when system draining and isolation would have a negative impact on safety or productivity.

[Section 14.4, ORD] [Section 17.11, BOD]

#### 4.10.2.1.6 Uniquely Identified Instrument Valves

All instrument valves shall be uniquely identified. [Section 11.16, ORD]

#### 4.10.2.1.7 Thermal Insulation

When thermal insulation is required around valves and in-line instruments it shall be sectionalized to allow easy removal and replacement. [Section 11.16, ORD]

#### 4.10.2.1.8 Indicators

Indicators shall be positioned to give a clear line-of-sight and safe accessibility. [Section 11.16, ORD]

#### 4.10.2.2 Sealed Components

##### 4.10.2.2.1 Sealed Components

Permanently lubricated, sealed for life components shall be used wherever possible in order to reduce maintenance requirements. [Section 9.1, ORD]

##### 4.10.2.2.2 Pump Seals or Other Design Features

Pump seals or other design features, upon failure, shall not provide a pathway for liquids or gases to personnel or to the environment. In some cases, protection from sprays or leakage will need to be provided. [Section 14.1, ORD]

#### 4.10.2.3 Piping

##### 4.10.2.3.1 Utility Piping

Utility piping containing fluids without suspended solids can be level with high point vents and low point drains such that the piping can be drained. In-cell instrument air lines connected using flexible jumpers are not considered process piping and are not required to be sloped.

Active ORD Interpretations:

24590-WTP-ORDI-OP-16-00001

[Section 14.3, ORD]

##### 4.10.2.3.2 Bypass Piping

Where flow interruption is not acceptable, flowmeters shall be provided with bypass piping. [Section 11.16, ORD]

#### 4.10.2.4 Instrumentation

##### 4.10.2.4.1 Temperature Elements

Temperature elements shall be installed in thermowells to allow removal without interrupting the process. [Section 11.16, ORD]

##### 4.10.2.5 Equipment Enclosures

Equipment enclosures shall be suitable for the area classification in which they are installed. [Section 16.1, ORD]

##### 4.10.2.6 Vessel Entry

Design shall provide a means of gaining personnel access to each vessel to facilitate vessel integrity inspection, cleaning, and draining of contents. A man-way shall be a temporary cover that shall be fitted with a mechanism to securely lock the cover in place and shall provide a positive seal so as not to hinder the vessel ventilation commissioning program. Upon completion of commissioning and to comply with vessel and cell ventilation requirements, a permanent cover (and appropriate shielding) shall be fitted in place. If personnel access is not feasible, provisions shall be made to ensure that vessel cleanliness is certified at construction and maintained by controls until turnover to commissioning. [Section 19.10, ORD]

### 4.10.3 Systems

#### 4.10.3.1 Gaseous Hazard

Systems with gaseous hazards shall be designed to separate the hazard from facility personnel via the following:

- Systems with gaseous hazards shall be located outside to the extent practicable.
- Piping and tubing systems containing gaseous hazards within facility buildings shall use welded joints to the extent practicable to eliminate leak points.
- Potential leak points shall be contained within ventilated enclosures where feasible and appropriate to prevent worker exposure to leaks.
- If potential leak points are not enclosed, evaluation of design leakage from system components and piping against designed ventilation flow through the affected room must demonstrate atmospheric concentrations remain below applicable limits during normal system operation.

[Section 8.1.4.2, ORD]

#### 4.10.3.2 Lock-out and Tag-out

The design shall address the requirement for items of equipment and systems to be periodically locked out and isolated for commissioning or maintenance activities.

Isolating devices shall be capable of being locked out and shall provide visible indication of the device position required. [Section 19.14, ORD]

### 4.10.4 Emergency Shutdown

#### 4.10.4.1 Emergency Shutdown Zones

Emergency shutdown zones shall be designed around the cell and system boundaries or other logical grouping. Each emergency shutdown zone may be initiated at the control room or from suitable locations within the facility (such as in or near an FCR or MCR). [Section 11.12.5.1, ORD]

#### 4.10.4.2 Emergency Shutdown Ventilation

Each emergency shutdown would be initiated at the control room or from suitable locations within the facility (such as in or near an FCR). [Section 11.12.5.2, ORD]

#### 4.10.4.3 Emergency Stop and Reset

Where physical injury is credible, dedicated emergency-stop (E-Stop) buttons shall be provided near the machinery. The location of such stops will depend on the machine's physical and operational characteristics.

E-Stops will normally be implemented by dedicated programmable electronic systems (PESs). They may also be implemented in conjunction with related safety systems (for example, using an existing safety instrumented system (SIS) controller). For diagnostic purposes, each individual E-Stop provided in the plant, however configured, shall report its individual status back to its control system (e.g., integrated control network (ICN) receives E-Stop status for ICN controlled equipment, non-ICN controlled equipment E-Stop status is reported to its non-ICN control system). The E-Stop circuit shall remain in the shutdown state until the circuit is physically reset, to prevent restart while the dangerous condition exists. [Section 11.12.5.3, ORD]

## 4.10.5 Inspections

Plant and equipment that contain dangerous (hazardous) wastes shall have inspection provisions. The capability to perform these inspections shall be designed and included in the layout. Non-accessible cells and caves shall be provided with TV inspection ports to allow for remote inspection of mechanical and process facilities and piping. [Section 14.13, ORD]

## 4.10.6 Commissioning

### 4.10.6.1 Commissioning of Control and Instrumentation Systems

To the extent practical, engineering shall standardize the control and instrument design to minimize the types of testing and test equipment required.

The control system shall be designed such that individual systems and components of the system can be independently isolated. Design shall provide for the control system hardware to be tested before installation. [Section 19.7, ORD]

### 4.10.6.2 Sampling Requirements During Commissioning

The design shall provide for additional manual sampling to accommodate the additional sampling requirements for environmental performance testing. The design, research and technology, commissioning, and environmental organizations shall jointly identify these requirements. [Section 19.8, ORD]

### 4.10.6.3 Provide Instrument Access Points for Commissioning (relocated from 4.6.5.2)

The design shall provide for access points for connecting or inserting temporary flow, pressure, and temperature measuring equipment for commissioning purposes. The design organization shall identify locations and requirements for temporary measuring devices to be used during commissioning. [Section 19.12, ORD]

## 5 Reserved

## 6 Description

### 6.1 General Overview

The BOF consists of facilities and systems that supply chemical and process services, and provides infrastructure support services and utilities for the WTP site. The BOF facilities that uniquely support direct feed LAW (DFLAW) are discussed in 24590-BOF-3ZD-25-00001, *WTP Direct Feed Low Activity Waste (DFLAW) Facility and System Design Description*, those facilities are directly involved with the process of radiological material. The remaining BOF facilities that are discussed in this document are not involved with the processing or vitrification of radiological materials.

The BOF provides services and utilities such as electrical power, compressed air, sanitary disposal, steam, and chilled water. Wet chemical storage facility 11 and GFSF 21 contain process chemicals. Water treatment building 86, steam plant 85, chiller/compressor plant 82, and cooling tower facility 83 contain chemicals involved with water treatment not associated with waste processing.

Table 2-1 provides a list of buildings and their respective identification numbers.

Roads, parking areas, utility racks and other supporting buildings are also part of the BOF.

Facility descriptions are provided for the following four facilities and related systems to support WTP construction turnover schedules. Future revisions of this document will include additional facilities, some of which are still in the final design phase, to support WTP schedules.

- Non-dangerous, non-radioactive effluent facility 54; and motor control building
- Chiller/compressor plant 82
- Switchgear building 87
- BOF switchgear building 91

### 6.1.1 Hazards

The BOF facilities described in this FD do not have radiological hazards other than the small transit samples in the pneumatic transfer system of the autosampling system (ASX). There are no radioactive inventories in the facilities; consequently, there are no radiological design basis accidents (24590-WTP-PSAR-ESH-01-002-01, *Preliminary Documented Safety Analysis to Support Construction Authorization; General Information*).

Hazards unique to each facility will be discussed in the relevant subsections.

### 6.1.2 BOF Access Controls

There are several documents that address safeguards and security at the WTP site. The following list is the most current relating to physical security and access:

- 24590-WTP-GPP-RASS-SB-0001, *WTP Security Badge and Access Requirements*
- 24590-WTP-GPP-SS-010, *WTP Security Lock and Key Control*
- 24590-WTP-GPP-CON-2103, *WTP Construction Escort Program for Work Activities Performed by Non-WTP Site Badged Personnel*

#### 6.1.2.1 Handicapped Accessibility

Handicapped accessibility is not being provided to WTP in the design for construction of all facilities within the access control fence. Administration building 51 is outside the access control fence and will be accessible to handicapped personnel (CCN 082941, *Handicap Accessibility of Facilities*).

#### 6.1.2.2 Fencing

The WTP site perimeter is fenced to provide limited access to the WTP site and facilities; and for safeguards and security of DOE-owned materials, property, and information in accordance with Standard 8, *Safeguards and Security* and WAC-173-303-310(2). [Part C.7(a)(7), WTP Contract]

Access to the WTP is only through the personnel access gate and through vehicle access gates. The security fence layout and gates, site fence plan, and the technical specification and details for the fence and gates are presented in the following documents:

- 24590-BOF-3PI-CY11-00001, *Technical Specification for Fence and Gates*
- 24590-BOF-3PS-CY11-T0001, *Technical Specification for Fence and Gates*
- 24590-BOF-C0-C12T-00001, *Site Fence Plan*
- 24590-BOF-C0-C12T-00002, *Fence and Gate Details*



### 6.1.2.3 Main Access - WTP Facility Gates

Multiple gates are available to access WTP facilities by vehicle and by walking personnel. The configuration during construction may be different than the final design. Descriptions of the designed gate access points are included in Table 6–1, as shown on 24590-BOF-C0-C12T-00001, *Site Fence Plan*.

**Table 6–1 WTP Main Access Points**

Road	Gate Name	Gate Type	Landmarks
B Road	Reagent delivery gate	28 ft double swing gate	Pretreatment Facility
L Road	WTP site delivery gate	2-28 ft sliding gate	Between cooling tower facility facilities 83 and water treatment building and storage tanks 86
N Road	DOE access/ immobilized waste export gate	28 ft sliding gate	East of cooling tower facility 83
N Road	Personnel crash-out gate	6 ft personnel gate	East of cooling tower facility 83
I Road	Emergency vehicle access gate	28 ft double swing gate	North of Analytical Laboratory
Near I Road	Operation personnel access turnstiles		Northwest of the Analytical Laboratory. Entry from the main parking lot to WTP security station.
Near I Road	Personnel crash-out gate	6 ft personnel; two locations at each end of the turnstiles	Northwest of the Analytical Laboratory. Entry from the main parking lot to the WTP security station.
Near I Road	Sliding gate		Northwest of the Analytical Laboratory. Entry from the main parking lot to the WTP security station.
	Security gate	18 ft single gate	North end of WTP site
WTP Loop Road	Anhydrous ammonia facility 23	4 ft	Inside the BOF perimeter and providing access from the road loop to anhydrous ammonia facility 23

### 6.1.3 Personnel Access Control

Management of personnel access into the BOF buildings will be achieved by locking the BOF building doors and controlling access to the keys. No badge readers will be installed in these facilities except for warehouse 52 and maintenance shop (combination shop) 56. Exterior access points are limited to the minimum number required to support the function of the facility (see Table 6–1).

Details of the current plan for the WTP electronic access control system for the WTP site and specific buildings (e.g., LAW, Lab, HLW, PT) are in 24590-WTP-3YD-CME-00001, *System Description for the Communications Electrical System (CME) and Facility Network Infrastructure (FNJ)*. The CME is a WTP plant-wide communications system that includes and integrates various components and services, including the building electronic access and control system, in one data network infrastructure. Authorization data are confirmed before

personnel are allowed access into the access-controlled areas. The CME controls physical barriers that are deactivated, allowing personnel to enter or exit the access-controlled areas.

In case of an emergency evacuation from the WTP site, there are crash-out gates on both sides of the turnstiles to expedite personnel evacuation to the staging areas. To facilitate building-wide egress, electronic access controlled barriers will be deactivated, allowing personnel to quickly egress the area.

Two-person doors are located in warehouse 52 and the maintenance shop (combination shop) 56 facilities where there is physical access to the WTP facility from the parking lots. The doors have badge readers for both entrance and exit to the building and subsequently to the WTP facility. The entrance and exit door(s) have mechanical releases connected to the badge readers for opening by striking the badge. Telephones are located on both sides of the door for any badging problems and are connected to the shift supervisor's office.

### 6.1.3.1 Warning Signs

The facilities have signs posted at each entrance to the active portion and at other locations in sufficient numbers to be seen from any approach to the active portion. Signs must bear the legend, "Danger - Unauthorized Personnel Keep Out," or an equivalent legend written in English and legible from a distance of at least 25 ft or more. The following documents provide information on standards of signs:

- 24590-NP-FMR-AE00-03692, *Accuform Parts Warning Signs/ Danger Signs / Emergency Signs*
- 24590-NP-FMR-USSC-00756, *Signs, Safety, "Caution", "Danger", "Danger High Voltage" - Various Line Items*
- 24590-NP-FMR-USSC-01161, *Signs, Safety "Danger" Blank 10"X14" Plastic, National Marker #D-1RB OR Approved Project Stock Code Sign003, Tape, Barricade Red & Black 3" X 1000', REEF #50210 [National Tape #SP745] OR Approved Project Stock Code TAPS002, Vest, Surveyor's, Class 2*
- 24590-NP-FMR-USSC-01291, *Signs, Safety "Danger" Blank 10" X 14" Plastic, National Marker #D-1RB OR Approved, Project Stock Code SIGN003*
- 24590-NP-FMR-USSC-01316, *Signs, Safety "Danger" Blank 10"X14" Plastic, National Marker #D-1RB OR Approved, Project Stock Code Sign003, Sign, Notice Blank 10" X 14" Plastic, National Marker #N-1RB OR Approved, Project Stock Code SIGN006)*

### 6.1.3.2 Surveillance

Surveillance requirements are coordinated with operations and determined by safety, operational, and commissioning requirements.

Facilities are protected either with a 24-hour surveillance system that continuously monitors and controls entry onto the active portion of the facility; or an artificial or natural barrier, or combination of both, which completely surrounds the active portion of the facility with a means to control access through gates or other entrances to the active portion of the facility at all times. More details can be found in 24590-WTP-3YD-CME-00001, *System Description for the Communications Electrical System (CME) and Facility Network Infrastructure (FNJ)*.

### 6.1.3.3 Barricades and Bollards

Safe-Hit BARRACUDA barricades are water-filled high plastic barriers used for site maintenance of roads and objects as well as for impact protection. For protection of utility installation and vehicle traffic, Energite III Model 960 Sand barricades are used (24590-NP-FMR-U000-01127, *Safe-Hit Barracuda Barricades / Water Filled High Grade Plastic Barrier This is to Be Used for Site Maintenance of Roads, and Objects, for Impact Protection. Tri-City Sign and Barricade Info. No Substitution Without Approval by Requestor Energite III*).

Bollard posts are installed at doorways with expected vehicle travel and in the BOF yard near roadways to protect from unauthorized vehicle entry into the building as well as service piping and components (such as fire hydrants, pipe bridges) from accidental runs by the vehicle. Locations of bollard posts are reflected on the following BOF site bollard location plans:

- 24590-BOF-C0-C12T-00007, *Balance of Facilities Site Bollard Location Plan Sheet 1*
- 24590-BOF-C0-C12T-00008, *Balance of Facilities Site Bollard Location Plan Sheet 2*
- 24590-BOF-C0-C12T-00009, *Balance of Facilities Site Bollard Location Plan Sheet 3*
- 24590-BOF-C0-C12T-00010, *Balance of Facilities Site Bollard Location Plan Sheet 4*
- 24590-BOF-C0-C12T-00011, *Balance of Facilities Site Bollards Schedule and Details*

#### 6.1.4 Chemicals, Reagents and Disposal Control

Different chemicals and reagents are used in the BOF to support the operation and processes that are hosted in these facilities. Details of the chemical and reagents used in separate facilities and means of disposal will be discussed in sections describing particular buildings.

Chemical and reagents in the BOF are located, used, treated, and collected in the following buildings:

- Anhydrous ammonia facility 23
- Chiller/compressor plant 82
- Cooling tower facility 83
- GFSF 21
- Steam plant 85
- Water treatment building and storage tanks 86
- Wet chemical storage facility 11

#### 6.1.5 BOF Services

To support normal operations, the BOF buildings' designs incorporate features and capability necessary to ensure that WTP operations are efficient and meet permitting, process control, authorization basis, and waste form qualification requirements. The following sections detail services that the BOF buildings provide.

##### 6.1.5.1 Power

The A6 substation is the WTP source of power provided by DOE. Switchgear building 87 receives its power from the A6 substation and distributes 13.8 kV MVE power from switchgear assemblies in switchgear building 87 to BOF switchgear building 91 and to various WTP utility, process, and laboratory facilities. BOF switchgear building 91 will support normal power supply (not important-to-safety electrical) to support BOF buildings. Switchgear building 91 houses 4.16 kV switchgear and 480 V unit substations.

##### 6.1.5.2 Utilities

The functionality of the BOF buildings depends upon many of the services supplied to these buildings. Steam, air, and water used for various purposes are piped to the BOF buildings.

Firewater (FSW), potable water (DOW) and plant service air (PSA) utility composite plans presented in the following drawings show the distribution of these utilities throughout the WTP:

- 24590-BOF-C2-C12T-00013, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 13*
- 24590-BOF-C2-C12T-00014, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 14*
- 24590-BOF-C2-C12T-00015, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 15*
- 24590-BOF-C2-C12T-00016, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 16*
- 24590-BOF-C2-C12T-00017, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 17*
- 24590-BOF-C2-C12T-00018, *Firewater, Potable Water Plant Service Air Yard Utility Composite Plan – Area 18*
- 24590-BOF-C2-C12T-00019, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 19*
- 24590-BOF-C2-C12T-00020, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 20*
- 24590-BOF-C2-C12T-00021, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 21*
- 24590-BOF-C2-C12T-00022, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 22*
- 24590-BOF-C2-C12T-00023, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 23*
- 24590-BOF-C2-C12T-00024, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 24*
- 24590-BOF-C2-C12T-00025, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 25*
- 24590-BOF-C2-C12T-00026, *Firewater, Potable Water Plant Service Air Yard Utility Composite Plan – Area 26*
- 24590-BOF-C2-C12T-00027, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 27*
- 24590-BOF-C2-C12T-00028, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 28*
- 24590-BOF-C2-C12T-00029, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 29*
- 24590-BOF-C2-C12T-00030, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 30*
- 24590-BOF-C2-C12T-00031, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 31*
- 24590-BOF-C2-C12T-00032, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 32*
- 24590-BOF-C2-C12T-00033, *Firewater, Potable Water, Plant Service Air Yard Utility Sections and Details Sheet 1*
- 24590-BOF-C2-C12T-00034, *Firewater, Potable Water, Plant Service Air Yard Utility Details Sheet 2*
- 24590-BOF-C2-C12T-00035, *Firewater, Potable Water, Plant Service Air Yard Utility Sections and Details Sheet 3*
- 24590-BOF-C2-C12T-00037, *Firewater, Potable Water, Plant Service Air Yard Utility Sections and Details Sheet 4*

#### 6.1.5.2.1 Fire Service Water (FSW)

The FSW is piped from fire water pump house A and B (84A and 84B) and the fire water storage tanks to all process facilities, including all buildings located in the BOF except the NLD, cooling tower facility 83, cooling tower facility support building 83S, anhydrous ammonia facility 23, and fuel oil facility 81.

#### 6.1.5.2.2 Domestic Potable Water System (DOW)

Potable water (DOW) is distributed from water treatment building 86 throughout the BOF buildings, providing water to water fountains, restrooms, safety showers, eye wash stations, kitchens, HVAC for humidity control, and other areas.

#### 6.1.5.2.3 Plant Service Air System (PSA)

The PSA from BOF is dry, oil free, compressed air that is distributed into the facility as a regulated supply. The PSA consists of a pressure regulation station, air dryers, a process air receiver, and a distribution piping system. Pressure is monitored and transmitted as needed. The PSA distribution, showing the distribution of PSA throughout the BOF, is presented in the following drawings:

- 24590-BOF-C0-PSA-00001, *Plant Service Air Drawing Index, Key Plant and General Notes*
- 24590-BOF-C0-PSA-00002, *Plant Service Air Plan and Profile PSA1 STA. 0+00 to 3+00*
- 24590-BOF-C0-PSA-00003, *Plant Service Air Plan and Profile PSA1 STA. 3+00 to 6+00*
- 24590-BOF-C0-PSA-00004, *Plant Service Air Plan and Profile PSA1 & PSA 2 PSA2 STA. 6+00 to 8+55.19*
- 24590-BOF-C0-PSA-00005, *Plant Service Air Plan and Profile STA. 0+00 to 0+38.95 PSA5 STA. 0+00 to 0+62.45 PSA5*
- 24590-BOF-C0-PSA-00006, *Plant Service Air Plan and Profile PSA3 STA. 0+00 to 1+18.47*
- 24590-BOF-C0-PSA-00007, *Plant Service Air Miscellaneous Details*
- 24590-BOF-C0-PSA-00008, *Plant Service Air Plan and Profile PSA6 Station 0+00 to 3+00*
- 24590-BOF-C0-PSA-00009, *Plant Service Air Plan and Profile PSA6 Station 3+00 to 5+58.28*

The following BOF buildings are receiving PSA to support the operation of systems located in these facilities: wet chemical storage facility 11 and support building 11S, fuel oil facility 81, chiller/compressor plant 82, water treatment building and storage tanks 86, and the NDNR effluent facility 54.

#### 6.1.5.2.4 Instrument Service Air System (ISA)

The ISA receives instrument quality air from the PSA, and distributes a supply of pressure-regulated instrument air to plant equipment and instruments.

#### 6.1.5.2.5 Demineralized Water System (DIW)

The DIW is supplied from BOF to different facilities throughout the WTP. The DIW drawings show the distribution of DIW throughout the WTP in the following drawings:

- 24590-BOF-C0-DIW-00001, *Demineralized Water Drawing Index, Key Plan, General Notes and Legend*
- 24590-BOF-C0-DIW-00002, *Demineralized Water Plan for DW1, DW2 and DW7 Profile for DW1 and DW2 STA 0+00 TO STA 2+45*
- 24590-BOF-C0-DIW-00003, *Demineralized Water Plan for DW1 and DW6 Profile for DW1 STA 2+45 to STA 4+85*
- 24590-BOF-C0-DIW-00004, *Demineralized Water Plan for DW1 and DW3 Profile for DW1 STA 4+85 to STA 7+85*
- 24590-BOF-C0-DIW-00005, *Demineralized Water Plan and Profile for DW1 STA 7+85 to STA 10+40*

- 24590-BOF-C0-DIW-00006, *Demineralized Water Plan and Profile from DW1 STA 10+40 to STA 12+90*
- 24590-BOF-C0-DIW-00007, *Demineralized Water Plan for DW1 and DW8 Profile for DW1 STA 12+90 to STA 15+40*
- 24590-BOF-C0-DIW-00008, *Demineralized Water Plan and Profile for DW1 STA 15+40 to STA 17+40 Profile for DW8 STA 0+00 to STA 0+27.08*
- 24590-BOF-C0-DIW-00009, *Demineralized Water Plan and Profile for DW1 STA 17+40 to STA 19+90*
- 24590-BOF-C0-DIW-00010, *Demineralized Water Plan and Profile for DW1 STA 19+90 to STA 21+02.79 Profile for DW6 STA 0+00 to STA 0+13.00*
- 24590-BOF-C0-DIW-00011, *Demineralized Water Plan and Profile for DW3 STA 0+75 to STA 3+03.10*
- 24590-BOF-C0-DIW-00012, *Demineralized Water Plan and Profile for DW5 STA 0+00 to STA 2+75*
- 24590-BOF-C0-DIW-00013, *Demineralized Water Plan and Profile for DW5 STA 2+75 to STA 5+04.96*
- 24590-BOF-C0-DIW-00014, *Demineralized Water Plan and Profile for DW4 STA 0+00 to STA 1+26.03 Profile for DW3 STA 0+00 to STA 0+75.00*
- 24590-BOF-C0-DIW-00015, *Demineralized Water Details and Sections Sheet 1*
- 24590-BOF-C0-DIW-00016, *Demineralized Water Details and Sections Sheet 2*
- 24590-BOF-C0-DIW-00017, *Demineralized Water Plan and Profile for DW6 STA 0+13.00 to STA 2+25.00*
- 24590-BOF-C0-DIW-00018, *Demineralized Water Plan and Profile for DW6 STA 2+25.00 to STA 3+81.24*

Among the BOF buildings, facilities using DIW includes the Glass Former Reagent facility, the Wet Chemical facility, the Steam Plant facility, and the LAW Effluent Management facility.

#### 6.1.5.2.6 Process Service Water (PSW)

The PSW receives process water from the primary DOE DOW system and supplies it to water treatment building 86 and storage tanks for further processing and distribution to all major process facilities and throughout the BOF via distribution pumps. The PSW plan and profile, showing the distribution of PSW throughout the WTP, is presented in the following drawings:

- 24590-BOF-C0-PSW-00001, *Process Service Water Drawing Index, Key Plan and General Notes*
- 24590-BOF-C0-PSW-00002, *Process Service Water Plan and Profile for STA. (R) 0+00 to (R) 1+44.88 PSW1 STA. (R) 1+44.88 to (R) 2+75 PSW2*
- 24590-BOF-C0-PSW-00003, *Process Service Water Plan and Profile for STA. 2+75 to 3+85.55 PSW2 STA. 3+85.55 to 5+75 PSW3*
- 24590-BOF-C0-PSW-00004, *Process Service Water Plan and Profile for PSW3 STA. 5+75 to 8+25*
- 24590-BOF-C0-PSW-00005, *Process Service Water Plan and Profile for PSW3 STA. 8+25 to 10+75*
- 24590-BOF-C0-PSW-00006, *Process Service Water Plan and Profile for PSW3 STA. 10+75 to 13+25*
- 24590-BOF-C0-PSW-00007, *Process Service Water Plan and Profile for PSW3 STA. 13+25 to 15+75*
- 24590-BOF-C0-PSW-00008, *Process Service Water Plan and Profile for PSW3 STA. 15+75 to 18+50*
- 24590-BOF-C0-PSW-00009, *Process Service Water Plan and Profile for PSW3 STA. 18+50 to 20+62.28*
- 24590-BOF-C0-PSW-00010, *Process Service Water Plan and Profile for STA. 0+00 to 0+06.40 PSW4 STA. 0+00 TO 0+15.00 PSW5*
- 24590-BOF-C0-PSW-00011, *Process Service Water Plan and Profile for PSW7 STA. 0+00 to 1+34.44*
- 24590-BOF-C0-PSW-00012, *Process Service Water Plan and Profile for PSW6 STA. 0+00 to 0+31.89 AND STA. 0+00 to 2+50*
- 24590-BOF-C0-PSW-00013, *Process Service Water Plan and Profile for PSW6 STA. 2+50.00 to 4+87.98*
- 24590-BOF-C0-PSW-00014, *Process Service Water Plan and Profile for PSW9 STA. 0+00 to 2+20.84*
- 24590-BOF-C0-PSW-00015, *Process Service Water Plan and Profile for PSW10 STA. 0+03 to 0+96.79*
- 24590-BOF-C0-PSW-00017, *Process Service Water Miscellaneous Details Sheet 1*
- 24590-BOF-C0-PSW-00018, *Process Service Water Miscellaneous Details Sheet 2*

- 24590-BOF-C0-PSW-00019, *Process Service Water Plan and Profile for PSW5 STA 0+15.00 to STA 2+25.00*
- 24590-BOF-C0-PSW-00020, *Process Service Water Plan and Profile for PSW5 STA 2+25.00 to STA 3+86.49*

In the BOF, filtered process water from water treatment building and storage tanks 86 is used in the DIW, chiller/compressor plant 82, the LAW Effluent Management facility, and wet chemical storage facility 11.

#### 6.1.5.2.7 Chilled Water System (CHW)

The CHW from the BOF balances the supply flow in the distribution piping to the HVAC cooling coils and process vessels cooling heat exchangers throughout the WTP facility; collects the chilled water return from these components; and returns the chilled water to the BOF [ALARA]. The chilled water plan and profile, showing the distribution of chilled water throughout the WTP, is presented in the following drawings:

- 24590-BOF-M6-CHW-00001001, *BOF Chilled Water System Yard Distribution Piping*
- 24590-BOF-C0-CHW-00001, *Chilled Water Drawing Index, Key Plan, General Notes and Legend*
- 24590-BOF-C0-CHW-00002, *Chilled Water Plan for CH1 and CH2 Profile for CH2 STA R 0+00 to STA 2+90*
- 24590-BOF-C0-CHW-00003, *Chilled Water Profile for CH1 and CH2 CH1 STA R 0+00 to STA 4+03.75 CH2 STA 2+90 to STA 3+88.92*
- 24590-BOF-C0-CHW-00004, *Chilled Water Plan for CH1, CH2, CH3 and CH4 Profile for CH3 STA 0+00 to STA 2+30*
- 24590-BOF-C0-CHW-00005, *Chilled Water Profile for CH4, CH5 and CH6 CH4 STA 0+00 to STA 2+30 CH5 STA 0+00 to STA 0+09.17 CH6 STA 0+00 to STA 0+12.25*
- 24590-BOF-C0-CHW-00006, *Chilled Water Plan for CH3, CH4, CH7 and CH8 Profile for CH3 STA 2+30 to STA 5+30*
- 24590-BOF-C0-CHW-00007, *Chilled Water Profile for CH4 STA 2+30 to 5+30*
- 24590-BOF-C0-CHW-00008, *Chilled Water Plan for CH3 and CH4 Profile for CH3 STA 5+30 to STA 8+25*
- 24590-BOF-C0-CHW-00009, *Chilled Water Profile for CH4 STA 5+30 to STA 8+25*
- 24590-BOF-C0-CHW-00010, *Chilled Water Plan for CH3 and CH4 Profile for CH3 STA 8+25 to STA 11+25*
- 24590-BOF-C0-CHW-00011, *Chilled Water Profile for CH4 STA 8+25 to STA 11+25*
- 24590-BOF-C0-CHW-00012, *Chilled Water Plan for CH3 and CH4 Profile for CH3 STA 11+25 to STA 12+75.06*
- 24590-BOF-C0-CHW-00013, *Chilled Water Profile for CH4, CH11 and C12 CH4 STA 11+25 to STA 13+23.43 CH11 STA 0+00 to STA 0+80.25 CH12 STA 0+00 to STA 0+73.95*
- 24590-BOF-C0-CHW-00014, *Chilled Water Plan for CH9 and CH10 Profile for CH9 STA 0+00 to STA 1+65*
- 24590-BOF-C0-CHW-00015, *Chilled Water Profile for CH10 STA 0+00 to STA 1+70*
- 24590-BOF-C0-CHW-00016, *Chilled Water Plan for CH9, CH10, CH11 & CH12 Profile for CH9 STA 1+65 to STA 3+55.08*
- 24590-BOF-C0-CHW-00017, *Chilled Water Profile for CH10 STA 1+70 to STA 3+61.50*
- 24590-BOF-C0-CHW-00018, *Chilled Water Plan for CH7 and CH8 Profile for CH7 STA 0+00 to STA 2+25.74*
- 24590-BOF-C0-CHW-00019, *Chilled Water Profile for CH8, CH13 and CH14 CH8 STA 0+00 to STA 2+22.84 CH13 STA 0+00 to STA 0+52.08 CH14 STA 0+00 to STA 0+26.75*
- 24590-BOF-C0-CHW-00020, *Chilled Water Sections and Details Sheet 1*
- 24590-BOF-C0-CHW-00021, *Chilled Water Sections and Details Sheet 2*

#### 6.1.5.2.8 Plant Cooling Water System (PCW)

The PCW circulates cooling water from cooling tower facility 83 to the secondary cooling circuits that serve active process equipment cooling coils. The secondary circuits are cooled by heat exchangers on the primary loop, with BOF-supplied cooling water, and then recirculate the water back to cooling tower facility 83 [ALARA]. The PCW circulates cooling water directly to the chiller compressor plant for the air compressors and the chillers. PCW also

circulates cooling water directly to the steam plant 85 to support boiler operations. The cooling water plan and profile, showing the distribution of cooling water throughout the WTP, is presented in the following drawings:

- 24590-BOF-M6-PCW-00001001, BOF Plant Cooling Water System Cooling Tower – Distribution Piping
- 24590-BOF-C0-PCW-00001, *Plant Cooling Water Drawing Index, Key Plan, General Notes and Legend*
- 24590-BOF-C0-PCW-00002, *Plant Cooling Water Plan for C1 and C2 Profile for C1 STA 0+00.46 to STA 1+35*
- 24590-BOF-C0-PCW-00003, *Plant Cooling Water Profile for C2 STA (R)0+00 to STA (R)1+84.19*
- 24590-BOF-C0-PCW-00004, *Plant Cooling Water Plan for C1, C2, C3 and C4 Profile for C1 STA 1+35 to STA 3+30*
- 24590-BOF-C0-PCW-00005, *Plant Cooling Water Profiles for C2, C3 and C4 C2 STA (R)1+84.19 to STA 3+20 C3 STA 0+00 to STA 0+09.50 C4 STA 0+00 to STA 0+13.50*
- 24590-BOF-C0-PCW-00006, *Plant Cooling Water Plan for C1 and C2 Profile for C1 STA 3+30 to STA 6+30*
- 24590-BOF-C0-PCW-00007, *Plant Cooling Water Profile for C2 STA 3+20 to STA 6+20*
- 24590-BOF-C0-PCW-00008, *Plant Cooling Water Plan for C1 and C2 Profile for C1 STA 6+30 to STA 9+25*
- 24590-BOF-C0-PCW-00009, *Plant Cooling Water Profile for C2 STA 6+20 to STA 9+15*
- 24590-BOF-C0-PCW-00010, *Plant Cooling Water Plan for C1, C2, C5 and C6 Profile for C1 STA 9+25 to STA 12+20*
- 24590-BOF-C0-PCW-00011, *Plant Cooling Water Profiles for C2, C5 and C6 C2 STA 9+15 to STA 12+10 C5 STA 0+00 to STA 0+96.28 C6 STA 0+00 to STA 0+93.61*
- 24590-BOF-C0-PCW-00012, *Plant Cooling Water Plan for C1 and C2 Profile for C1 STA 12+20 to STA 15+20*
- 24590-BOF-C0-PCW-00013, *Plant Cooling Water Profile for C2, C7 and C8 C2 STA 12+10 to STA 14+95 C7 STA 0+00 to STA 0+09.62 C8 STA 0+00 to STA 0+09.74*
- 24590-BOF-C0-PCW-00014, *Plant Cooling Water Plan for C1 and C2 Profile for C1 STA 15+20 to 18+20*
- 24590-BOF-C0-PCW-00015, *Plant Cooling Water Profile for C2 STA 14+95 to STA 17+95*
- 24590-BOF-C0-PCW-00016, *Plant Cooling Water Plan for C1 and C2 Profile for C1 STA 18+20 to STA 20+58.48*
- 24590-BOF-C0-PCW-00017, *Plant Cooling Water Profile for C2 C2 STA 17+95 to STA 19+97.43*
- 24590-BOF-C0-PCW-00018, *Plant Cooling Water Plan for C10 to C11 Profile for C10 STA 0+00 to 3+00*
- 24590-BOF-C0-PCW-00019, *Plant Cooling Water Profile for C11 STA 0+00 to STA 3+00*
- 24590-BOF-C0-PCW-00020, *Plant Cooling Water Plan for C10 and C11 Profile for C10 STA 3+00 to STA 5+88.56*
- 24590-BOF-C0-PCW-00021, *Plant Cooling Water Profile for C11 STA 3+00 to STA 6+00.65*
- 24590-BOF-C0-PCW-00022, *Plant Cooling Water Plan for C12, C7 and C8 Profile for C12 STA 0+00 to STA 1+59.17*
- 24590-BOF-C0-PCW-00023, *Plant Cooling Water Sections and Details Sheet 1*
- 24590-BOF-C0-PCW-00024, *Plant Cooling Water Sections and Details Sheet 2*
- 24590-BOF-C0-PCW-00025, *Plant Cooling Water Plan for C3 and C4 and Profile for C3 STA 0+9.50 to STA 2+15.00*
- 24590-BOF-C0-PCW-00026, *Plant Cooling Water Plan for C3 and C4 and Profile for C3 STA 2+15.00 to STA 3+65.61*
- 24590-BOF-C0-PCW-00027, *Plant Cooling Water Plan C4 STA 0+13.50 to STA 2+24.67 and STA 2+24.67 to STA 3+75.28*
- 24590-BOF-C0-PCW-00028, *Plant Cooling Water Miscellaneous Details Sheet 3*

#### 6.1.5.2.9 High Pressure Steam System (HPS)

The HPS is supplied to all WTP facilities utilizing the BOF steam distribution piping from steam plant 85, which is part of the BOF. HPS is also supplied to the steam plant for atomizing fuel and to the low pressure steam (LPS) system on the dearator. The HPS system distribution throughout the WTP is presented in drawings



- 24590-BOF-M6-HPS-00001001, *BOF High Pressure Steam System Distribution Header*
- 24590-BOF-M6-HPS-00001002, *BOF High Pressure Steam System Distribution Header*
- 24590-BOF-M6-HPS-00001003, *BOF High Pressure Steam System Distribution Header*
- 24590-BOF-M6-HPS-00022001, *BOF/EMF High Pressure Steam System Distribution Header*

#### 6.1.5.2.10 Steam Condensate Water System (SCW)

The primary function of the SCW is to collect the steam condensate throughout the WTP and send it to a condensate tank. The SCW is pumped back through the BOF via SCW condensate pumps.

The SCW system distribution showing the piping collecting SCW throughout the WTP is represented on the system piping and instrument diagram (P&ID) 24590-BOF-M6-SCW-00002001, *BOF Steam Condensate Water System Collection and Distribution*.

#### 6.1.6 Building Code and Means of Egress

The BOF buildings are designed to UBC 1997 edition, while means of egress are designed to the NFPA 101 1997 edition. Each facility has been evaluated for compliance and are documented in the following reports:

- 24590-BOF-RPT-ENG-01-001, *Building Code Evaluations for BOF*
- 24590-BOF-RPT-ENG-01-002, *Life Safety Code Means of Egress Evaluations for BOF*

The BOF buildings and facilities that have no issued design or have been cancelled on or before the issue date of this report are not included. Temporary, offsite, and future buildings—such as LAW switchgear building 24, warehouse 52, maintenance building 56, simulator building 58, and emergency turbine generator facility 89—are not included in these reports and will be addressed separately.

#### 6.1.7 Ventilation System

A majority of the BOF buildings have a ventilation system designated as C1V. Air is recirculated within each building. The C1V provides heat pumps, air conditioning units, ducts, and supply and exhaust fans. The HVAC systems provide heating and cooling within the building, and allow areas within the building to be maintained at design temperatures. A more detailed description is located in the system description for the BOF C1V (24590-BOF-3YD-C1V-00002, *System Description for the BOF C1V HVAC Systems*). The location of the C1V equipment for each BOF building is described in the following sections that contain the details for each of the BOF buildings. Buildings not constructed yet are not included in the 24590-BOF-3YD-C1V-00002 and will be added at a later date.

### 6.2 Facilities Overview

#### 6.2.1 Wet Chemical Storage Facility 11; Wet Chemical Storage Facility Support Building 11S

Facility descriptions will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.2 Glass Former Storage Facility and Glass Former Storage Facility Blend Building 21; Glass Former Storage Facility Control Building 21S

Facility descriptions will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.3 Anhydrous Ammonia Facility 23

A facility description will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.4 Low-Activity Waste Facility Switchgear Building 24

A facility description will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.5 LAW Effluent Process Building 25; LAW Effluent Drain Tank Building 25A; LAW Effluent Utility Building 26; LAW Effluent Electrical Building 27

A description of all EMF buildings is available in 24590-BOF-3ZD-25-00001, *WTP Direct Feed Low Activity Waste (DFLAW) Facility and Systems Design Description*.

#### 6.2.6 Deleted

#### 6.2.7 Future Immobilized High-Level Waste Canister Storage Facility 33

A facility description will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.8 Administration Building 51

A facility description will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.9 Warehouse 52

A facility description will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.10 Non-dangerous, Non-radioactive Effluent Facility 54; NLD Wastewater THM Air Strippers 54S

The purpose of the Non-Dangerous, Non-Radioactive (NDNR) Effluent and motor control building is to collect, treat, and transfer NDNR effluent received from various BOF buildings and each of the major process facilities.

#### Figure 6–1 Deleted

The NLD is a non-processing system that transfers NDNR waste to the site treated effluent disposal facility (TEDF). The effluent is collected in the NLD effluent tank (NLD-TK-00001) and pumped through an air stripper from where it is discharged outside of the WTP facility boundary into a network of underground piping connected to existing facilities at the Hanford Site 200 East and West areas. The piping network discharges to the TEDF.

Non-dangerous, non-radioactive effluent facility 54, NLD wastewater trihalomethane (THM) air strippers, the NLD effluent tank, and the NLD powerhouse are located in the southwest corner of the WTP site, just west of the fire water storage tanks. The location is identified in 24590-BOF-C2-C12T-00002, *RPP-WTP Site General Arrangement Plan*.

Non-dangerous, non-radioactive effluent facility 54 is a 288 ft<sup>2</sup> one-story pre-engineered metal structure. It does not have a supervised automatic sprinkler system. The building occupancy classification is special purpose industrial occupancy per NFPA 101, *Life Safety Code*, Section 28-1.4.1(b) of NFPA 101, *Life Safety Code* (see 24590-BOF-RPT-ENG-01-002, *Life Safety Code Means of Egress Evaluations for BOF*).

#### Figure 6–2 Deleted

#### Figure 6–3 Deleted

The NLD powerhouse is an SC-IV vendor provided one-story 119ft<sup>2</sup> prefabricated building that sits on an independent concrete foundation, located South of the NLD wastewater THM air strippers. The building contains the motor control center (MCC) equipment (LVE-MCC-54002), which is classified as commercial material (CM). Enclosure NLD-ENCL-00003 is part of LVE-MCC-54002 and is also inside the powerhouse.

Non-dangerous, non-radioactive effluent facility 54, NLD wastewater THM air strippers, the NDNR effluent tank foundation, and the NLD powerhouse do not present a radiological or chemical hazard, and are not required for the prevention or mitigation of any radiological or chemical hazards associated with the WTP.

### 6.2.10.1 Facility Layout

Non-dangerous, non-radioactive effluent facility 54 houses transfer pumps (NLD-PMP-00020A/B), a sump (NLD-SUMP-00024) and sump pump (NLD-PMP-00029). The finished grade of this building is at top of concrete elevation of 680.5 ft.

A personnel entrance to NDNR effluent facility 54 at the 680.5 ft elevation is located on the north side of the building. Installation and removal of equipment can be accomplished through a 4 ft wide door on the east side of the building.

Figure 6–4 shows a general layout of NDNR effluent facility 54 and the tank foundation. For a detailed listing of all equipment in NDNR effluent facility 54, refer to drawings 24590-BOF-P1-54-00001, *Non-Dangerous/Non-Radioactive Effluent Facility General Arrangement Plan* and 24590-BOF-P1-54-00002, *Non-Dangerous/Non-Radioactive Effluent Facility General Arrangement Section*. For a facility floor plan, exterior elevations and building section see 24590-BOF-A1-54-00001, *BOF Non-Dangerous Non-Radioactive Effluent Facility Floor Plan, Exterior Elevations & Building Section*.

The NLD wastewater THM air strippers (54S) pad houses the air strippers (NLD-VSL-00008A/B), pumps (NLD-PMP-00043A/B), and blowers (NLD-BLWR-00001 and NLD-BLWR-00002). The finished grade of this building is at top of concrete elevation of 680.5 ft. Figure 6–5 shows a general layout of the NLD wastewater THM air strippers. For a detailed listing of all equipment, refer to drawings 24590-BOF-P1-54-00003, *NLD Wastewater THM Air Strippers General Arrangement Plan* and 24590-BOF-P1-54-00004, *NLD Wastewater THM Air Strippers Equipment Location Plan*.

The NLD powerhouse houses LVE-MCC-54002 and NLD-ENCL-00003. The finished grade of this building is at top of concrete elevation 681.0ft. An HVAC unit is provided to maintain internal ambient conditions. For more information, refer to 24590-WTP-3PS-EY00-T0006, *Engineering Specification for NLD Powerhouse and Motor Control Center*.

The exterior wall and roof systems are an insulated metal panel assembly. The interior walls and ceiling are the exposed metal liner of the exterior wall and roof panels.

The design of NDNR effluent facility 54 was subcontracted per service requisitions (SR) 24590-CM-SRA-MPGP-00002, *To Design, Fabricate, and Construct the Fuel Oil, Fire Water (2 Buildings), and Non-Dangerous, Non-Radioactive Effluent Pump Houses per the Attached Documents. Attachments: Exhibit “D” 0-Rev 2, Scope of Work Exhibit “E” – Rev. 2, Technical*. The SR provided the subcontractor with the scope of work for the listed buildings.

The design of the NLD powerhouse was subcontracted per service requisition (SR) 24590-CM-POA-EC00-00004 *United Controls International (UCI)*, to design, fabricate, and construct. The SR provided the subcontractor with the scope of work for the listed building.

The deliverable from the subcontractor provided Bechtel Systems and Infrastructure, Inc. (BSII) with documents and drawings that were reviewed by the subcontract technical representative.

Figure 6-4 Non-dangerous, Non-radioactive Effluent Facility 54 and Tank Foundation Layout

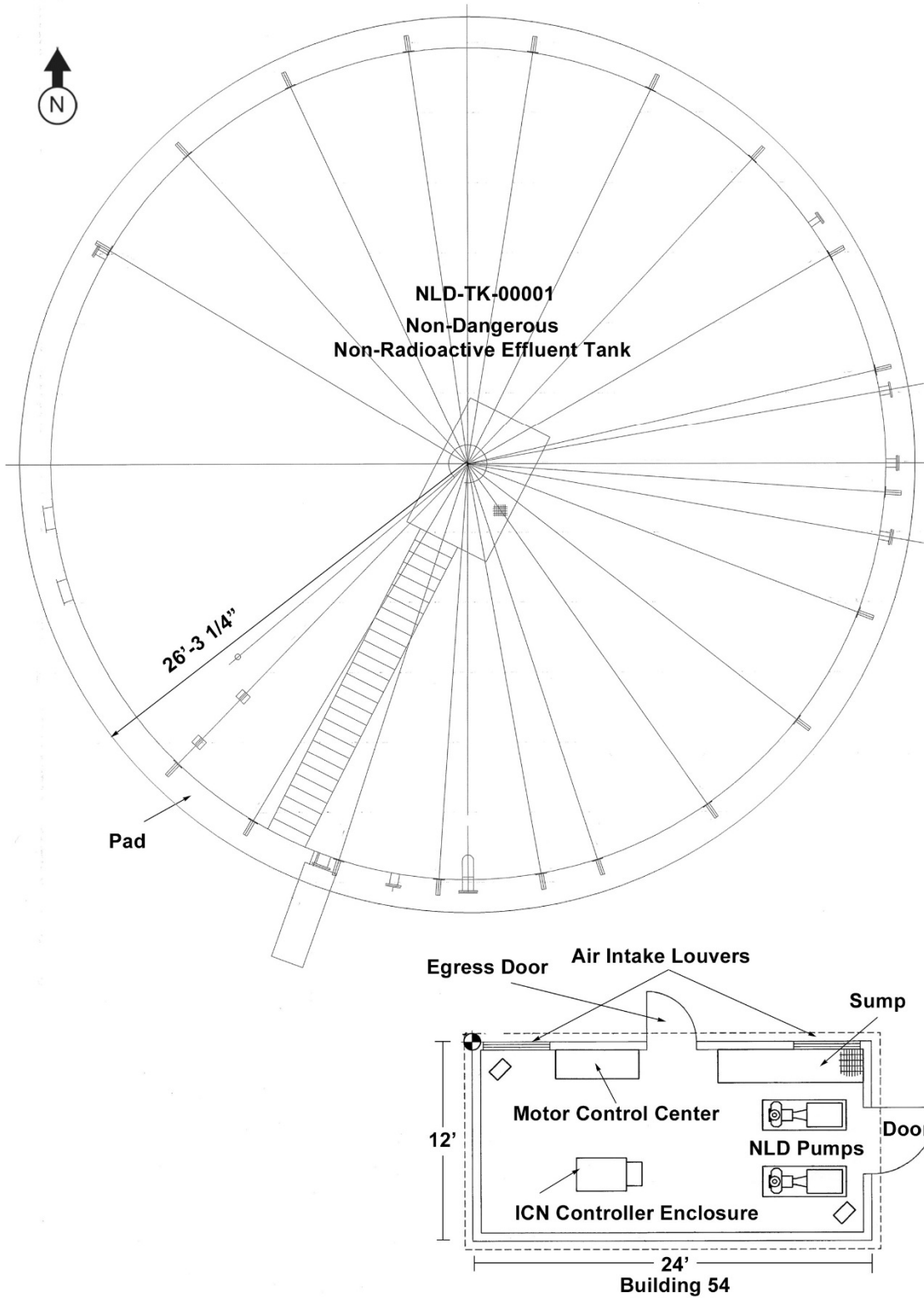
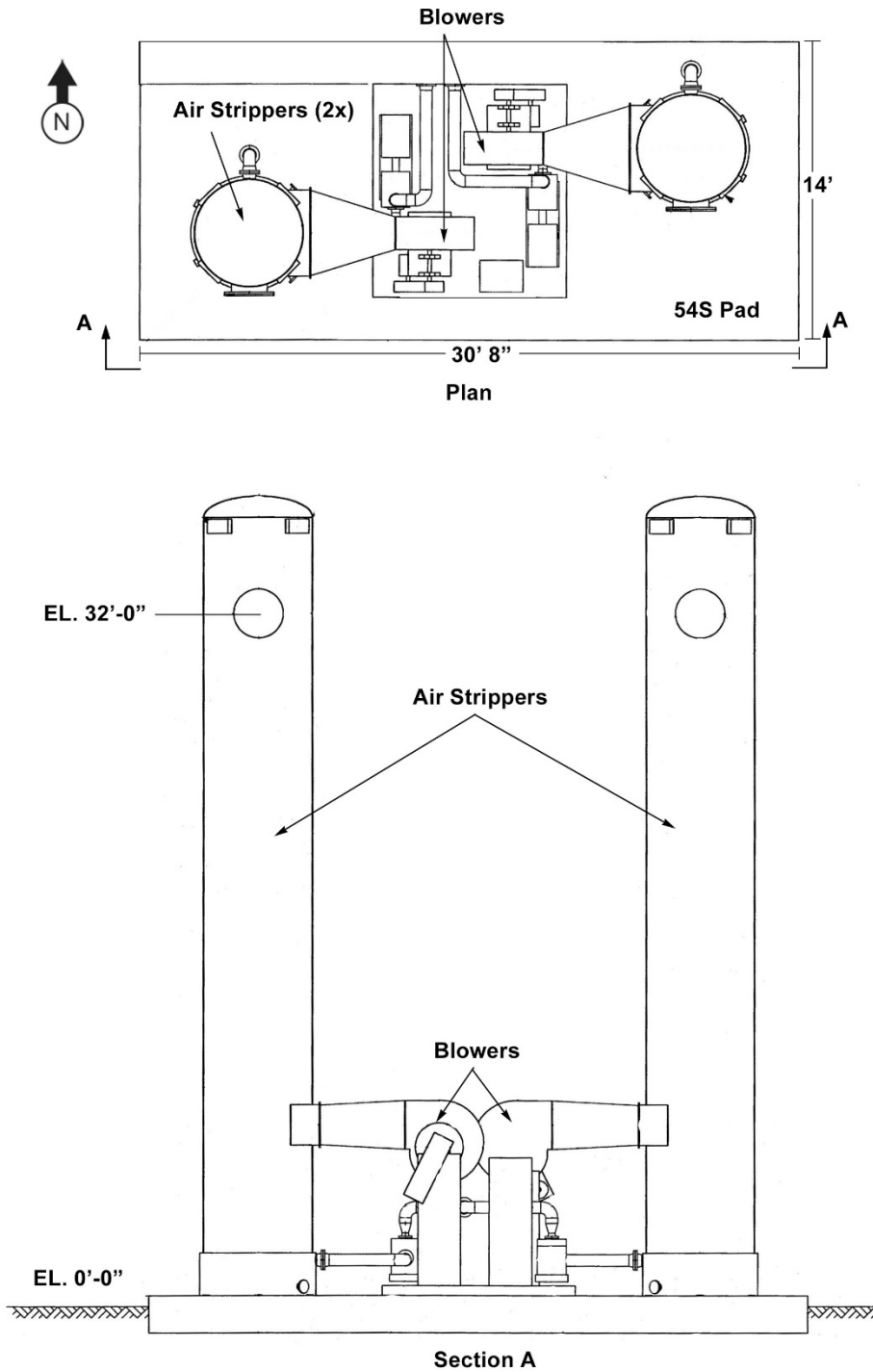


Figure 6-5 Non-radioactive Liquid Waste Disposal Wastewater Trihalomethane Air Strippers Layout



The NDNR effluent facility 54 design is in compliance with requirements for allowable height, allowable area, fire resistance, and exterior wall and opening protection per 24590-BOF-RPT-ENG-01-001, *Building Code Evaluations for BOF* and 24590-BOF-RPT-ENG-01-002, *Life Safety Code Means of Egress Evaluations for BOF*.

The NDNR effluent tank and the NLD wastewater THM air strippers' foundation, and the at-grade floor slabs are constructed of reinforced concrete. Buildings and associated equipment foundation designs are detailed in the following list of vendor documents. Included in this list are the vendor submitted as-built building details, contract

documents, and some design drawings. The change documents, due to constructability, against the applicable vendor submittals have been created to show current design, are not included in the list below. These changes meet the standard requirements for the WTP Project.

- 24590-BOF-A1-54-00001, *BOF Non-Dangerous Non-Radioactive Effluent Facility Floor Plan, Exterior Elevations & Building Section*
- 24590-B54-J1-NLD-00001, *Balance of Facilities System NLD System Block Diagram Non-Radioactive Liquid Waste Disposal System*
- 24590-BOF-C2-C12T-00037, *Firewater, Potable Water, Plant Service Air Yard Utility Sections and Details Sheet 4*
- 24590-BOF-DB-80-00008, *NLD Wastewater THM Air Stripper Foundation Plan, Sections and Details*
- 24590-BOF-DB-80-00009, *NLD Pipe Support Foundation Plan, Sections and Details*
- 24590-BOF-DBC-80-00013, *NLD Air Stripper Anchors and Foundation*
- 24590-BOF-DBC-80-00014, *NLD Pipe Support Foundation*
- 24590-BOF-DBC-NLD-00001, *Design of Ringwall Foundation for Non-Radioactive Effluent Tank NLD-TK-00001*
- 24590-BOF-DBC-NLD-00003, *Design of NLD Powerhouse Mat Foundation and Anchorage*
- 24590-BOF-DBC-S13T-00002, *Design of Pipe Support Foundations in NLD Tank Area*
- 24590-BOF-DB-S13T-00013, *Non-Radioactive Effluent Tank-Foundation Plan, Section and Details*
- 24590-BOF-DB-S13T-00044, *Non-Dangerous Non-Radioactive Effluent Facility Tank Pipe Support Foundations Plan and Sections*
- 24590-BOF-DB-80-00022, *NLD Powerhouse Foundation Plan, Sections and Details*
- 24590-BOF-P1-54-00001, *Non-Dangerous/Non-Radioactive Effluent Facility General Arrangement Plan*
- 24590-BOF-P1-54-00002, *Non-Dangerous/Non-Radioactive Effluent Facility General Arrangement Section*
- 24590-BOF-P1-54-00003, *NLD Wastewater THM Air Strippers General Arrangement Plan*
- 24590-BOF-P1-54-00004, *NLD Wastewater THM Air Strippers Equipment Location Plan*
- 24590-CM-HC1-MPGP-00001-03-02, *Submittal 026 Parkline Building Calculation Package Submittal NLD Pump House Building 54*
- 24590-CM-HC1-MPGP-00001-04-01, *BOF Pump House Facilities Structural Notes and Details – 800*
- 24590-CM-HC1-MPGP-00001-15-00058, *Submittal 082.1, SK-100 - BOF Pump House Facilities Underground Instrument Air Line Detail NLD Pump House Building 54*
- 24590-CM-HC1-MPGP-00001-15-00059, *As-Built – NLD Pump House - Instrumentation Location and Wiring Schedule*
- 24590-CM-HC1-MPGP-00001-15-01, *BOF Pump House General Arrangement- NLD Pump House*
- 24590-CM-HC1-MPGP-00001-15-12, *BOF Pump House Facilities - Piping Plan - NLD Pump House Bldg. 54*
- 24590-CM-HC1-MPGP-00001-15-13, *BOF Pump House Facilities - Piping Details - NLD Pump House Bldg. 54*
- 24590-CM-HC1-MPGP-00001-15-20, *BOF Pump House Facilities NLD Pump House Wiring Diagram*
- 24590-CM-HC1-MPGP-00001-15-25, *BOF Pump House Facilities NLD Pump House Lighting/Heating/Fan Schedule and Locations*
- 24590-CM-HC1-MPGP-00001-15-32, *BOF Pump House Facilities - NLD Pump House and Fuel Oil Pump House Framing Plans*
- 24590-CM-HC1-MPGP-00001-15-33, *BOF Pump House Facilities - NLD Pump House and Fuel Oil Pump House Sections and Details*
- 24590-CM-HC1-MPGP-00001-15-39, *BOF Pump House Facilities - Grounding Plan and Details - NLD Pump House*
- 24590-CM-HC1-MPGP-00001-15-43, *BOF Pump House Facilities - NLD Pump House - Control Panel Wiring Diagram*

- 24590-CM-HC1-MPGP-00001-15-45, *BOF Pump House Facilities - Support Layout & Details - NLD Pump House*
- 24590-CM-HC1-MPGP-00001-15-51, *BOF Pump House Facilities - NLD Pump House - Main Control Panel (CP-100) Layout*
- 24590-CM-HC1-MPGP-00001-31-01, *Submittal 054.1 - Stress Seismic Calculation Package*
- 24590-CM-HC1-MPGP-00001-36-00006, *Certificates - UL Master Label Certificates - FSW, NLD, DFO Pumphouses*
- 24590-CM-TSA-DG01-00001-05-00147, *BOF Facility - NLD Pump House Building 54 Sidewalks*
- 24590-CM-TSA-DG01-00001-05-00150, *BOF - NLD Air Stripper Foundation Slab @ EL. (-)2'-0" Bottom Steel*
- 24590-CM-TSA-DG01-00001-05-00151, *BOF - NLD Air Stripper Foundation Slab @ EL. (-)2'-0" Top Steel*
- 24590-CM-TSA-DG01-00001-05-24, *BOF - Non-Radio Active Affluent Tank - Foundation for Tank NLD-TK-00001*
- 24590-CM-TSA-DG01-00001-05-30, *BOF- NLD Pump House Foundation*
- 24590-CM-POA-EC00-00004-01-00003, *NLD Powerhouse 7 Ft-0 in X 17 Ft-0 in X 10 Ft-10 In*
- 24590-CM-POA-EC00-00004-01-00004, *United Controls International 7 ft - 0 in X 17 ft - 0 in X 10 ft - 10 In*
- 24590-CM-POA-EC00-00004-01-00006, *MCC Seismic Mounting Req. Info.*

The NDNR effluent facility 54 has one distinct egress door location discussed in Section 6.2.10.6.2.

#### 6.2.10.1.1 Wall Penetrations

The walls of NDNR effluent facility 54 have several penetrations for utilities to pass through. For building 54 wall penetration details, see drawing 24590-BOF-A1-54-00001, *BOF Non-Dangerous Non-Radioactive Effluent Facility Floor Plan, Exterior Elevations & Building Section*. On the west side, near the bottom-left corner at 1 ft 3 ½ in. off the ground, a penetration exists for the 6 in. TEDF discharge pipe. To the right at the same elevation, a 2 in. airline enters the building. On the north side, near the bottom-right corner of the building at 1 ft 3 ½ in. off the ground, two penetrations exist for the 6 in. water lines that pump the water to and from the NDNR effluent tank. Also on the north side near the top, just left of the door, there are four penetrations at 8 ft 6 in. off the ground for 2 in. electrical conduit. On the south side, there are two penetrations at 8 ft 6 in. off the ground for 4 in. electrical conduit.

#### 6.2.10.2 Systems

Non-dangerous, non-radioactive effluent facility 54, NLD wastewater THM air strippers, and the NDNR effluent tank foundation includes the following main components:

- Air stripper towers, blowers, and pumps
- Collection tank
- Connection to the TEDF interface flange
- Control valve
- Discharge header
- Discharge monitoring instrumentation (pH, conductivity, flow rate)
- Discharge pumps
- Recycle piping connection to PT Facility via a spectacle blind

System locators are described in 24590-WTP-RPT-ENG-02-009, *System and Area Locators List and System Division of Responsibility*. Systems and related documents are provided in the following list:

- NLD: 24590-WTP-3YD-NLD-00001, *System Description for the Waste Treatment Plant Non-Radioactive Liquid Waste Disposal (NLD) System*
- LVE: 24590-WTP-3ZD-MVE-00001, *LAW BOF and Lab Medium Voltage Electrical (MVE) Low Voltage Electrical (LVE) and DC Electrical (DCE) System Design Description*
- UPE: 24590-WTP-3YD-UPE-00001, *System Description for the UPE Power System*
- LTE: 24590-WTP-3YD-LTE-00001, *System Description for Lighting Systems (LTE)*
- PCJ, mechanical handling control system (MHJ) and autosampling control system (ASJ): 24590-WTP-3ZD-PCJ-00001, *Process Control (PCJ), Mechanical Handling Control (MHJ), and Autosampling Control (ASJ) System Design Description*
- CME and FNJ: 24590-WTP-3YD-CME-00001, *System Description for the Communications Electrical System (CME) and Facility Network Infrastructure (FNJ)*
- GRE: 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lightning Protection System*
- FSW: 24590-WTP-3YD-FSW-00001, *System Description for the Fire Service Water (FSW), Fire Protection Water (FPW), and the Fire Detection and Alarm (FDE) Systems*
- PSA: 24590-WTP-3YD-PSA-00002, *System Description for the Waste Treatment Plant (WTP) Plant Service Air (PSA) System*

### 6.2.10.3 Facility Interfaces

The NDNR effluent storage tank receives water from various BOF buildings as well as each of the major process facilities. The systems housed in NDNR effluent facility 54 transfer the NDNR effluent to the air strippers on the air strippers' concrete pad. The effluent is then pumped offsite to the TEDF or the PT Facility at the WTP.

The NDNR effluent facility 54 and NLD wastewater THM air strippers design incorporates features and capabilities necessary to ensure efficient WTP operations and meets the permitting, process control, authorization basis, and waste form qualification requirements as defined in the baseline document 24590-WTP-PL-G-01-001, *Functional Specification*.

### 6.2.10.4 Utilities

#### 6.2.10.4.1 Power

The facility is provided with onsite power.

#### 6.2.10.4.2 Air

The facility is provided with PSA for air driven pumps and eductor mixing

#### 6.2.10.4.3 Lighting

A complete and operable lighting system is provided in NDNR effluent facility 54 in accordance with NFPA 70, *National Electric Code*, Sections 410 and 700; *IESNA Lighting Handbook* (IESNA 2000); NFPA 101 (1997 and 2000 Eds.); and ANSI/IESNA RP-7, *Lighting Industrial Facilities ANSI Approved*.



Both normal and emergency lighting is provided. Fixtures are selected from the electrical lighting fixture schedule. Non-standard fixture selection is designed per the individual requirements of each facility.

All lighting fixtures are compatible with the environment in which they are installed (areas subject to decontamination, outdoor areas, radiation, etc.). Lighting fixtures installed in industrial areas and subjected to possible physical damage are equipped with appropriate protection.

The details of light locations for NDNR effluent facility 54, types of lighting used, and the exact location of all the light fixtures are provided in drawing 24590-CM-HC1-MPGP-00001-15-25, *BOF Pump House Facility NLD Pump House Lighting/Heating/Fan Schedule and Locations*.

Four light fixtures provide lighting for NDNR effluent facility 54. Fixtures are distributed in four rows running the width of the building. Each row has two light fixtures. Above the egress exit, the combination of emergency lights and exit signs are installed. Wall pack light fixtures are located outside over the egress door and over the maintenance door on the east side.

#### 6.2.10.4.4 Ventilation

Non-dangerous, non-radioactive effluent facility 54 is one open room with two roof-mounted exhaust fans. The exhaust fans are sized to exhaust enough air from the area to maintain the summer temperature at no greater than 10°F above the outdoor design temperature of 101°F. A wall-mounted thermostat starts the exhaust fans when the room temperature is above the set point. Two operable louvers are provided to open when the fans operate and close when the fan stops. The ventilation intake louvers are located on both sides of the egress door on the north side. Two electric heaters are also installed to provide heating during the winter and maintain a minimum temperature of 50°F. The unit heaters are provided with integral thermostats that activate when the temperature drops below the set point. One electric space heater is mounted inside the upper northwest corner of the building and another one is located in the southeast corner. The heaters and ventilation equipment is shown in drawing 24590-CM-HC1-MPGP-00001-15-25, *BOF Pump House Facility NLD Pump House Lighting/Heating/Fan Schedule and Locations*. More detailed descriptions are in 24590-BOF-3YD-C1V-00002, *System Description for the BOF CIV HVAC Systems*.

#### 6.2.10.4.5 Fire Protection

Non-dangerous, non-radioactive effluent facility 54 does not have an automatic sprinkler system. The fire alarm and detection plan is detailed in 24590-CM-HC4-JQ05-00001-T01-01-00145, *Fire Pump House/Non-Dangerous Effluent Bldgs 84A, 84B & 54 Fire Alarm System - Plan View*.

#### 6.2.10.4.6 Lightning Protection and Grounding

The lightning protection system description is discussed in detail in 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lighting Protection System*.

#### 6.2.10.4.7 Capacity

The function of NDNR effluent facility 54 is to remove the NDNR effluent from the WTP. The NLD system capacity is discussed in 24590-WTP-3YD-NLD-00001.

#### 6.2.10.5 Energy Conservation

Non-dangerous, non-radioactive effluent facility 54 is designed in accordance with the energy conservation requirements set forth in ASHRAE 90.1, *Energy Efficient Design of New Buildings Except Low-Rise Residential Building*. Exterior openings are sealed to minimize air leakage.

### 6.2.10.6 Health and Safety

Non-dangerous, non-radioactive effluent facility 54 provides the following industrial safety design features that ensure personnel safety and minimize industrial safety concerns.

#### 6.2.10.6.1 Communications

An intra-building public address and telephone communication system is provided for non-dangerous, non-radioactive effluent facility 54. Visual and/or audio alarms are located in the building, as shown in 24590-B54-EFCT-CME-00005, *Field Sketch – BOF Non-Dangerous/Non-Radioactive Effluent Facility - Communication Layout Plan - Building 54*.

#### 6.2.10.6.2 Means of Egress

Non-dangerous, non-radioactive effluent facility 54 is defined as a special-purpose industrial occupancy per NFPA 101. Consistent with Section 10 of DOE-STD-1066-97, compliance with NFPA 101 is considered to satisfy the exit requirements of the applicable building code. Means of egress and other life safety provisions are designed in accordance with NFPA 101. NDNR effluent facility 54 has one distinct egress door location with a minimum width of 36 in. One personnel entrance to NDNR effluent facility 54 is located on the north side of the facility. Installation and removal of equipment can be accomplished through a 4-ft wide door on the east side of the facility. These doors are shown in 24590-BOF-P1-54-00001, *Non-Dangerous/Non-Radioactive Effluent Facility General Arrangement Plan*, and 24590-BOF-P1-54-00002, *Non-Dangerous/Non-Radioactive Effluent Facility General Arrangement Section*.

The structure evaluation concluded the egress capacity of exits meets or exceeds the required minimum width. Travel distances to the closest exit in the facility (24 ft) are within the maximum travel distance allowed by NFPA 101, *Life Safety Code*. Common paths of travel in NDNR effluent facility 54 are within the maximum allowed ( 24590-BOF-RPT-ENG-01-002, *Life Safety Code Means of Egress Evaluation for BOF*; note that CR 24590-WTP-GCA-MGT-17-00760 may impact this document for this facility).

Locations of exit doors are shown in the general arrangement plan and architectural design drawings, and are in accordance with architectural design criteria. Continuous and unobstructed access to the exits is available from the operational area floor and each of these exits discharges outdoors at grade level. Exit signs are posted. Integral self-contained dry battery packs and inverters compose each lighting fixture identified as egress lighting.

#### 6.2.10.6.3 High Noise Areas

Non-dangerous, non-radioactive effluent facility 54 may require PPE for entry. The facility is designed to provide sufficient space to accommodate additional noise reduction equipment (if needed), and/or communications equipment such as acoustical booths, loud ringers, visual signaling devices, speakers, or speaker phones (if needed). Exemptions may be granted by the operations facility lead or commissioning operations manager. High noise areas will be determined or designated during startup and operations.

#### 6.2.10.6.4 Portable Fire Extinguishers

Portable fire extinguishers are provided in accordance with NFPA 10-2002, *Standard for Portable Fire Extinguishers*. These fire extinguishers are placed in easily accessible locations, such as near exit doors and along routes of travel. Fire extinguishers are selected for the class of hazards to be protected and are located in cabinets that are semirecessed or surface mounted. There is one fire extinguisher located inside of the north wall door of NDNR effluent facility 54. The permanent plant design document establishing the number, type, and location of fire extinguishers in this building is 24590-B54-U2-M36T-00001, *BOF Non-Dangerous Non-Radioactive Effluent Building 54 Fire Protection Fire Extinguisher Locations*.

#### 6.2.10.6.5 Access

Access to areas within NDNR effluent facility 54 are facilitated and controlled by the following:

- One personnel door at primary entry and exit
- One maintenance door
- Lighted exit signs at exit doors
- Access door locks

#### 6.2.10.6.6 Building Code

Non-dangerous, non-radioactive effluent facility 54 is classified and constructed as Type II Noncombustible (II-N) construction per Table 6-A in the UBC. The facility is considered a Special Purpose Industrial Occupancy per NFPA 101, *Life Safety Code*, Section 28-1.4.1 (b), Group F Division 2 Occupancy with building elements non-rated, except shaft enclosures are 1-hour. This facility design is designed for allowable height, allowable area, fire resistance, and exterior wall and opening protection.

#### 6.2.10.6.7 Hazards

##### 6.2.10.6.7.1 Radioactive/Contamination Hazards

There are no radioactive or contamination hazards identified in NDNR effluent facility 54 or NLD wastewater THM air strippers. General site hazards are discussed in 24590-BOF-RPT-ENS-12-002, *Process Hazards Analysis for Balance of Facilities (BOF)*.

##### 6.2.10.6.7.2 Chemical Hazards

No chemical hazards are identified in the building.

#### 6.2.10.6.8 Personal Safety Features

No additional personal safety features are identified beyond standard industrial requirements.

#### 6.2.11 Maintenance Shop (Combination Shop) 56

A facility description will be included in a future revision to support WTP construction turnover schedules.

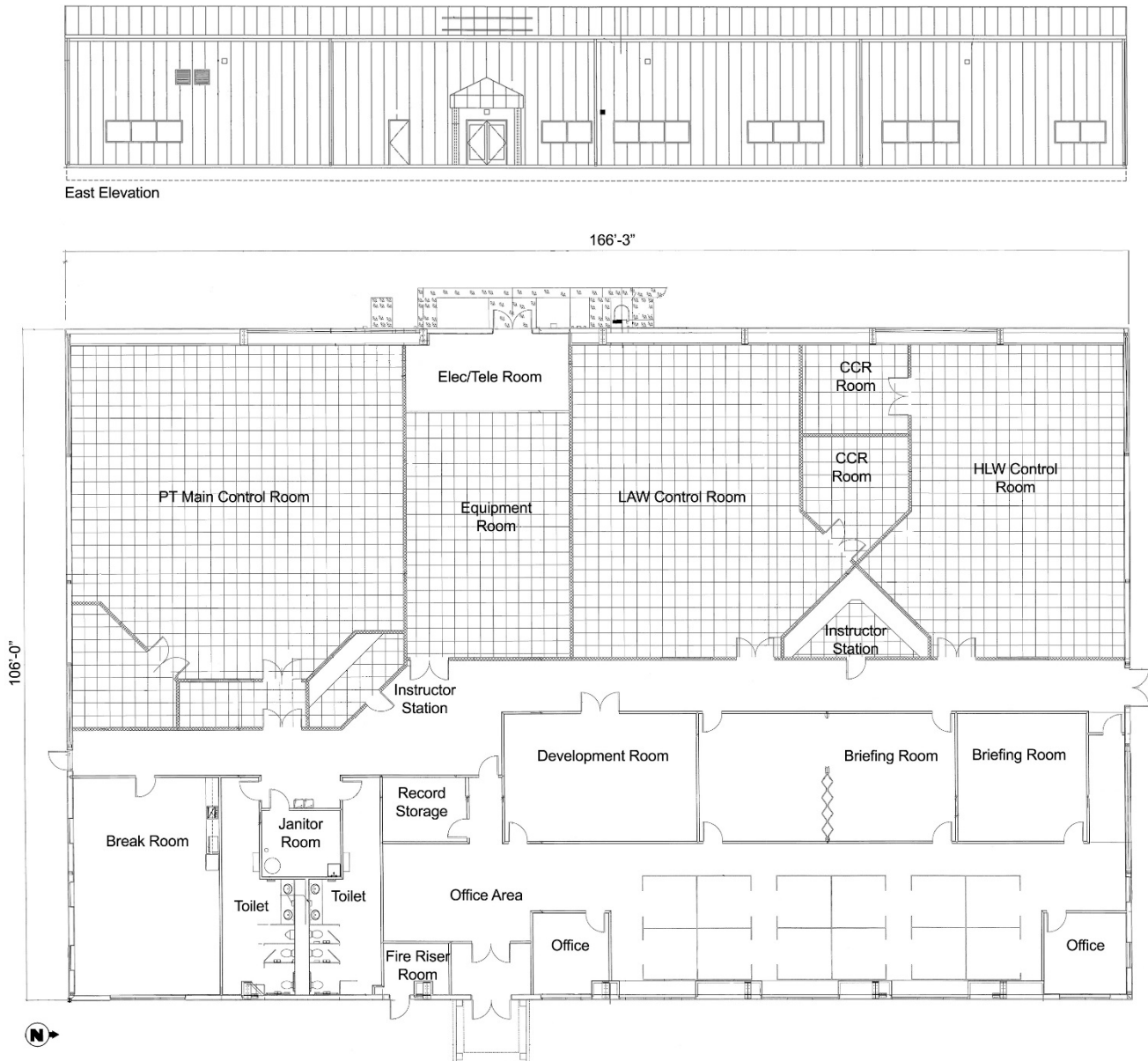
#### 6.2.12 Simulator Building 58

The Simulator Building is the only BOF facility not located on the WTP site, but is located at 2984 Horn Rapids Rd. in North Richland. The building contains mock-ups of the WTP control rooms for the three main process buildings (Pretreatment, High-Level Waste, and Low-Activity Waste), administrative office area, training classrooms, and associated computer support systems. The facility provides training for operators and mimics the general operation and off-normal condition for the three main WTP processing facilities. The Simulator Building fulfills the simulator and training requirements of the BOD.

##### 6.2.12.1 Facility Layout

The Simulator Building is a one-story pre-engineered metal structure, approximately 166 ft. x 106 ft. with a total enclosed area of 17,600 square feet. The building is approximately 25 feet high at its peak. Figure 6-3 shows the general arrangement floor plan and elevation of the Simulator Building.

Figure 6-6 Simulator Building Layout



The Simulator Building is designed to meet the code requirements of the UBC 1997 edition. The facility consists of a concrete slab on grade with a structural steel superstructure. The exterior envelope consists metal siding and roof panels and insulated with batt blanket insulation. The building design and associated detail designs are documented in the following list of project and vendor documents:

- 24590-BOF-A1-58-00001 *Simulator Building Architectural Floor Plan*
- 24590-BOF-A1-58-00002 *Simulator Building Architectural Reflected Ceiling plan*
- 24590-BOF-A2-58-00001 *Simulator Building Architectural Exterior Elevations & Building Section*
- 24590-BOF-A3-58-00001 *Simulator Building Architectural Schedules, Interior Elevation & Details*
- 24590-CM-HC1-AKBS-00001-07-17 *Simulator Building - Structural Notes & Legend, S-01*

- 24590-CM-HC1-AKBS-00001-07-18 *Simulator Building Structural Foundation Plan, S-02*
- 24590-CM-HC1-AKBS-00001-07-19 *Simulator Building - Mechanical Notes, Legend, Schedules & Details, M-01*
- 24590-CM-HC1-AKBS-00001-07-20 *Simulator Building - Mechanical Plumbing Plan - M-02*
- 24590-CM-HC1-AKBS-00001-07-21 *Simulator Building - Mechanical HVAC Plan - M-03*
- 24590-CM-HC1-AKBS-00001-07-22 *Simulator Building - Mechanical HVAC Plan - Roof, M-04*
- 24590-CM-HC1-AKBS-00001-07-28 *Simulator Building Fire Protection - Site Plan, Riser Detail, Hanger and EQ Details, General Notes, F-01*
- 24590-CM-HC1-AKBS-00001-07-29 *Simulator Building Fire Protection - Fire Protection Plan at Ceiling, General Notes, F-02*
- 24590-CM-HC1-AKBS-00001-07-34 *Simulator Building - Notes, Plans & Details - LP-01*
- 24590-CM-HC1-AKBS-00001-07-35 *Simulator Building - Structural Sections & Details, S-03*
- 24590-CM-HC1-AKBS-00001-07-36 *Simulator Building - Structural Sections & Details, S-04*
- 24590-CM-HC1-AKBS-00001-07-37 *Simulator Building - Structural Sections & Details, S-05*
- 24590-CM-HC1-AKBS-00001-07-39 *Simulator Building - Civil Site Utility Plan, Notes & Legend, C-02*
- 24590-CM-HC1-AKBS-00001-07-40 *Simulator Building - Civil Site Grading Plan, C-03*
- 24590-CM-HC1-AKBS-00001-07-41 *Simulator Building - Civil Details, C-04*
- 24590-CM-HC1-AKBS-00001-07-42 *Simulator Building - Civil Details, C-05*
- 24590-CM-HC1-AKBS-00001-07-43 *Simulator Building Fire Protection - Fire Protection Plan at Structure, General Notes, F-03*
- 24590-CM-HC1-AKBS-00001-07-44 *Simulator Building Fire Alarm, Fire Alarm Plan*
- 24590-CM-HC1-AKBS-00001-07-45 *Simulator Building Fire Alarm Panel Wirings and Battery Calculations*
- 24590-CM-HC1-AKBS-00001-07-46 *Simulator Building Fire Alarm Riser and Wiring Diagrams*
- 24590-B58-E1-LVE-00001 *Simulator Building 480V Power Distribution Diagram*
- 24590-B58-E2-E53T-00001 *BOF Simulator Building Equip & Elec Rm SF-0116 & SF-0117 Raceway Layout Plan*
- 24590-B58-E2-E53T-00002 *BOF Simulator Building Grounding Power Layout & Raceway Plan*
- 24590-B58-E2-E53T-00003 *BOF Simulator Building Roof Power Plan*
- 24590-B58-E2-E53T-00004 *BOF Simulator Building Electrical Notes, Legend, Schedules Section & Details*
- 24590-B58-E2-LTE-00001 *BOF Simulator Building Lighting Plan*
- 24590-B58-EF-CME-00001 *BOF Simulator Building Communications Plan*
- 24590-B58-M0X-C1V-00001 *HVAC Equipment List for B58 Simulator Bldg. C1V System*

### 6.2.12.2 Systems

The Simulator Building does not house any of the WTP systems

### 6.2.12.3 Facility Interfaces

The Simulator Building is a stand-alone facility and does not interface with any other WTP site buildings.

### 6.2.12.4 Utilities

#### 6.2.12.4.1 Power

The facility is provided with power by local utility company.

#### 6.2.12.4.2 Lighting

A complete and operable lighting system is provided and complies with *National Electrical Code*, NFPA 70.

#### 6.2.12.4.3 Ventilation

The facility is equipped with five roof mounted air conditioning units that provide heating and cooling throughout the facility. Environmental controls are provided via wall mounted thermostat. The HVAC system is shown on documents 24590-CM-HC1-AKBS-00001-07-19, *Simulator Building - Mechanical Notes, Legend, Schedules & Details, M-01*, 24590-CM-HC1-AKBS-00001-07-21, *Simulator Building – Mechanical HVAC Plan - M-03*, and 24590-CM-HC1-AKBS-00001-07-22, *Simulator Building – Mechanical HVAC Plan – Roof, M-04*.

#### 6.2.12.4.4 Fire Protection

The facility is provided with a fire suppression system throughout the building. The fire protection system is documented in 24590-CM-HC1-AKBS-00001-07-28, *Simulator Building Fire Protection – Site Plan, Riser Detail, Hanger and EQ Details, General Notes, F-01*, 24590-CM-HC1-AKBS-00001-07-29, *Simulator Building Fire Protection – Fire Protection Plan at Ceiling, General Notes, F-02*, and 24590-CM-HC1-AKBS-00001-07-43, *Simulator Building Fire Protection – Fire Protection Plan at Structure, General Notes, F-03*.

#### 6.2.12.4.5 Lightning Protection & Grounding

The Simulator building is equipped with a lightning protection system and building grounding as shown in document 24590-CM-HC1-AKBS-00001-07-34, *Simulator Building – Notes, Plans & Details - LP-01*.

#### 6.2.12.5 Energy Conservation

The Simulator Building is designed in accordance with the energy conservation requirements set forth in ASHRAE 90.1.

#### 6.2.12.6 Health & Safety

##### 6.2.12.6.1 High Noise Areas

No high noise areas are identified in the Simulator building.

##### 6.2.12.6.2 Building Codes & Means of Egress

The building has been designed to meet the building requirements of the UBC 1997 edition and the NFPA 101 (1997 edition). Compliance with these codes are documented in documents 24590-BOF-RPT-ENG-01-033, *Building Code Evaluation for the Simulator Building*, and 24590-BOF-RPT-ENG-01-034, *Life Safety Code Means of Egress Evaluation for Simulator Building*, respectively.

##### 6.2.12.6.3 Portable Fire Extinguishers

The Simulator Building will have several portable fire extinguishers provided by others, per 24590-BOF-A1-58-00001, *Simulator Building Architectural Floor Plan*.

##### 6.2.12.6.4 Hazards

General site hazards are discussed in 24590-BOF-RPT-ENS-12-002, *Process Hazards Analysis for Balance of Facilities (BOF)*.

##### 6.2.12.6.4.1 Radioactive/Contamination Hazards

There are no radioactive or contamination hazards identified in Simulator building 58.

#### 6.2.12.5.4.2 Chemical Hazards

No chemical hazards are identified in the Simulator building.

#### 6.2.12.5.5 Personal Safety Features

No additional personal safety features are identified beyond standard industrial requirements.

#### 6.2.13 Personnel Access Facility 59

A facility description will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.14 Fuel Oil Facility 81

A facility description will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.15 Chiller/Compressor Plant 82

Chiller/compressor plant 82 houses equipment for the PSA and chilled water for WTP operations.

The PCW lines enter and leave the west wall of chiller/compressor plant 82. These lines provide cooling water to the chillers. The PCW lines enter and exit chiller/compressor plant 82 at 48 in. diameter and transition to 36 in. underground. The centerlines of these pipes enter and exit the building at elevation +686 ft.

#### Figure 6–7 Deleted

Chiller/compressor plant 82 is located on the south end of the WTP site, east of G Road and north of B Road. The location is identified in 24590-BOF-C2-C12T-00002, *RPP-WTP Site General Arrangement Plan*.

Chiller/compressor plant 82 is a one level, 33,660 ft<sup>2</sup>, pre-engineered metal structure. The actual area exceeds the basic allowable area of 18,000 ft<sup>2</sup>; however, the extra space was allowed because it is a one-story building protected by an approved, supervised automatic sprinkler system. The building occupancy classification is Special Purpose Industrial Occupancy per Section 28-1.4.1(b) of NFPA 101, *Life Safety Code* (24590-BOF-RPT-ENG-01-002). The overall footprint of the building is 204 ft long by 165 ft wide. The elevation is +34 ft and the ridge elevation is 40 ft 10.5 in. There are many intermediate levels inside the building, which consist of mainly multicommodity supports.

#### Figure 6–8 Deleted

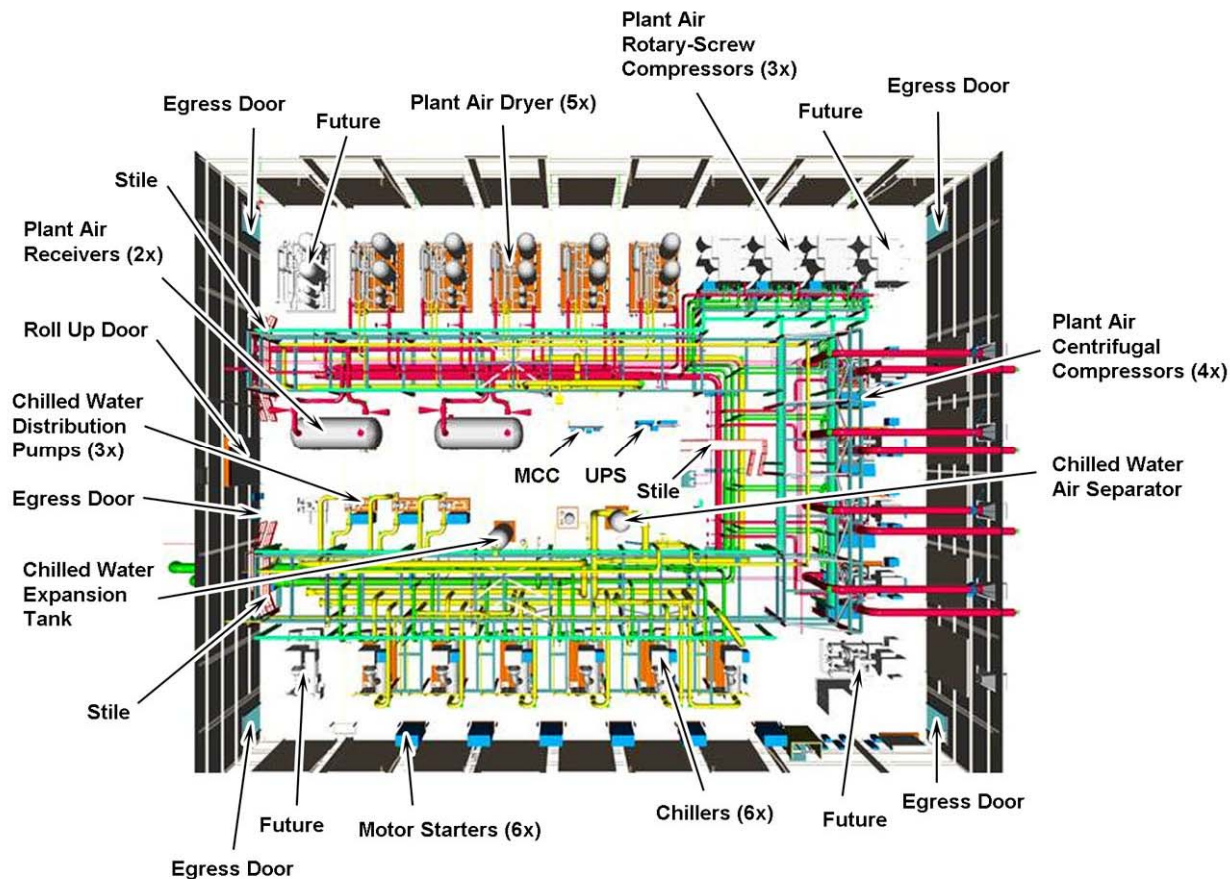
#### Figure 6–9 Deleted

Chiller/compressor plant 82 and the PSA system do not present a radiological hazard. The plant and its systems are not required for the prevention or mitigation of any radiological hazards associated with the WTP. Chilled water requirements—to support safety functions—are provided by dedicated systems in the process facilities independent from the BOF CHW.

#### 6.2.15.1 Facility Layout

Chiller/compressor plant 82 houses major equipment for the PSA, ISA, and CHW. The finished grade of this plant is at top of concrete elevation +683 ft. Chiller/compressor plant 82 has five distinct egress door locations discussed in Section 6.2.15.6.2. Figure 6–10 shows a general layout of the plant. For a detailed listing of all equipment in the plant, refer to the 24590-BOF-P1-82-0000X drawing series.

Figure 6–10 Chiller/Compressor Plant 82 Layout



Chiller/compressor plant 82 is a one-level building with six intermediate levels at elevations +5 ft 3 in., +10 ft 6 in., +11 ft 7 in., +12 ft 0 in., +17 ft 6 in., and +25 ft 6 in. above the first floor elevation. These additional levels consist of mainly multicommodity supports. The chiller compressor room (CC-0101) is designed to support main chiller/compressor plant 82 functions. The fire riser room (CC-0102) is a small room with an entrance from south of the building that houses fire protection equipment. The wall and ceiling between the chiller compressor room (CC-0101) and the fire riser room (CC-0102) is a gypsum board structure. There are no administrative areas, control rooms, or any other personnel and administrative support functions available in this building. Three bridges—or stiles—provide access to the central part of the plant; two on the west side and one on the east side of the building. Multicommodity supports provide support to all the pipes running throughout the building. All the main equipment is located in the chiller compressor room (CC-0101) at ground level. A majority of the supporting electrical equipment is located in the center of chiller/compressor plant 82. Ventilation equipment is located throughout the chiller compressor room (CC-0101). Chiller/compressor plant 82 is provided with eight roof-mounted exhaust fans.

Provisions have been made for additional equipment to be installed as needed, but design changes may be required to expand the current plant capacity. The work may require upgrades of normal/standby emergency power and control, utilities, and HVAC. The work may also require other systems and components not initially installed.

The design of chiller/compressor plant 82 was subcontracted per service contract number 24590-CM-FC3-AKBP-00001. A service requisition provided the subcontractor with the scope of work for chiller/compressor plant 82. . The complete plant erection package—provided by the contractor—reflects that all codes, requirements, and regulations were followed during the design of chiller/compressor plant 82. Chiller/compressor plant 82 employs a variety of construction methods, including reinforced concrete, structural



steel frame, and other non-combustible materials throughout. The exterior wall and roof systems are an insulated metal panel assembly. The exterior walls are non-bearing, foam-insulated core metal panels. Some of the exterior panels are solid, removable panels and some are louvered panels located behind each major piece of equipment in the north, east, and south walls. The exterior wall system for the entire structure is non-bearing, non-rated, and non-combustible metal sandwich panels over structural girt and framing.

The deliverable from the subcontractor provided BSII with documents and drawings reviewed by the subcontract technical representative. The chiller/compressor plant 82 design is in compliance with requirements for allowable height, allowable area, fire resistance, exterior wall protection, and opening protection per 24590-BOF-RPT-ENG-01-001, *Building Code Evaluations for BOF*.

The chiller/compressor plant 82 foundation and the at-grade floor slab are constructed of reinforced concrete to support plant columns, pipe rack columns, pipe supports, and equipment. The floor slab has embedded coaxial piping to support facility operations. The plant and associated equipment foundation designs are detailed in the following list of vendor documents. Included in this list are the vendor submitted as-built building details, contract documents, design drawings, and calculations. Some vendor drawings may deviate from current installation due to constructability. Change documents against the applicable vendor submittals have been created to show these deviations but are not included in the following list. These changes meet the standard requirements for the WTP Project.

- 24590-B82-E22-E54T-00001, *Chiller Compressor Plant Electrical Underground Conduit Plan - Area 1*
- 24590-B82-E22-E54T-00002, *Chiller Compressor Plant Electrical Underground Conduit Plan - Area 2*
- 24590-B82-E22-E54T-00003, *Chiller Compressor Plant Electrical Underground Conduit Plan - Area 3*
- 24590-B82-E22-E54T-00004, *Chiller Compressor Plant Electrical Underground Conduit Plan - Area 4*
- 24590-B82-E22-E54T-00005, *Chiller Compressor Plant Electrical U.G. Conduit Sections and Details*
- 24590-B82-E22-GRE-00001, *Chiller Compressor Plant Electrical Grounding Plan Area 1*
- 24590-B82-E22-GRE-00002, *Chiller Compressor Plant Electrical Grounding Plan Area 2*
- 24590-B82-E22-GRE-00003, *Chiller Compressor Plant Electrical Grounding Plan Area 3*
- 24590-B82-E22-GRE-00004, *Chiller Compressor Plant Electrical Grounding Plan Area 4*
- 24590-BOF-DBC-82-00001, *Chiller Compressor Plant MAT Foundation Design*
- 24590-BOF-DBC-82-00002, *Chiller/Compressor Plant-Pipe Rack Segments 1, 2 & 5 Anchorage Design*
- 24590-BOF-DBC-82-00003, *Chiller/Compressor Plant Pipe Rack Segment # 3 and # 4 Anchorage Design*
- 24590-BOF-DBC-82-00004, *Chiller Compressor Plant Building Column Anchorage Design*
- 24590-BOF-DBC-82-00005, *Chiller/Compressor Plant-Sleeper Anchor Design*
- 24590-BOF-DBC-82-00006, *Chiller/Compressor Plant Equipment Anchorage*
- 24590-BOF-DBC-82-00007, *Chiller Compressor Plant: Post Installed Anchor Design for Equipment Anchorage*
- 24590-BOF-DBC-82-00011, *Chiller Compressor Plant FNJ-ENCL-00088 Anchorage*
- 24590-BOF-DB-S13T-00008, *Chiller/Compressor Plant MAT Foundation Reinforcement Plan and Section*
- 24590-BOF-DB-S13T-00009, *Chiller/Compressor Plant MAT Foundation Reinforcement Details and Sections*
- 24590-BOF-DB-S13T-00010, *Chiller/Compressor Plant MAT Foundation Floor Slab Plan at EL 0'-0"*
- 24590-BOF-DB-S13T-00011, *Chiller/Compressor Plant MAT Foundation Equipment and Column Bolt Setting Plans, Sections and Details*
- 24590-BOF-DB-S13T-00012, *Chiller/Compressor Plant MAT Foundation Equipment Bolt Setting Plans, Sections and Details*
- 24590-BOF-DB-S13T-00041, *Chiller/Compressor Plant NLD Sump & Equipment Pads and Details*
- 24590-BOF-DB-S13T-00046, *Chiller/Compressor Plant Mat Foundation Pipe Rack/Pipe Sleepers Bolt Setting Plan, Embed Plates and Drains*
- 24590-BOF-DB-S13T-00048, *Chiller/Compressor Plant Mat Foundation Reinforcement Details and Sections*
- 24590-BOF-DB-S13T-00074, *Chiller/Compressor Plant Concrete Mat Foundation Sections & Details*
- 24590-BOF-P1-50-00002, *RPP-WTP Equipment Location Plan Chilled Water Booster Pumps Partial Plans*

- 24590-BOF-P1-50-00003, *RPP-WTP Equipment Location Plan SCW Pumping Trap Skid Partial Plans*
- 24590-BOF-P1-82-00001, *Chiller/Compressor Plant General Arrangement Roof Plan*
- 24590-BOF-P1-82-00002, *Chiller/Compressor Plant General Arrangement Plan at Grade*
- 24590-BOF-P1-82-00003, *Chiller/Compressor Plant General Arrangement Sections A, B & C*
- 24590-BOF-P1-82-00004, *Chiller/Compressor Plant General Arrangement Sections D, E & F*
- 24590-BOF-P1-82-00005, *Chiller/Compressor Plant Equipment Location Roof Plan*
- 24590-BOF-P1-82-00006, *Chiller/Compressor Plant Equipment Location Plan at Grade*
- 24590-BOF-P1-82-00007, *Chiller/Compressor Plant Equipment Location Sections A, B & C*
- 24590-BOF-P1-82-00008, *Chiller/Compressor Plant Equipment Location Sections D, E & F*
- 24590-BOF-P1-82-00009, *Chiller/Compressor Plant Equipment Location Point of Support/Schedule/General Notes*
- 24590-BOF-SSC-S15T-00008, *Chiller/Compressor Plant - Pipe Sleeper Steel Design*
- 24590-BOF-SSC-S15T-00009, *Chiller/Compressor Plant Utility Rack Steel and Connection Design*
- 24590-BOF-SSC-S15T-00014, *Guardrail Design for Buildings 82, 85 and 86*
- 24590-CM-FC3-AKBP-00001-31-00060, *Chiller Compressor Plant Building-Building #82-Insulated Panels (13121)*
- 24590-CM-FC3-AKBP-00001-31-00065, *Chiller Compressor Plant Building - Building No. 82 - Controls and Instrumentation - Product Data and Wiring Diagram (15900)*
- 24590-CM-FC3-AKBP-00001-31-00066, *Chiller Compressor Plant Building - Building No. 82 - Lighting Fixtures, Lamps, Relay Panel, Remote Switching Stations, Photocell-Product Data (16510-001-002-003)*
- 24590-CM-FC3-AKBP-00001-31-00068, *Chiller Compressor Plant Building - Building No. 82 - Unit Heater - Product Data (15500)*
- 24590-CM-FC3-AKBP-00001-31-00069, *Supplier Document - B82 LVE-Pnl-82001b with Grounding Bus Kit*
- 24590-CM-FC3-AKBP-00001-31-00070, *Chiller Compressor Plant Building - Building No. 82 - Mechanical Identification - Accent Signs and Engraving - Product Data (15190)*
- 24590-CM-FC3-AKBP-00001-31-00073, *Chiller Compressor Plant Building - Bldg. No. 82 - HM Doors and Frames, Product Data (08100)*
- 24590-CM-FC3-AKBP-00001-31-00085, *Chiller Compressor Plant Building - Bldg 82 - Roof Curbs - Product Data, Calculations, Shop Drawings (13121)*
- 24590-CM-FC3-AKBP-00001-31-00086, *Chiller Compressor Plant Building - Bldg 82 - Exhaust Fans - Product Data (15500)*
- 24590-CM-FC3-AKBP-00001-31-00087, *Chiller Compressor Plant Building - Bldg. No. 82 - Louver Product Data and Shop Drawings*
- 24590-CM-FC3-AKBP-00001-31-00088, *Chiller Compressor Plant Building - Building No 82 - Overhead Door - (08360)*
- 24590-CM-FC3-AKBP-00001-31-00089, *Chiller Compressor Plant Building - Building No 82 - Window Glazing Product Data-(08800)*
- 24590-CM-FC3-AKBP-00001-31-00091, *Chiller Compressor Plant - Building #82 - Flashing and Sheet Metal - Product Data (07600)*
- 24590-CM-FC3-AKBP-00001-31-00093, *Chiller Compressor Plant Building - Bldg. No. 82 - Joint Sealers - Product Data (07900)*
- 24590-CM-FC3-AKBP-00001-31-00095, *Chiller Compressor Plant Building - Bldg. No. 82 - Lightning Protection Product Data (16610)*
- 24590-CM-FC3-AKBP-00001-31-00096, *Chiller Compressor Plant Building - Bldg. No. 82 - Electrical Conduits and Conductors (Section 16100)*
- 24590-CM-FC3-AKBP-00001-31-00098, *Chiller Compressor Plant Building - Bldg. No. 82 - Electrical Grounding (Section 16450)*
- 24590-CM-FC3-AKBP-00001-31-00105, *Chiller Compressor Plant Building - Bldg. 82 - Electrical Wiring Devices Product Data (16141)*
- 24590-CM-FC3-AKBP-00001-31-00106, *Chiller Compressor Plant Building - Bldg. 82 - Electrical Safety Switches Product Data (16010/16100)*

- 24590-CM-FC3-AKBP-00001-31-00110, Chiller Compressor Plant Building - Bldg. 82 - Electrical - NEMA 12 Materials - Product Data (16141)
- 24590-CM-FC3-AKBP-00001-31-00111, Chiller Compressor Plant Building - Bldg. 82 - Structural Grating for Intake Filter Platforms - Product Data (05500)
- 24590-CM-FC3-AKBP-00001-31-00112, Chiller Compressor Plant Building - Bldg. No. 82 - Light Gage Metal Framing (05400)
- 24590-CM-FC3-AKBP-00001-31-00113, Chiller Compressor Plant Building - Bldg. No. 82 - Roof Curb Flashing and Cricket Details - Product Data (13121)
- 24590-CM-FC3-AKBP-00001-31-00118, Chiller Compressor Plant Building - Building No. 82 - Gypsum Board Product Data (09250)
- 24590-CM-FC3-AKBP-00001-31-00120, Chiller Compressor Plant Building - Bldg. No. 82 - Safety- Walk Product Data (13121)
- 24590-CM-FC3-AKBP-00001-31-00134, Chiller Compressor Plant Building (CCP) - Bldg. 82 - Exhaust Fan Rigging & Lifting Information (Reference Submittal 24590-CM-FC3-AKBP-00001-31-00086)
- 24590-CM-FC3-AKBP-00001-31-00135, Chiller Compressor Plant Building - Bldg. #82 - Testing Report for Lifting Beam Device for CCP Cable Tray Supports
- 24590-CM-FC3-AKBP-00001-31-00136, Chiller Compressor Plant Building (CCP) - Bldg. 82 - CCP Cable Tray Unistrut Support Product Data (16000)
- 24590-CM-FC3-AKBP-00001-31-00138, Chiller Compressor Plant Building - Bldg. 82 - Controls and Instrumentation- Outdoor Air Sensor (Reference Submittal 24590-Cm-Fc3-Akbp-00001-31-00065)
- 24590-CM-FC3-AKBP-00001-31-00145, Chiller Compressor Plant Building - Building No. 82 - Resilient Wall Base Sample (09653)
- 24590-CM-FC3-AKBP-00001-31-00153, Chiller Compressor Plant Building - Bldg. #82 - Roof Ladder and Cages
- 24590-CM-FC3-AKBP-00001-31-00171, Chiller Compressor Plant - Bldg. 82 - Paint Product Data CCP Building
- 24590-CM-FC3-AKBP-00001-49-00044, Chiller Compressor Plant - Building 82 - Erection Drawings - 100% Package (13121)
- 24590-CM-FC3-AKBP-00001-49-07, Chiller Compressor Plant Building - Building #82 - Reaction Loads, Design and Calculations
- 24590-CM-FC3-AKBP-00001-59-08, Chiller Compressor Plant - Building No. 82 - 100% HVAC Calculations
- 24590-CM-FC3-AKBP-00001-61-00018, BOF Chiller Compressor Plant - Building #82 - Electrical Lighting Protection Plan Drawing, BOF-82-LP-01
- 24590-CM-FC3-AKBP-00001-61-00019, BOF Chiller Compressor Plant - Building #82 - Roof Plan - BOF-82-A-04
- 24590-CM-FC3-AKBP-00001-61-00036, BOF Chiller Compressor Plant - Building #82 - Roof Plan - BOF-82-E-04
- 24590-CM-FC3-AKBP-00001-61-00044, Chiller Compressor Plant Building-Building #82 - Metal Wall and Roof Panel Shop Drawing, Removable Frame Calculations and Shop Drawings (Sections 05500 & 13121)
- 24590-CM-FC3-AKBP-00001-61-00046, Chiller Compressor Plant Building - Building No. 82 - Overhead Door - Shop Drawings-(08360)
- 24590-CM-FC3-AKBP-00001-61-00048, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Material List - CT-SK-01
- 24590-CM-FC3-AKBP-00001-61-00049, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-02
- 24590-CM-FC3-AKBP-00001-61-00050, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-03
- 24590-CM-FC3-AKBP-00001-61-00051, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-04
- 24590-CM-FC3-AKBP-00001-61-00052, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-05

- 24590-CM-FC3-AKBP-00001-61-00053, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-06
- 24590-CM-FC3-AKBP-00001-61-00054, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-07
- 24590-CM-FC3-AKBP-00001-61-00055, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-08
- 24590-CM-FC3-AKBP-00001-61-00056, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-09
- 24590-CM-FC3-AKBP-00001-61-00057, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-10
- 24590-CM-FC3-AKBP-00001-61-00058, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-11
- 24590-CM-FC3-AKBP-00001-61-00059, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Details - CT-SK-12
- 24590-CM-FC3-AKBP-00001-61-00060, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Details - CT-SK-13
- 24590-CM-FC3-AKBP-00001-61-00061, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Details - CT-SK-14
- 24590-CM-FC3-AKBP-00001-61-00062, Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Details- CT-SK-15
- 24590-CM-FC3-AKBP-00001-61-00063, Chiller Compressor Plant Building - Bldg. No. 82 - Cable Tray Supports - Drawing CT-SK-17 - Cable Tray Support Details
- 24590-CM-FC3-AKBP-00001-61-00064, Chiller Compressor Plant Building - Bldg. No. 82 - Cable Tray Supports - Drawing CT-SK-16 - Cable Tray Support Details
- 24590-CM-FC3-AKBP-00001-61-00065, Chiller Compressor Plant Building - Building #82 - Roof Ladder and Platform Sketch Fabrication, Construction - MI-21662-01
- 24590-CM-FC3-AKBP-00001-61-00066, Chiller Compressor Plant Building - Building #82 - Roof Ladder and Platform Sketch Fabrication, Construction - MI-21662-02
- 24590-CM-FC3-AKBP-00001-61-09, Chiller Compressor Plant - Building #82 - Floor Plan, Notes & Legend - BOF-82-A-01
- 24590-CM-FC3-AKBP-00001-61-10, BOF Chiller Compressor Plant - Building #82 - Exterior Elevation & Sections- BOF-82-A-02
- 24590-CM-FC3-AKBP-00001-61-11, BOF - Chiller Compressor Plant Building - Bldg #82 - Exterior Elevations & Schedules - BOF-82-A-03
- 24590-CM-FC3-AKBP-00001-61-12, Chiller Compressor Plant - Bldg. #82 - Notes, Legend, & Schedules - BOF-82-M-01
- 24590-CM-FC3-AKBP-00001-61-13, BOF Chiller Compressor Plant - Building #82 - HVAC Plan - BOF-82-M-02
- 24590-CM-FC3-AKBP-00001-61-14, BOF Chiller Compressor Plant - Building #82 - Notes, Legend, Schedules & Details - BOF-82-E-01
- 24590-CM-FC3-AKBP-00001-61-15, BOF Chiller Compressor Plant - Building #82 - Power Plan BOF-82-E-02
- 24590-CM-FC3-AKBP-00001-61-16, BOF Chiller Compressor Plant - Building #82 - Lighting Plan - BOF-82-E-03
- 24590-CM-FC3-AKBP-00001-64-01, Base Plate Design Calculations for Building 87, 91 and 82
- 24590-CM-FC3-AKBP-00001-65-01, As-Built - Specifications - Chiller Compressor Plant - Building #82 - Project Specifications
- 24590-CM-FC3-AKBP-00001-69-00003, Bldg 82, Chiller Compressor Plant - 100% Design Lighting Calculation
- 24590-CM-FC3-AKBP-00001-69-00009, Chiller Compressor Plant Building - Bldg #82 - Wall and Roof Panel Structural Calculations

- 24590-CM-FC3-AKBP-00001-69-00011, *Chiller Compressor Plant Building - Bldg. No. 82 - Louver Calculations Letter of Clarification (Reference: 24590-CM-FC3-AKBP-00001-59-08 Rev 00C)*
- 24590-CM-FC3-AKBP-00001-69-00012, *Chiller Compressor Plant Building - Bldg. 82 - Hoisting and Rigging Calculation for Lifting Beam for Cable Tray Supports*
- 24590-CM-FC3-AKBP-00001-69-00014, *Chiller Compressor Plant Building - Bldg. 82 - Cable Tray Supports Structural Calculations*
- 24590-CM-FC3-AKBP-00001-69-00015, *Chiller Compressor Plant Building - Bldg. No. 82 - Roof Tie-Off Point Calculation*
- 24590-CM-FC3-AKBP-00001-69-02, *Chiller Compressor Plant Building # 82-Electrical Calculations*
- 24590-CM-FC3-AKBP-00001-70-00006, *Chiller Compressor Plant Building – Building 82 Base Plate Repair Procedure*
- 24590-CM-FC3-AKBP-00001-70-00007, *Chiller Compressor Plant Building – Building 82 – Welding Procedure for Shielded Arc Welding of Carbon Steel 1/8th Through 1-1/2in Thick*
- 24590-CM-FC3-AKBP-00001-70-00008, *Type A Pre-Engineered Metal Buildings 82, 86, 87 & 91 - Wall and Roof Panel Repair Procedure (13121)*
- 24590-CM-FC3-AKBP-00001-72-00003, *Material Sample of - Chiller Compressor Plant Building - Building 82 - Color Chips for Wall & Roof Panels*
- 24590-CM-FC3-AKBP-00001-81-00001, *Chiller/Compressor Plant Building 82 - UBC/NFPA 101 Code Evaluations*
- 24590-CM-TSA-DG01-00001-05-00069, *Balance of Facilities - Chiller Compressor Plant, 4.16kv Electrical Duct Bank, Area 2*
- 24590-CM-TSA-DG01-00001-05-00070, *Balance of Facilities - Chiller Compressor Plant, 4.16kv Electrical Duct Bank, Area 3*
- 24590-CM-TSA-DG01-00001-05-00071, *Balance of Facilities - Chiller Compressor Plant, 4.16kv Electrical Duct Bank, Area 4*
- 24590-CM-TSA-DG01-00001-05-00072, *BOF (Balance of Facilities) - Chiller Compressor Plant, Basemat Foundation, Bottom Steel*
- 24590-CM-TSA-DG01-00001-05-00073, *BOF (Balance of Facilities) - Chiller Compressor Plant, Basemat Foundation, Top Steel*
- 24590-CM-TSA-DG01-00001-05-00074, *BOF (Balance of Facilities) - Chiller Compressor Plant, Basemat Foundation, Additional Steel*
- 24590-CM-TSA-DG01-00001-05-00075, *BOF (Balance of Facilities) - Chiller Compressor Plant, Basemat Foundation, Pedestal Steel*
- 24590-CM-TSA-DG01-00001-05-00078, *BOF (Balance of Facilities) - Chiller Compressor Plant Basemat Foundation Support Steel*
- 24590-CM-TSA-DG01-00001-05-00079, *BOF (Balance of Facilities) - Chiller Compressor Plant Basemat Foundation Additional To #BOF00S1061*
- 24590-CM-TSA-DG01-00001-05-00080, *BOF (Balance of Facilities) - Chiller Compressor Plant Basemat Foundation Additional to #BOF00S1059*
- 24590-CM-TSA-DG01-00001-05-00083, *BOF (Balance of Facilities) - Chiller Compressor Plant Basemat Foundation Additional Steel for Anchor Bolts*
- 24590-CM-TSA-DG01-00001-05-00123, *BOF - Chiller Compressor Plant Basemat Foundation Concrete Aprons and Pads*
- 24590-CM-TSA-DG01-00001-05-00124, *BOF (Balance of Facilities) Chiller Compressor Plant Basemat Foundation Pedestal Steel - Additional to #BOF00S1062*

#### 6.2.15.1.1 Wall Penetrations

Chiller/compressor plant 82 was designed with removable wall panels for ease of large equipment installation and removal. These panels are 16 ft wide by 20 ft high. On the north side of the building there are six solid panels and three louvered panels. On the east side, there are three solid panels and two louvered panels. On the south side

there are four solid panels and three louvered panels. The west side of the building is equipped with a rollup door for access.

Other large penetrations in the walls of chiller/compressor plant 82 are utility pipe header wall openings and ventilation fan openings. Facing the west side of the building, there are three large rectangular ground pipe header wall openings. The first is on the left side and starts about 1 ft 9 in. off the ground. The opening is 3 ft 4 in. tall by 4 ft 5 in. wide and facilitates the 24 in. diameter plant service air return line. At 7 ft 10 in. to the right of the first opening is a 3 ft 4 in. by 3 ft 4 in. opening for the 24 in. diameter returning chilled water line. Directly above the rollup door in the middle of the west wall of the plant, at approximately 30 ft off the ground, is an opening for the exhaust fan discharge, measuring 4 ft 3.75 in. by 4 ft 3.75 in. To the right of the rollup door and the entrance door, a 5 ft high by 12 ft 10 in. wide opening sets 3 in. off the ground. This opening is for plant cooling water and chilled water. Exiting the left side of the opening is the outgoing 24 in. diameter chilled water supply line. Just to the right of the chilled water line is the 48 in. diameter plant cooling water return line. Just to the right of the plant cooling water return line is the 48 in. diameter plant cooling water supply line.

### 6.2.15.2 Systems

Chiller/compressor plant 82 houses major equipment for the PSA, ISA, and CHW, all providing utility services for the WTP. The systems include equipment and piping in chiller/compressor plant 82 and yard distribution piping up to the battery limits (5 ft distance) of process buildings and other support facilities. The process buildings include the PT, LAW, and HLW facilities; the Lab; and other support facilities. Drawing 24590-BOF-P1-82-00002, *Chiller/Compressor Plant General Arrangement Plan at Grade*, shows the general arrangement of chiller/compressor plant 82.

One central NLD sump, two pumps, and associated discharge piping are an integral part of chiller/compressor plant 82. Cooling water is supplied to the chillers for heat extraction by the PCW lines. The BOF CHW uses plant service water and PSW for the initial fill and subsequent makeup for the feedwater closed loop circuit. The chilled water for the CHW is generated and distributed from chiller/compressor plant 82. The compressed air for the PSA is also generated and distributed from this building. The DOW is supplied to the Chiller/Compressor plant 82 for the safety shower(s), water heater, and eyewash station(s).

The BOF scope of PSA provides a continuous supply of clean, dry air in the proper quantity and pressure to the process buildings (PT, HLW, and LAW facilities), the Lab, and other plant support facilities. Major components of the system consist of air compressors, dryers, receivers, and distribution piping (refer to drawing series 24590-BOF-M6-PSA-0000100X, 24590-BOF-M6-PSA-000020XX, 24590-BOF-M6-PSA-000030XX, 24590-BOF-M6-PSA-000040XX, 24590-BOF-M6-PSA-0000500X, and 24590-BOF-M6-PSA-0000600X). Each process building has its own compressed air distribution system, supplied by BOF plant service air. Within each process building and other BOF support facilities, service air is split into instrument and/or plant air and is distributed to various points of application in the building.

The BOF CHW provides a continuous supply of chilled water in the proper quantity, pressure, and temperature to the process buildings (PT, HLW, and LAW), the Lab, and other plant support facilities. The system is a closed loop. Separate primary and secondary circuits in the process facilities are provided as part of the process facility design for cooling circuits associated with equipment in contact with radioactive material. The major components of the system consist of package chiller units and distribution pumps (refer to drawing series 24590-BOF-M6-CHW-0000100X, 24590-BOF-M6-CHW-0000200X, 24590-BOF-M6-CHW-0000300X, and 24590-BOF-M6-CHW-0000400X).

The system locators are described in 24590-WTP-RPT-ENG-02-009, *Systems and Area Locators List and System Division of Responsibility*. The systems in chiller/compressor plant 82 are described in the following:

- NLD, 24590-WTP-3YD-NLD-00001, *System Description for the Waste Treatment Plant Non-Radioactive Liquid Waste Disposal (NLD) System*
- CHW, 24590-WTP-3YD-CHW-00001, *System Description for Lab, BOF, LAW, HLW and BOF-Supplied PTF Chilled Water System (CHW)*
- DOW, 24590-WTP-3YD-DOW-00001, *System Description for the Waste Treatment Plant Domestic Water System (DOW)*
- C1V, 24590-BOF-3YD-C1V-00002, *System Description for the BOF CIV Systems*
- FSW, FPW, and FDE; 24590-WTP-3YD-FSW-00001, *System Description for the Fire Service Water (FSW), Fire Protection Water (FPW), and the Fire Detection and Alarm (FDE) Systems*
- PCW, 24590-WTP-3YD-PCW-00001, *System Description for the WTP Plant Cooling Water System (PCW)*
- PSW, 24590-WTP-3YD-PSW-00001, *System Description for the Process Service Water System (PSW)*
- PSA, 24590-WTP-3YD-PSA-00002, *System Description for the Waste Treatment Plant (WTP) Plant Service Air (PSA) System*
- MVE, 24590-WTP-3ZD-MVE-00001, *LAW BOF and Lab Medium Voltage Electrical (MVE) Low Voltage Electrical (LVE) and DC Electrical (DCE) System Design Description*
- LVE, See MVE
- DCE, See MVE
- UPE, 24590-WTP-3YD-UPE-00001, *System Description for the UPE Power System*
- LTE, 24590-WTP-3YD-LTE-00001, *System Description for Lighting Systems (LTE)*
- PCJ, MHJ, and ASJ; 24590-WTP-3ZD-PCJ-00001, *Process Control (PCJ), Mechanical Handling Control (MHJ), and Autosampling Control (ASJ) System Design Discription*
- CME and FNJ; 24590-WTP-3YD-CME-00001, *System Description for the Communications Electrical System (CME) and Facility Network Infrastructure (FNJ)*
- GRE, 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lightning Protection System*

### 6.2.15.3 Facility Interfaces

Chiller/compressor plant 82 receives 4.16 kV, MVE power from BOF switchgear building 91.

The CHW equipment located in chiller/compressor plant 82 receives its initial and makeup water for the cooling medium from the PSW. The CHW pumps distribute cooling water to all major WTP facilities.

The PSA equipment located in chiller/compressor plant 82 include four centrifugal-compressor packages, four rotary-screw-compressor packages, five heat-of-compression dryer packages, two BOF PSA air receivers, and the BOF PSA distribution piping network. Leaving chiller/compressor plant 82 is the 24 in. main PSA supply line that supplies the yard-distribution loop.

The chiller/compressor plant 82 design incorporates features and capabilities necessary to ensure efficient WTP operations and meets the permitting, process control, authorization basis, and waste form qualification requirements as defined in the baseline document 24590-WTP-PL-G-01-001, *Functional Specification*. Chiller/compressor plant 82 provides protection from chemical hazards, protection from industrial hazards, and protection for the environment.

#### 6.2.15.4 Utilities

##### 6.2.15.4.1 Power

BOF switchgear building 91 provides the 4.16kV, MVE source power running all equipment. The chiller/compressor plant 82 is powered by 4.16 kV, MVE power feeding all the compressors and chillers (starters) and by 480V LVE-LC feeding all the LVE-MCCs for plant pumps (starters). LVE-MCC also supports the UPE-UPS needs in this facility.

##### 6.2.15.4.2 Lighting

A complete and operable lighting system is provided in chiller/compressor plant 82 in accordance with NFPA 70, *National Electric Code*, Sections 410 and 700; *IESNA Lighting Handbook* (IESNA 2000); NFPA 101 (1997 and 2000 Editions); and ANSI/IESNA RP-7.

Both normal and emergency lighting is provided. Fixtures are selected from the electrical lighting fixture schedule. Non-standard fixture selection is designed per the individual requirements of each facility.

All lighting fixtures are compatible with the environment in which they are installed (areas subject to decontamination, outdoor areas, radiation, etc.). Lighting fixtures installed in industrial areas and subjected to possible physical damage are equipped with appropriate protection.

The details of light locations for chiller/compressor plant 82, types of lighting used, and the exact location of all the light fixtures are provided in drawing 24590-CM-FC3-AKBP-00001-61-16, *BOF Chiller Compressor Plant - Building #82 - Lighting Plant - BOF-82-E-03*, and calculation 24590-CM-FC3-AKBP-00001-69-00003, *Bldg 82, Chiller Compressor Plant - 100% Design Lighting Calculation*.

Five rows of 10 light fixtures, spanning east to west, provide lighting for chiller/compressor plant 82. The first row of fixtures is offset 12 ft 6 in. from the north wall. The second row is 35 ft south of the first row. Row 3, at the centerline of the plant, is spaced another 35 ft from row 2. Row 4 is another 35 ft south of row 3, and row 5 is another 35 ft south of row 4. Above the egress exit, a combination of emergency lights and exit signs are installed. Four wall pack light fixtures are evenly spaced across the outside top of the north wall. Four wall pack light fixtures are evenly spaced across the outside top of the south wall. Three wall pack light fixtures are evenly spaced across the outside top of the east wall. Three wall pack light fixtures are evenly spaced across the outside top of the west wall.

##### 6.2.15.4.3 Ventilation

Chiller/compressor plant 82 is provided with eight roof-mounted exhaust fans. The roof-mounted exhaust fans are sized to exhaust enough air from the area to limit the summer temperature at no greater than 10°F above the outdoor design temperature of 101°F. Thermostats with staggered set points (from 74°F to 86°F in increments of 4°F) start the roof-mounted exhaust fans when the room temperature is above its set point. Each thermostat operates two exhaust fans. The external temperature sensor is located in the middle of the north side of the building at 6 ft off the ground as shown in 24590-CM-FC3-AKBP-00001-31-00138, *Chiller Compressor Plant Building - Bldg. 82 – Controls and Instrumentation – Outdoor Air Sensor (Reference Submittal 24590-CM-FC3-AKBP-00001-31-00065)*.



Chiller/compressor plant 82 is also provided with a wall-mounted exhaust fan to provide continuous ventilation at 0.5 cfm per square foot of floor area, in accordance with the *2012 Uniform Mechanical Code (IAPMO 2012)*. The exhaust fan includes a backdraft damper and a galvanized weather hood.

An electric unit heater is provided in the fire riser room to provide heating and keep the fire water valve from freezing. The unit heater is provided with an integral thermostat, which activates the unit heater when the room temperature gets lower than the set point.

A more detailed description can be found in 24590-BOF-3YD-C1V-00002.

#### 6.2.15.4.4 Fire Protection

A fully automatic pipe sprinkler system is provided throughout chiller/compressor plant 82. A fire detector is installed above the fire alarm control panel (FACP), and fire alarm systems supervise the fire protection systems. These systems meet the requirements of NFPA and FM data sheets.

The fire riser room (CC-0102) is a small room located in the southeast corner of chiller/compressor plant 82 and shown in drawing 24590-BOF-P1-82-00006, *Chiller/Compressor Plant Equipment Location Plant at Grade*. The fire riser room has a separate entrance from the south side of the building. The fire riser room houses the fire riser for the wet fire suppression system and is connected to the FSW system. The fire department connection (FDC) is located outside of the fire riser room entry door. The following fire protection equipment is located in the fire riser room:

- FDE-PNL-82001: fire alarm control panel fire alarm system
- FDE-PNL-82100: fiber optic patch panel fire alarm system
- FDE-PNL-82002: digital audio amplifier fire alarm system
- FDE-PNL-82003: field charger power support fire alarm system
- FDE-PNL-82004: field charger power support fire alarm system
- C1V-UH-00036: unit heater

The main control valve for the fire protection system is located in the fire riser room. Details of the fire protection system are listed in the following documents:

- 24590-CM-HC1-PY21-00001-11-00007, *Fire Protection Plan for CCP Building (Bldg. 82)* – page 1 of 2
- 24590-CM-HC1-PY21-00001-11-00008, *Fire Protection Details for CCP Building (Bldg. 82)* – page 2 of 2
- 24590-CM-HC1-PY21-00002-10-00223, *Bldg 82 Piping Plan (82 00002)*
- 24590-CM-HC4-JQ05-00001-T01-01-00008, *Chiller Compressor Plant - Building 82 - Fire Alarm System - Plan View*

#### 6.2.15.4.5 Lightning Protection and Grounding

Lightning protection is provided for chiller/compressor plant 82. Arrangement of ground rod, lightning protection conductors, and grounding/ counterpoise conductors are demonstrated in drawing 24590-CM-FC3-AKBP-00001-61-00018, *BOF Chiller Compressor Plant - Building #82 – Electrical Lighting Protection Plan BOF-82-LP-01*. The lightning protection system description is discussed in detail in 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lighting Protection System*.

### 6.2.15.5 Energy Conservation

Chiller/compressor plant 82 is designed in accordance with the energy conservation requirements set forth in ASHRAE 90.1. Exterior openings are sealed to minimize air leakage.

### 6.2.15.6 Health and Safety

#### 6.2.15.6.1 Communications

An intra-building public address and telephone communication system is provided for chiller/compressor plant 82. Visual and/or audio alarms are located in the plant as shown on the following drawing:

- 24590-B82-EF-CME-00007, *BOF Chiller/Compressor Plant Communication Layout Plan Building 82*

#### 6.2.15.6.2 Means of Egress

Chiller/compressor plant 82 is defined as a special-purpose industrial occupancy per NFPA 101. Consistent with Section 10 of DOE-STD-1066-97, compliance with NFPA 101 is considered to satisfy the exit requirements of the applicable building code and the fire protection basis of design. Means of egress and other life safety provisions are designed in accordance with NFPA 101. Chiller/compressor plant 82 has 5 distinct egress doors at elevation +683 ft. Eight feet wide by 10 ft high double doors are located in each corner of the building, each protected by two interior and two exterior bollards. There is one 3 ft by 7 ft worker door on the west side of the building adjacent to the central rollup door also protected by two interior and two exterior bollards.

The structure evaluation concluded that the egress capacity of exits meets or exceeds the required minimum width. Travel distances to the closest exit in the building, 65 ft, are within the maximum travel distance allowed by NFPA 101, *Life Safety Code*. Common paths of travel in chiller/compressor plant 82 are within the maximum allowed (24590-BOF-RPT-ENG-01-001, *Building Code Evaluation for BOF*).

Locations of exit doors are shown in the general arrangement plan and architectural design drawings, and are in accordance with architectural design criteria. Continuous and unobstructed access to the exits is available from the operational area floor and each of these exits discharges outdoors at grade level. Exit signs are posted. Integral, self-contained, dry battery packs and inverters compose each lighting fixture identified as egress lighting.

#### 6.2.15.6.3 High Noise Areas

Chiller/compressor plant 82 may require PPE for entry. Other high-noise areas within chiller/compressor plant 82 are designed to provide sufficient space to accommodate additional noise reduction equipment (if needed), and/or communications equipment (such as acoustical booths, loud ringers, visual signaling devices, speakers, or speaker phones) if needed. Exemptions may be granted by the operations facility lead or commissioning operations manager. High noise areas will be determined or designated during startup and operations.

#### 6.2.15.6.4 Portable Fire Extinguishers

Portable fire extinguishers are provided in accordance with NFPA 10. These fire extinguishers are placed in easily accessible locations (near exit doors, along routes of travel, etc.). Fire extinguishers are selected for the class of hazards to be protected and are located in semi-recessed or surface mounted cabinets. Field sketches currently document the location of extinguishers while under construction (24590-WTP-FSK-CON-T-13-00005001, *Field Sketch - RPP-WTP - Building 82 Chiller/Compressor Fire Extinguisher Layout*). The permanent plant design document establishing the number, type, and location of fire extinguishers in chiller/compressor plant is 24590-B82-U2-M36T-00001, *Chiller/Compressor Plant Fire Protection Fire Extinguisher Locations*.

#### 6.2.15.6.5 Access

Access to areas within chiller/compressor plant 82 are facilitated and controlled by the following:

- Five personnel doors at primary entry and exit
- One rollup door
- Lighted exit signs at exit doors
- Access door locks

#### 6.2.15.6.6 Building Code

Chiller/compressor plant 82 is classified and constructed as Type II Noncombustible (II-N) construction per Table 6-A in the UBC. Chiller/compressor plant 82 is considered a Special Purpose Industrial Occupancy per NFPA 101, *Life Safety Code*, Section 28-1.4.1 (b), Group F Division 2 Occupancy with building elements nonrated, except shaft enclosures are 1-hour. This building design is in compliance with requirements for allowable height, allowable area, fire resistance, exterior wall protection, and opening protection. Egress capacity of exits meets or exceeds the required minimum width. A travel distance of 65 ft in the building is within the maximum travel distance allowed by NFPA 101, *Life Safety Code*.

#### 6.2.15.6.7 Hazards

General site hazards are discussed in 24590-BOF-RPT-ENS-12-002.

##### 6.2.15.6.7.1 Radioactive/Contamination Hazards

There are no radiation or contamination hazards identified in chiller/compressor plant 82.

##### 6.2.15.6.7.2 Chemical Hazards

The BOF CHW components and lines contain corrosion inhibitors, scale inhibitors, and pH adjustment chemicals, as needed, to limit deterioration of the materials in contact with the cooling medium and the fouling of heat-transfer surfaces. An eye wash and safety shower is located next to the chemical addition tank in chiller/compressor plant 82.

#### 6.2.15.6.8 Personal Safety Features

Chiller/compressor plant 82 provides the following industrial safety design features to ensure personnel safety and minimize industrial safety concerns.

##### 6.2.15.6.8.1 Refrigerant Leak Detection System

To detect refrigerant leaks and protect personnel and the environment, chiller/compressor plant 82 is equipped with a refrigerant leak detection unit capable of sensing gas leaks as low as 1 part-per-million (ppm). The unit is wall mounted around the area to be serviced and can be linked to multiple alarms for leak notification. It is factory calibrated to detect one type of refrigerant. The alarm is triggered at each of the following detection concentrations: 9, 29, and 700 ppm. The Chillgard RT Refrigerant Monitor can monitor up to 8 individual locations at a distance of approximately 150 ft from the unit. Further details of the Chillgard RT Refrigerant Monitor system can be found in 24590-WTP-3YD-CHW-00001, *System Description for the WTP Chilled Water System (CHW)*, and 24590-CM-POA-MERK-00001-10-07, *Manual - Chillgard RT Photoacoustic Infrared Refrigerant Monitor*. An emergency refrigerant purge fan with visual and audible alarms serving the chiller area automatically activates upon refrigerant leak detection. Manual activation switches are provided at locations required by the 2012 *Uniform Mechanical*

Code (IAPMO 2012) and ANSI/ASHRAE 15, *Safety Standards for Refrigeration Systems*. A trouble alarm signal is sent to the MCR upon activation of the emergency refrigerant purge fan.

### 6.2.16 Cooling Tower Facility 83; Cooling Tower Facility Support Building 83S

Facility descriptions will be included in a future revision to support WTP construction turnover schedules.

### 6.2.17 Fire Water Pump Houses A and B (84A, 84B) and Fire Tank Pads

The purpose of the fire water pump houses A and B (84A, 84B) and fire water storage tanks is to supply fire water at sufficient flows and pressures to the WTP for fire suppression.

#### Figure 6–11 Deleted

The FSW is a non-processing system that provides fire water received from DOE and stored onsite in fire water storage tanks FSW-TK-00001 and FSW-TK-00002 by the pumps located in fire water pump houses A and B (84A, 84B).

As required by the BOD, the redundant sets of fire water pumps are located in separate buildings to avoid common cause failure, such as a fire in the pump house or a break in a suction or discharge pipe. Each fire water pump house contains a pump that provides water via an underground fire water loop to buildings and hydrants at the WTP site (refer to drawing 24590-BOF-P1-84-00001, *Fire Water Pump House Facility – Buildings 84A & 84B General Arrangement Plan*). Water storage tanks will supply water to the pumps and subsequently to the fire protection systems throughout the WTP.

Fire water storage tanks FSW-TK-00001 and FSW-TK-00002 and fire water pump houses A and B (84A, 84B) are located in the southwest corner of the WTP site, just east of the NLD storage tanks and south, and across E street from the HLW Facility. The location is identified in 24590-BOF-C2-C12T-00002, *RPP-WTP Site General Arrangement Plan*.

Fire water pump houses A and B (84A and 84 B) are 288 ft<sup>2</sup> one-story pre-engineered metal structures (24590-CM-HC1-MPGP-00001-15-03, *BOF Pump House General Arrangement – Fire Water System Pump Houses*). Figure 6-5 shows the foundation for the fire water tanks and fire water pump houses A and B.

Fire water tanks and fire water pump houses A and B (84A and 84B)—as well as foundations for these structures—do not present a radiological or chemical hazard, and are not required for the prevention or mitigation of any radiological or chemical hazards associated with the WTP.

#### 6.2.17.1 Facility Layout

Each of the fire water pump houses A and B (84A and 84 B) contains a diesel engine driven fire pump and the motor driven jockey pump. The diesel engine driven fire pump package includes a fire pump; a diesel engine driver and controller; a diesel fuel day tank; a relief valve; and associated piping, valves, instrumentation and peripheral components. The pump package is provided in accordance with NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection. The diesel fuel day tanks are double walled tanks to collect any leakage. The circulation water heater package includes the recirculation fire water pump; pump motors and controllers; heaters and associated piping, valves, instrumentation and peripheral components. The package is provided in accordance with NFPA 20.

The finished grade of fire water pump houses A and B (84A and 84 B) is the floor level elevation of approximately 682 ft per drawing 24590-BOF-CG-C12T-00016, *Final Grading Plan Area 16*. Also refer to drawings 24590-BOF-A1-84-00001, *BOF Pump House Facilities Fire Pump House-Bldg 84A Architectural Plan & Elevations*, and

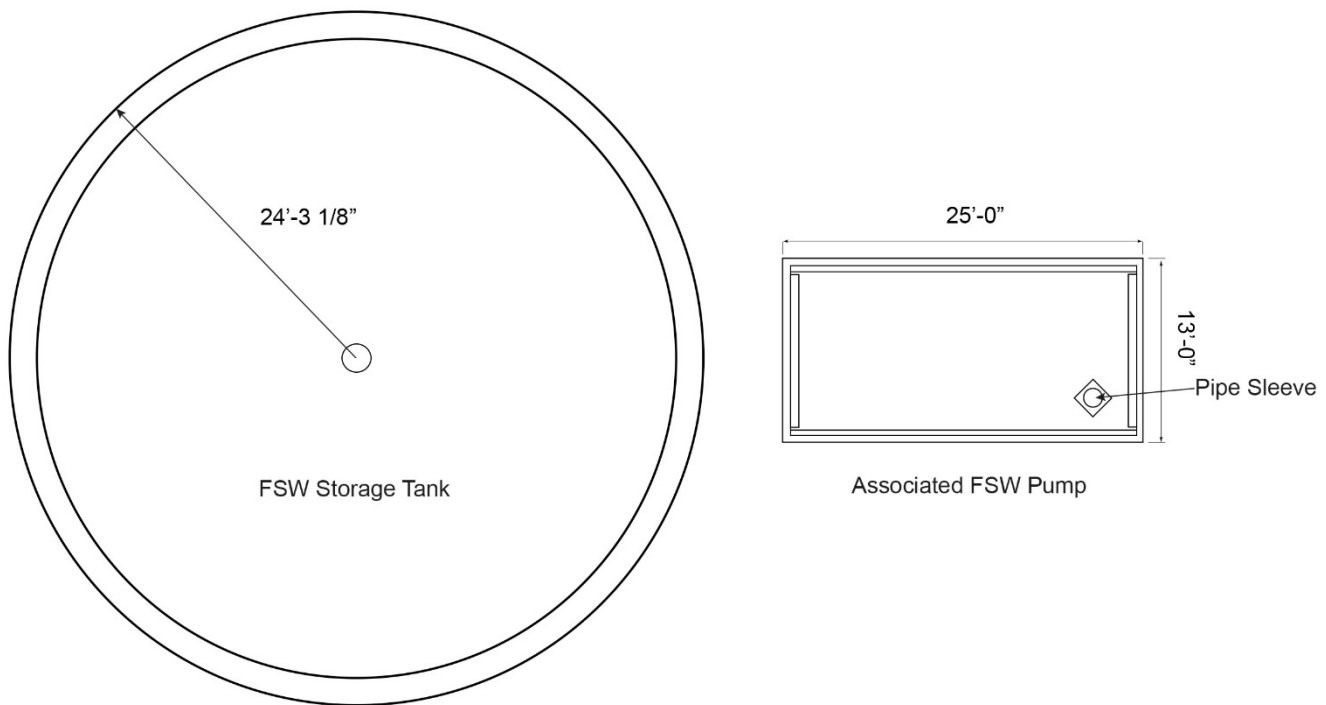
24590-BOF-A1-84-00002, *BOF Pump House Facilities Fire Pump House-Bldg 84B Architectural Plan & Elevations*. Personnel entrances to fire water pump houses A and B (84A and 84 B) at the 682 ft elevation are located on the north side of the building. Installation and removal of equipment can be accomplished through a 6 ft wide door on the south side of the building.

Figure 6-5 shows the fire water tanks and fire water pump house foundation. Figure 6-6 illustrates a general layout of fire water pump houses A and B (84A and 84B) and the fire water tank foundations for fire water storage tanks FSW-TK-00001 and FSW-TK-00002. For a detailed listing of all equipment in the general layout of fire water pump houses A and B, refer to drawings 24590-BOF-P1-84-00001, *Fire Water Pump House Facility – Buildings 84A & 84B General Arrangement Plan*, and 24590-BOF-P1-84-00002, *Fire Water Pump House Facility - Buildings 84A & 84B General Arrangement Section*.

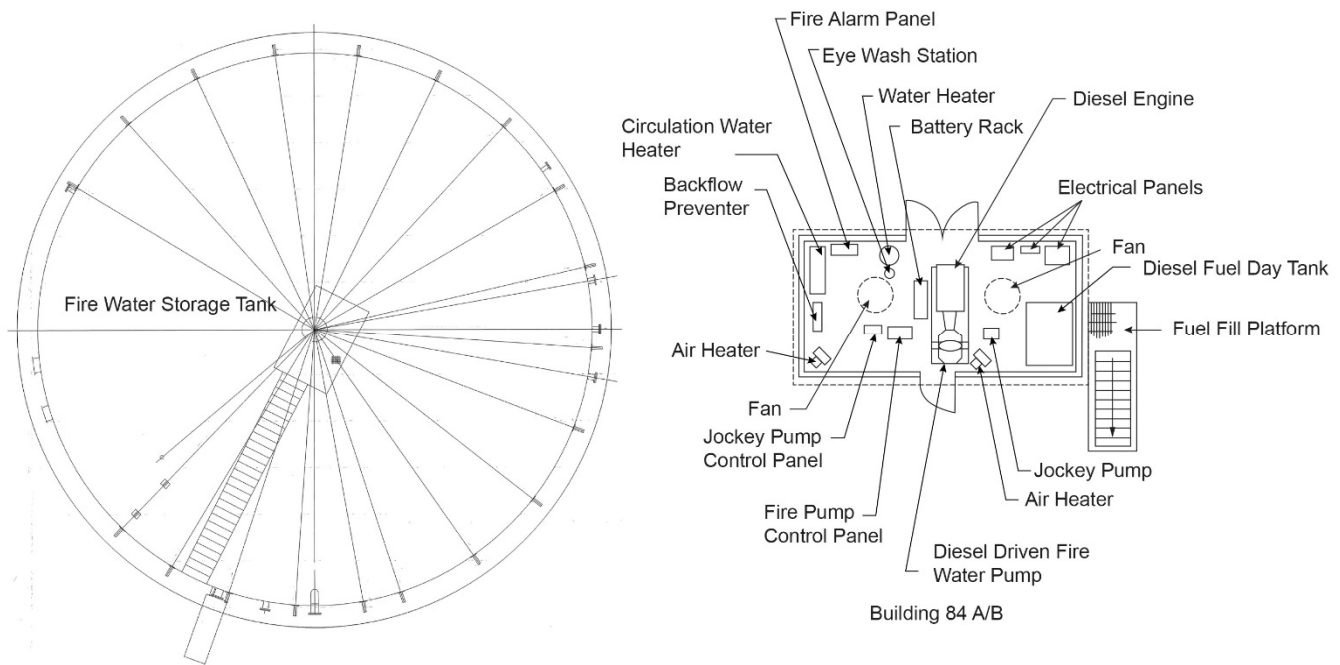
The exterior wall and roof systems are an insulated metal panel assembly. The interior walls and ceiling are the exposed metal liner of the exterior wall and roof panels.

The design of fire water pump houses A and B (84A and 84B) was subcontracted per SR 24590-CM-SRA-MPGP-00002, *To Design, Fabricate, and Construct the Fuel Oil, Fire Water (2 Buildings), and Non-Dangerous, Non-Radioactive Effluent Pump Houses per the Attached Documents. Attachments: Exhibit “D” 0- Rev. 2, Scope of Work; Exhibit “E” - Rev. 2, Technical Specifications; and Exhibit “F” - Rev. 2, Drawings*. The SR provided the subcontractor with the scope of work for the listed buildings.

**Figure 6–12 Fire Water Tanks and Fire Water Pump House Foundation**



**Figure 6-13 General Layout of Fire Water Pump Houses 84A and 83B and the Fire Water Tanks Foundations**



Fire water pump houses A and B (84A and 84B) and the fire water tanks are in compliance with requirements for allowable height, allowable area, fire resistance, and exterior wall and opening protection per 24590-BOF-RPT-ENG-01-001, *Building Code Evaluations for BOF*.

The fire water tanks foundations and the at-grade floor slabs for fire water pump houses A and B (84A and 84B) are constructed of reinforced concrete. Buildings and associated equipment foundation designs are detailed in the following list of vendor documents. Included in this list are the vendor-submitted as-built building details, contract documents, and some design drawings. Some vendor drawings may deviate from current installation due to constructability. Change documents against the applicable vendor submittals have been created to show these deviations but are not included in the list below. These changes meet the standard requirements for the WTP Project.

- 24590-B84-J1-FSW-00001, *Balance of Facilities System FSW System Block Diagram Fire Water System*
- 24590-BOF-C2-C12T-00033, *Firewater, Potable Water, Plant Service Air Yard Utility Sections and Details Sheet 1*
- 24590-BOF-C2-C12T-00034, *Firewater, Potable Water, Plant Service Air Yard Utility Details Sheet 2*
- 24590-BOF-C2-C12T-00035, *Firewater, Potable Water, Plant Service Air Yard Utility Sections and Details Sheet 3*
- 24590-BOF-C2-C12T-00037, *Firewater, Potable Water, Plant Service Air Yard Utility Sections and Details Sheet 4*
- 24590-BOF-DB-80-00002, *Balance of Facilities Miscellaneous Yard Pipe Support Foundations*
- 24590-BOF-DB-80-00003, *Balance of Facilities Miscellaneous Yard Pipe Support Foundations*
- 24590-BOF-DBC-FSW-00001, *Calculation-Design of Ringwall Foundation for Fire Water Storage Tank FSW-TK-00001 & 00002*
- 24590-BOF-DBC-S13T-00004, *Design of Pipe Support Foundations in the Fire Service Water Tanks Area*
- 24590-BOF-DB-S13T-00015, *Firewater Storage Tanks Foundation Plan, Sections and Details*
- 24590-BOF-DB-S13T-00047, *Firewater Storage Tanks Pipe Support Foundations Plan and Sections*
- 24590-BOF-DB-S13T-00070, *Balance of Facilities Concrete Forming & Reinforcing Building 84A & 84B Platform Plans, Sections & Details*

- 24590-BOF-A1-84-00001, *BOF Pump House Facilities Fire Pump House-Bldg 84A Architectural Plan & Elevations*
- 24590-BOF-A1-84-00002, *BOF Pump House Facilities Fire Pump House-Bldg 84B Architectural Plan & Elevations*
- 24590-BOF-P1-84-00001, *Fire Water Pump House Facility - Buildings 84A & 84B General Arrangement Plan*
- 24590-BOF-P1-84-00002, *Fire Water Pump House Facility - Buildings 84A & 84B General Arrangement Section*
- 24590-CM-HC1-MPGP-00001-03-01, *Structural - 100% Foundation Design Calculations*
- 24590-CM-HC1-MPGP-00001-04-01, *BOF Pump House Facilities Structural Notes and Details*
- 24590-CM-HC1-MPGP-00001-04-02, *BOF Pump House Facilities NLD Pump House, Fuel Oil Pump House, & Fire Water Pump House Foundation Plans 1 of 2*
- 24590-CM-HC1-MPGP-00001-15-03, *BOF Pump House General Arrangement - Fire Water System Pump Houses*
- 24590-CM-HC1-MPGP-00001-15-16, *BOF Pump House Facilities - Fire Water Pump House - Bldg 84A – Piping Layout - 505*
- 24590-CM-HC1-MPGP-00001-15-17, *100% Design - BOF Pump House Facilities - BOF Pump House Facilities Fire Water Yard Piping, Sheet 1 of 2*
- 24590-CM-HC1-MPGP-00001-15-18, *100% Design - BOF Pump House Facilities - BOF Pump House Facilities Fire Water Yard Piping, Sheet 2 of 2*
- 24590-CM-HC1-MPGP-00001-15-23, *BOF Pump House Facilities Fire Water Pump House - Bldg 84A Circuit Modifications*
- 24590-CM-HC1-MPGP-00001-15-24, *BOF Pump House Facilities Fire Water Pump House - Bldg 84B Circuit Modifications*
- 24590-CM-HC1-MPGP-00001-15-27, *BOF Pump House Facilities - Fire Pump House - Bldgs. 84A - Lighting/Heating/Fan Schedule and Locations*
- 24590-CM-HC1-MPGP-00001-15-28, *BOF Pump House Facilities - Fire Pump House - Bldgs. 84B - Lighting/Heating/Fan Schedule and Locations*
- 24590-CM-HC1-MPGP-00001-15-31, *BOF Pump House Facilities - Fire Pump House - Bldg 84A - Instrumentation Location and Wiring*
- 24590-CM-HC1-MPGP-00001-15-37, *BOF Pump House Facilities - Fire Water Pump House - Bldg 84B – Piping Layout – 508*
- 24590-CM-HC1-MPGP-00001-15-38, *BOF Pump House Facilities - Fire Pump House- Bldg 84B - Instrumentation Location and Wiring*
- 24590-CM-HC1-MPGP-00001-15-41, *BOF Pump House Facilities - Grounding Plan and Details - Fire Water Pumphouse Bldg 84A*
- 24590-CM-HC1-MPGP-00001-15-42, *BOF Pump House Facilities - Grounding Plan and Details - Fire Water Pumphouse Bldg 84B*
- 24590-CM-HC1-MPGP-00001-15-47, *BOF Pump House Facilities - Fire Water Yard Piping Support Details - Fire Water System - 806*
- 24590-CM-HC1-MPGP-00001-15-49, *100% Design - Fire Water Tanks -Fire Water Tank Support Layout and Details FSW-TK-00002*
- 24590-CM-HC1-MPGP-00001-15-50, *100% Design - Fire Water Tanks - Tank Support Layout and Details FSW-TK-00001*
- 24590-CM-HC1-MPGP-00001-15-56, *BOF Pump House Facilities – Framing Plan and Elevation Fire Pump House 84A and 84B*
- 24590-CM-HC1-MPGP-00001-15-57, *BOF Pump House Facilities Piping Layout Firewater Pump House Bldgs 84A & 84B*
- 24590-BOF-S1-S15T-00005, *Balance of Facilities Fire Water Pump House Fuel Tank Service Platform Plan, Sections and Details*
- 24590-CM-HC1-MPGP-00001-31-01, *Submittal 054.1 - Stress Seismic Calculation Package*

- 24590-CM-HC1-MPGP-00001-36-00006, *Certificates - UL Master Label Certificates - FSW, NLD, DFO Pumphouses*
- 24590-CM-TSA-DG01-00001-05-00082, *BOF (Balance of Facilities) - Fire Water Storage Tanks – Pipe Support Foundations*
- 24590-CM-TSA-DG01-00001-05-00149, *BOF Facility - Fire Water Pump Houses Buildings 84A & 84B Sidewalks*
- 24590-CM-TSA-DG01-00001-05-26, *BOF – Non-Radioactive Affluent Tank – Foundation for Tank FSW-TK-00001*
- 24590-CM-TSA-DG01-00001-05-27, *BOF - Non-Radioactive Affluent Tank – Foundation for Tank FSW-TK-00002*
- 24590-CM-TSA-DG01-00001-05-32, *BOF – Fire Water Pump House Foundation*
- 24590-BOF-MT-FSW-00001, *Equipment Assembly Fire Water Storage Tank FSW-TK-00001 & FSW-TK-00002*
- 24590-BOF-MTC-FSW-00001, *BOF Fire Water Storage Tank Sizing*
- 24590-BOF-MTC-FSW-00003, *Acceptable Loads for N05, N08, N09 on BOF-FSW-TK-00001 and BOF-FSW-TK-00002*
- 24590-BOF-MTD-FSW-00001, *24590-BOF-MT-FSW-TK-00001 & 24590-BOF-MT-FSW-TK-00002 - Fire Water Storage Tank*
- 24590-BOF-N1D-FSW-00001, *FSK-TK-00001 & FSW-TK-00002 T09001 & T09002, System BOF-FSW (940) Fire Water Storage Tank*
- 24590-CM-HC1-MTF5-00001-03-00085, *Fire Water Storage Tank FSW-TK-00001 Sht # & Appurtenance*
- 24590-CM-HC1-MTF5-00001-03-00086, *Fire Water Storage Tank FSW-TK-00001 - Shell Rollout*
- 24590-CM-HC1-MTF5-00001-03-00087, *Fire Water Storage Tank FSW-TK-00001 - Chine and Rim Details*
- 24590-CM-HC1-MTF5-00001-03-00088, *Fire Water Storage Tank FSW-TK-00001 - Anchor Chair*
- 24590-CM-HC1-MTF5-00001-03-00089, *Fire Water Storage Tank FSW-TK-00001- Bottom Layout*
- 24590-CM-HC1-MTF5-00001-03-00090, *Fire Water Storage Tank FSW-TK-00001 - Bottom Sketches*
- 24590-CM-HC1-MTF5-00001-03-00091, *Fire Water Storage Tank FSW-TK-00001 - Roof Layout*
- 24590-CM-HC1-MTF5-00001-03-00092, *Fire Water Storage Tank FSW-TK-00001- Roof Sketches*
- 24590-CM-HC1-MTF5-00001-03-00093, *Fire Water Storage Tank FSW-TK-00001 - 20 Inch Roof Opening W/Vent (M2b)/(N06)*
- 24590-CM-HC1-MTF5-00001-03-00094, *Fire Water Storage Tank FSW-TK-00001 - 24 Inch Diameter Shell Manhole*
- 24590-CM-HC1-MTF5-00001-03-00095, *Fire Water Storage Tank FSW-TK-00001 - Manhole Details*
- 24590-CM-HC1-MTF5-00001-03-00096, *Fire Water Storage Tank FSW-TK-00001- 36 Inch Roof Manhole (M2a)*
- 24590-CM-HC1-MTF5-00001-03-00097, *Fire Water Storage Tank FSW-TK-00001 - 14 Inch Outlet (N01)*
- 24590-CM-HC1-MTF5-00001-03-00098, *Fire Water Storage Tank FSW-TK-00002 - 8 Inch Inlet (N02)*
- 24590-CM-HC1-MTF5-00001-03-00099, *Fire Water Storage Tank FSW-TK-00001 - 4 Inch Diameter Inlet (N03)*
- 24590-CM-HC1-MTF5-00001-03-00100, *Fire Water Storage Tank FSW-TK-00001- 10 Inch Diameter Overflow (N04)*
- 24590-CM-HC1-MTF5-00001-03-00102, *Fire Water Storage Tank FSW-TK-00001- 3/4 Inch Diameter Temperature (N07)*
- 24590-CM-HC1-MTF5-00001-03-00103, *Fire Water Storage Tank FSW-TK-00001 - 8 Inch Diameter Inlet (N08)*
- 24590-CM-HC1-MTF5-00001-03-00104, *Fire Water Storage Tank FSW-TK-00001 - 8 Inch Diameter Drain (N09)*
- 24590-CM-HC1-MTF5-00001-03-00105, *Fire Water Storage Tank FSW-TK-00001 - 8 Inch Diameter Spare Nozzle (N10)*
- 24590-CM-HC1-MTF5-00001-03-00106, *Fire Water Storage Tank FSW-TK-00001 - 8 Inch Diameter Spare Nozzle (N11)*



- 24590-CM-HC1-MTF5-00001-03-00107, *Fire Water Storage Tank FSW-TK-00001 - 1/2 Inch Diameter Level Transmitter (N05)*
- 24590-CM-HC1-MTF5-00001-03-00109, *Fire Water Storage Tank FSW-TK-00001 - Exterior Ladder*
- 24590-CM-HC1-MTF5-00001-03-00110, *Fire Water Storage Tank FSW-TK-00001 - Ladder Details*
- 24590-CM-HC1-MTF5-00001-03-00111, *Fire Water Storage Tank - FSW-TK-00001 - Upper Platform*
- 24590-CM-HC1-MTF5-00001-03-00112, *Fire Water Storage Tank - FSW-TK-00001 - Platform Details*
- 24590-CM-HC1-MTF5-00001-03-00113, *Fire Water Storage Tank - FSW-TK-00001 - Roof Stairs*
- 24590-CM-HC1-MTF5-00001-03-00114, *Fire Water Storage Tank - FSW-TK-00001 - Peak Platform*
- 24590-CM-HC1-MTF5-00001-03-00115, *Fire Water Storage Tank FSW-TK-00001 Cathodic Protection*
- 24590-CM-HC1-MTF5-00001-03-00117, *Fire Water Storage Tank FSW-TK-00001 Insulation Details*
- 24590-CM-HC1-MTF5-00001-03-00118, *Fire Water Storage Tank - FSW-TK-00001 - Interior Ladder*
- 24590-CM-HC1-MTF5-00001-03-00255, *Fire Water Storage Tank FSW-TK-00002 Plan & Appurtenance*
- 24590-CM-HC1-MTF5-00001-03-00256, *Fire Water Storage Tank - FSW-TK-00002- Shell Rollout*
- 24590-CM-HC1-MTF5-00001-03-00257, *Fire Water Storage Tank - FSW-TK-00002 - Chine and Rim Details*
- 24590-CM-HC1-MTF5-00001-03-00258, *Fire Water Storage Tank - FSW-TK-00002- Anchor Chair*
- 24590-CM-HC1-MTF5-00001-03-00259, *Fire Water Storage Tank - FSW-TK-00002- Bottom Layout*
- 24590-CM-HC1-MTF5-00001-03-00260, *Fire Water Storage Tank - FSW-TK-00002 - Bottom Sketches*
- 24590-CM-HC1-MTF5-00001-03-00261, *Fire Water Storage Tank - FSW-TK-00002 - Roof Layout*
- 24590-CM-HC1-MTF5-00001-03-00262, *Fire Water Storage Tank - FSW-TK-00002 - Roof Sketches*
- 24590-CM-HC1-MTF5-00001-03-00263, *Fire Water Storage Tank FSW-TK-00002 20 Inch Diameter Roof Opening W/ Vent (M2b) (N06)*
- 24590-CM-HC1-MTF5-00001-03-00264, *Fire Water Storage Tank - FSW-TK-00002 - 24 Inch Diameter Shell Manhole*
- 24590-CM-HC1-MTF5-00001-03-00265, *Fire Water Storage Tank - FSW-TK-00002- Manhole Details*
- 24590-CM-HC1-MTF5-00001-03-00266, *Fire Water Storage Tank - FSW-TK-00002 - 36 Inch Diameter Roof Manhole (M2a)*
- 24590-CM-HC1-MTF5-00001-03-00267, *Fire Water Storage Tank - FSW-TK-00002- 14 Inch Diameter Outlet (N01)*
- 24590-CM-HC1-MTF5-00001-03-00268, *Fire Water Storage Tank - FSW-TK-00002 - 8 Inch Diameter Inlet (N02)*
- 24590-CM-HC1-MTF5-00001-03-00269, *Fire Water Storage Tank - FSW-TK-00002 - 4 Inch Diameter Inlet (N03)*
- 24590-CM-HC1-MTF5-00001-03-00270, *Fire Water Storage Tank - FSW-TK-00001 - 10 Inch Diameter Overflow (N04)*
- 24590-CM-HC1-MTF5-00001-03-00272, *Fire Water Storage Tank - FSW-TK-00002 - 3/4 Inch Diameter Temperature (N07)*
- 24590-CM-HC1-MTF5-00001-03-00273, *Fire Water Storage Tank - FSW-TK-00001 - 8 Inch Diameter Inlet (N08)*
- 24590-CM-HC1-MTF5-00001-03-00274, *Fire Water Storage Tank - FSW-TK-00002 - 8 Inch Diameter Drain (N09)*
- 24590-CM-HC1-MTF5-00001-03-00275, *Fire Water Storage Tank - FSW-TK-00002 - 8 Inch Diameter Spare Nozzle (N10)*
- 24590-CM-HC1-MTF5-00001-03-00276, *Fire Water Storage Tank - FSW-TK-00002 - 8 Inch Diameter Spare Nozzle (N11)*
- 24590-CM-HC1-MTF5-00001-03-00277, *Fire Water Storage Tank - FSW-TK-00002 - 3/4 Inch Diameter Level Transmitter (N05)*
- 24590-CM-HC1-MTF5-00001-03-00279, *Fire Water Storage Tank - FSW-TK-00002 - Exterior Ladder*
- 24590-CM-HC1-MTF5-00001-03-00280, *Fire Water Storage Tank - FSW-TK-00002 - Ladder Details*
- 24590-CM-HC1-MTF5-00001-03-00281, *Fire Water Storage Tank - FSW-TK-00002 - Upper Platform*
- 24590-CM-HC1-MTF5-00001-03-00282, *Fire Water Storage Tank - FSW-TK-00002 - Platform Details*

- 24590-CM-HC1-MTF5-00001-03-00283, *Fire Water Storage Tank - FSW-TK-00002 - Roof Stairs*
- 24590-CM-HC1-MTF5-00001-03-00285, *Fire Water Storage Tank - FSW-TK-00002 - Cathodic Protection*
- 24590-CM-HC1-MTF5-00001-03-00286, *Fire Water Storage Tank - FSW-TK-00002 - Roof Handrail*
- 24590-CM-HC1-MTF5-00001-03-00287, *Fire Water Storage Tank FSW-TK-00002 Insulation Details*
- 24590-CM-HC1-MTF5-00001-03-00288, *Fire Water Storage Tank - FSW-TK-00002 - Interior Ladder*
- 24590-CM-HC1-MTF5-00001-03-00292, *Fire Water Storage Tank - FSW-TK-00002 - Pipe Support*
- 24590-CM-HC1-MTF5-00001-03-00293, *Fire Water Storage Tank - FSW-TK-00002 - Conduit Supports*
- 24590-CM-HC1-MTF5-00001-03-00298, *Fire Water Storage Tank - FSW-TK-00001 - Pipe Support*
- 24590-CM-HC1-MTF5-00001-03-00299, *Fire Water Storage Tank FSW-TK-00001 Conduit Supports*
- 24590-CM-HC1-MTF5-00001-03-06, *Fire Water Storage Tank - FSW-TK-00002 - Notes and Elevation*
- 24590-CM-HC1-MTF5-00001-03-08, *Fire Water Storage Tank FSW-TK-00001 - Notes and Elevation*
- 24590-CM-HC1-MTF5-00001-03-09, *Laydown Requirements for NLD And Fire Tanks, Fuel and Water Tanks*

#### 6.2.17.1.1 Wall Penetrations

The walls of fire water pump houses A and B (84A and 84B) have several penetrations for utilities to pass through. Both buildings are similar but contain some differences. For building 84A wall penetration details, see drawing 24590-BOF-A1-84-00001, *BOF Pump House Facilities Fire Pump House-Bldg 84A Architectural Plan & Elevations*. For building 84B wall penetration details, see drawing 24590-BOF-A1-84-00002, *BOF Pump House Facilities Fire Pump House-Bldg 84B Architectural Plan & Elevations*.

#### 6.2.17.1.2 Service platform

A fuel fill service platform is provided on the east side of each fire water pump house 84A and 84B (24590-BOF-P1-84-00001, *Fire Water Pump House Facility - Buildings 84A & 84B General Arrangement Plan*, 24590-BOF-P1-84-00002, *Fire Water Pump House Facility - Buildings 84A & 84B General Arrangement Section*, and 24590-BOF-S1-S15T-00005, *Balance of Facilities Fire Water Pump House Fuel Tank Service Platform Plan, Sections and Details*) for ease of access to the day diesel fuel tank. Protective railing is installed around the platform and along the platform access stairs.

#### 6.2.17.1.3 Sidewalks

Fire water pump houses 84A and 84B are provided with the sidewalks around the building (24590-CM-TSA-DG01-00001-05-00149, *BOF Facility - Fire Water Pump Houses Buildings 84A & 84B Sidewalks*).

#### 6.2.17.2 Systems

Fire water pump houses A and B (84A and 84B) and fire water storage tanks concrete pads contain the following main components:

- Two 100 % capacity pump packages, FSW-PMP-00009 and FSW-PMP-00010 (includes the fire pump; the diesel engine driver and controller; a diesel fuel day tank; a relief valve; and associated piping, valves, instrumentation and peripheral components)
- Jockey pump (FSW-PMP-00008 in 84A and FSW-PMP-00005 in 84B)
- Circulation water heater package, including the recirculation fire water pump; pump motors and controllers, heaters, and pressure relief valve at the outlet of each heater and associated components
- Control panel (FSW-PNL-00005 in 84A and FSW-PNL-00006 in 84B)
- FSW tanks

The DOW is supplied to the Fire water pump houses A and B (84A and 84B) for the water heater, and eyewash station(s).

System locators are described in 24590-WTP-RPT-ENG-02-009, *System and Area Locators List and System Division of Responsibility*. Descriptions of the systems housed by Fire water pump houses A and B (84A and 84B) are provided by:

- FSW: 24590-WTP-3YD-FSW-00001, *System Description for the Fire Service Water (FSW), Fire Protection Water (FPW), and the Fire Detection and Alarm (FDE) Systems*
- MVE, 24590-WTP-3ZD-MVE-00001, *LAW BOF and Lab Medium Voltage Electrical (MVE) Low Voltage Electrical (LVE) and DC Electrical (DCE) System Design Description*
- LVE: See MVE
- DCE: See MVE
- UPE: 24590-WTP-3YD-UPE-00001, *System Description for the UPE Power System*
- LTE: 24590-WTP-3YD-LTE-00001, *System Description for Lighting Systems (LTE)*
- PCJ: 24590-WTP-3ZD-PCJ-00001, *Process Control (PCJ), Mechanical Handling Control (MHJ), and Autosampling Control (ASJ) System Design Description*
- CME and FNJ: 24590-WTP-3YD-CME-00001, *System Description for the Communications Electrical System (CME) and Facility Network Infrastructure (FNJ)*
- GRE: 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lightning Protection System*
- DOW: 24590-WTP-3YD-DOW-00001, *System Description for the Waste Treatment Plant Domestic Water System (DOW)*
- CIV: 24590-BOF-3YD-CIV-00002, *System Description for the BOF CIV Systems*
- RWW: 24590-BOF-3YD-RWW-00001, *System Description for Raw Water System (RWW)*

### 6.2.17.3 Facility Interfaces

The fire water storage tanks receive and store water from the Hanford Site via the raw water system (RWW). The systems housed in fire water pump houses A and B (84A and 84B) distribute fire water throughout the WTP complex to fire hydrants and to buildings equipped with a fire sprinkler system and with standpipes.

### 6.2.17.4 Utilities

#### 6.2.17.4.1 Power

BOF switchgear building 91 provides the 4.16kV, MVE source power running all equipment. The recirculation pump and heaters are powered from electrical panels located in the northeast corner of each pump house.

#### 6.2.17.4.2 Lighting

A complete and operable lighting system is provided in fire water pump houses (84A and 84B) and around the fire water storage tanks in accordance with NFPA 70, *National Electric Code*, Sections 410 and 700; *IESNA Lighting*

*Handbook* (IESNA 2000); NFPA 101 (1997 and 2000 Eds.); and ANSI/IESNA RP-7, *Lighting Industrial Facilities ANSI Approved*.

Only normal lighting is provided in fire water pump houses (84A and 84B). Fixtures are selected from the electrical lighting fixture schedule. Nonstandard fixture selection is designed per the individual requirements of each facility. All lighting fixtures are compatible with the environment in which they are installed. Lighting fixtures installed in industrial areas and subjected to possible physical damage are equipped with appropriate protection.

The details of light locations for fire water pump houses A and B (84A and 84B), types of lighting used, and the exact location of all the light fixtures are provided in drawing 24590-CM-HC1-MPGP-00001-15-27, *Fire Water Pump House Facility - Bldg. 84A - Lighting/Heating/Fan Schedules and Locations*, and 24590-CM-HC1-MPGP-00001-15-28, *Fire Water Pump House Facility - Bldg. 84B - Lighting/Heating/Fan Schedules and Locations*.

- 24590-B84-E2-E53T-00001, *Fire Water Storage Tanks FSW-TK-00001/2 Lighting and Aboveground Raceway Plan*
- 24590-B84-E9-E53T-00001, *Fire Water Storage Tanks FSW-TK-00001/2 Lighting, Grounding & Aboveground Raceway Sections & Details*
- 24590-BOF-VDCN-E-13-00003, *Removal of Building 84A and 84B Emergency Lighting*
- 24590-B84-VDCN-E-10-00001, *Fire Water Pump Houses Building 84A and 84B Exit Sign Removal*

#### 6.2.17.4.3 Ventilation

Fire water pump houses A and B (84A and 84B) are one open room with two roof-mounted exhaust fans. The exhaust fans are sized to exhaust enough air from the area to maintain the summer temperature at no greater than 10°F above the outdoor design temperature of 101°F. A wall-mounted thermostat starts the exhaust fans when the room temperature is above the set point. Two operable louvers are provided to open when the fans operate and close when the fan stops. The ventilation intake louvers are located on both sides of the egress door on the south side.

Two electric heaters are also installed to provide heating during the winter and maintain a minimum temperature of 50°F. The unit heaters are provided with integral thermostats that activate when the temperature drops below the set point. One electric space heater is mounted inside the upper northwest corner of the building and another one is located in the southeast corner. The heaters and ventilation equipment is shown in drawings 24590-CM-HC1-MPGP-00001-15-27, *Fire Water Pump House Facility - Bldg. 84A - Lighting/Heating/Fan Schedules and Locations*, and 24590-CM-HC1-MPGP-00001-15-28, *Fire Water Pump House Facility - Bldg. 84B - Lighting/Heating/Fan Schedules and Locations*. More detailed descriptions are in 24590-BOF-3YD-C1V-00002, *System Description for the BOF CIV HVAC Systems*. The CIV panels are located on the west walls of each pump house A and B (84A and 84B).

#### 6.2.17.4.4 Fire Protection

Fire water pump houses A and B (84A and 84B) each have an automatic sprinkler system and are provided with a fire alarm and detection system. The system consists of one FACP, four subpanels, speaker/strobe devices for occupant notification, and initiating devices (water flow switches, tamper switches for valves, heat detector, manual pull stations, etc.) The FDE is additionally monitored by a radio fire alarm reporter (RFAR) panel mounted on the exterior of fire water pump house 84A. The FACP, the alarm initiating devices, notification appliances (horns, strobes, speakers), and the RFAR are UL listed and FM approved for their intended use.

#### 6.2.17.4.5 **Lightning Protection and Grounding**

The lightning protection system description is discussed in detail in 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lightning Protection System* and in drawing 24590-B84-E22-GRE-00001, *Fire Water Storage Tanks FSW-TK-00001/2 Grounding & Lightning Protection Plan*.

#### 6.2.17.4.6 **Capacity**

The FSW system capacity is discussed in 24590-WTP-3YD-FSW-00001, *System Description for the Fire Service Water (FSW), Fire Protection Water (FPW), and the Fire Detection and Alarm (FDE) Systems*.

#### 6.2.17.5 **Energy Conservation**

Fire water pump houses A and B (84A and 84B) are designed in accordance with the energy conservation requirements established in ASHRAE 90.1. Exterior openings are sealed to minimize air leakage.

#### 6.2.17.6 **Health and Safety**

##### 6.2.17.6.1 **Communications**

An intra-building public address and telephone communication system are not yet provided for fire water pump house facilities A and B (84A and 84B) but a new design is pending for these buildings.

##### 6.2.17.6.2 **Means of Egress**

Fire water pump house A and B (84A and 84B) are defined as a special-purpose industrial occupancy per NFPA 101. Consistent with Section 10 of DOE-STD-1066-97, compliance with NFPA 101 is considered to satisfy the exit requirements of the applicable building code and the fire protection BOD. Fire water pump houses 84A and 84B each have one distinct egress door location with a minimum width of 36 in. Fire water pump house 84A and 84B have one personnel entrance that is located on the north side of each facility. Installation and removal of equipment can be accomplished through a 6 ft wide door on the south side of each facility. These doors are shown in 24590-BOF-P1-84-00001, *Fire Water Pump House Facility - Buildings 84A & 84B General Arrangement Plan*, 24590-BOF-A1-84-00001, *BOF Pump House Facilities Fire Pump House-Bldg 84A Architectural Plan & Elevations*, and 24590-BOF-A1-84-00002, *BOF Pump House Facilities Fire Pump House-Bldg 84B Architectural Plan & Elevations*.

The structure evaluation concluded the egress capacity of exits meets or exceeds the required minimum width. Travel distances to the closest exit in the facility are less than (24 ft) and are within the maximum travel distance allowed by NFPA 101, *Life Safety Code*. Common paths of travel in fire water pump houses A and B (84A and 84B) are within the maximum allowed (24590-BOF-RPT-ENG-01-002, *Life Safety Code Means of Egress Evaluations for BOF; note that CR 24590-WTP-GCA-MGT-17-00760 may impact this document for this facility*).

Locations of exit doors are shown in the general arrangement plan and architectural design drawings, and are in accordance with architectural design criteria. Continuous and unobstructed access to the exits is available from the operational area floor and each of these exits discharges outdoors at grade level. Exit signs are posted. Integral self-contained dry battery packs and inverters compose each lighting fixture identified as egress lighting.

##### 6.2.17.6.3 **High Noise Areas**

Fire water pump houses A and B (84A and 84B) are considered high noise areas that require double hearing protection when the diesel fire pumps are running.

#### 6.2.17.6.4 **Portable Fire Extinguishers**

Portable fire extinguishers are provided in fire water pump houses A and B (84A and 84B) in accordance with NFPA 10-2002, *Standard for Portable Fire Extinguishers*. These fire extinguishers are placed in easily accessible locations, such as near exit doors and along travel routes. Fire extinguishers are selected for the class of hazards to be protected and are located in cabinets that are semi-recessed or surface mounted. There is one fire extinguisher located in each fire water pump house 84A and 84B. The locations are specified in 24590-B84-U2-M36T-00001, *Fire Water Pump House 84A Fire Protection Fire Extinguisher Locations* and 24590-B84-U2-M36T-00002, *Fire Water Pump House 84B Fire Protection Fire Extinguisher Locations*.

#### 6.2.17.6.5 **Access**

Access to areas within fire water pump house facilities 84A and 84B are facilitated and controlled by the following:

- One personnel door at primary entry and exit
- One maintenance door
- Access door locks

#### 6.2.17.6.6 **Building Code**

Fire water pump houses A and B (84A and 84B) are classified and constructed per 1997 Uniform Building Code (UBC). Refer to report 24590-BOF-RPT-ENG-01-001, *Building Code Evaluations for BOF*.

#### 6.2.17.6.7 **Hazards**

##### 6.2.17.6.7.1 **Radioactive/Contamination Hazards**

There are no radioactive or contamination hazards identified in fire water pump houses A and B (84A and 84B) and fire water storage tanks concrete pads.

##### 6.2.17.6.7.2 **Chemical Hazards**

Fire water pump houses A and B (84A and 84B) do contain unsealed lead acid batteries that, during fluid additions, may present a chemical hazard. Eyewash stations are provided for the mitigation of any chemical hazards.

##### 6.2.17.6.7.3 **General Hazards**

General site hazards are discussed in 24590-BOF-RPT-ENS-12-002, *Process Hazards Analysis for Balance of Facilities (BOF)*. The major hazards in the fire water pump houses A and B (84A and 84B) include electrical fire, electrical shock, and the presence of diesel fuel. Additional fire hazard information can be found in 24590-WTP-FHA-RAFP-FP-0001, *Fire Hazards Analysis (FHA) for the General/Balance of Facilities (BOF)*.

#### 6.2.17.6.8 **Personal Safety Features**

No additional personal safety features are identified beyond standard industrial requirements.

### 6.2.18 **Steam Plant 85**

Facility descriptions will be included in a future revision to support WTP construction turnover schedules.

## 6.2.19 Water Treatment Building and Storage Tanks 86

A facility description will be included in a future revision to support WTP construction turnover schedules.

## 6.2.20 Switchgear Building 87

Switchgear building 87 will support normal power supply to support WTP site operations. Switchgear building 87 is located off the B road, east of the Lab, and south of Administration building 51. Figure 6–14 Deleted

Switchgear building 87 is a one-story, pre-engineered metal structure 104 ft 4 in. long by 63 ft 0 in. wide by 23 ft 7 ½ in. high, constructed at top of concrete elevation of 674 ft 0 in. The below grade portion of the building is at elevation top of concrete elevation of 665 ft 0 in. The actual area of this building is approximately 6570 ft<sup>2</sup>. Building occupancy classification is Special Purpose Industrial Occupancy per NFPA 101, *Life Safety Code*, Section 28-1.4.1(b) of NFPA 101 (24590-BOF-RPT-ENG-01-002, *Life Safety Code Means of Egress Evaluations for BOF*). The building's location at the Hanford Site is identified in 24590-BOF-C2-C12T-00002, *RPP-WTP Site General Arrangement Plan*.

Switchgear building 87 provides space to support the functions of the hosting of the power distribution processes, equipment, and personnel protection. Design features are illustrated in the general arrangement drawings in 24590-BOF-P1-87-00001, *Switchgear Building General Arrangement Plan and Sections* and 24590-BOF-P1-87-00002, *Switchgear Building Equipment Location Plan and Sections*.

Switchgear building 87 and system do not present a radiological or chemical hazard, and are not required for the prevention or mitigation of any radiological or chemical hazards associated with the WTP.

### 6.2.20.1 Facility Layout

Switchgear building 87 houses power distribution equipment for power distribution activities and equipment for the ventilation system.

Personnel entrances to switchgear building 87 at the 0 ft elevation are located in the corners of the northwest side of the building, in the southeast and southwest corners of the building, and in the center of the east wall of the structure. The operating, maintenance, and storage areas of the building can be accessed through these personnel entrances. The aisles and ladders provide personnel access to operating and maintenance areas and to emergency exits.

Switchgear building 87 receives its power from the A6 substation—provided by DOE—and distributes 13.8 kVA power from switchgear assemblies in switchgear building 87 to BOF switchgear building 91 and to various WTP utility, process, and laboratory facilities.

Figure 6–15 shows a general layout of switchgear building 87. For a detailed listing of all equipment, refer to drawings 24590-BOF-P1-87-00001, *Switchgear Building General Arrangement Plan and Sections* and 24590-BOF-P1-87-00002, *Switchgear Building Equipment Location Plan and Sections*.

The exterior wall and roof systems are insulated metal sandwich panels. The interior face of exterior walls and ceilings are the exposed metal liner of the exterior panel assemblies.

The building design was subcontracted per SR 24590-CM-SRA-AKBP-00001, *Issue for Closeout of Subcontract, To Include Work not Completed to be Completed by Contractor*. The SR provided the subcontractor with the scope of work for the listed buildings.

The deliverable from the subcontractor provided BSII with documents and drawings that were reviewed by the subcontract technical representative.

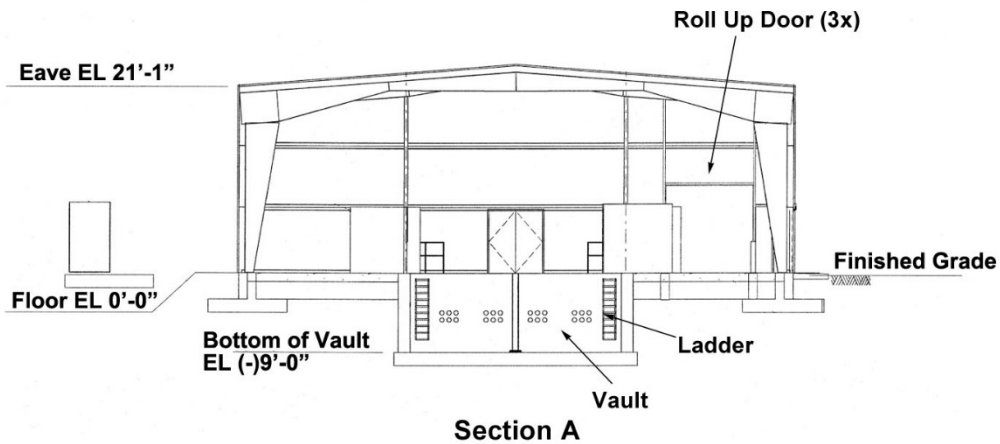
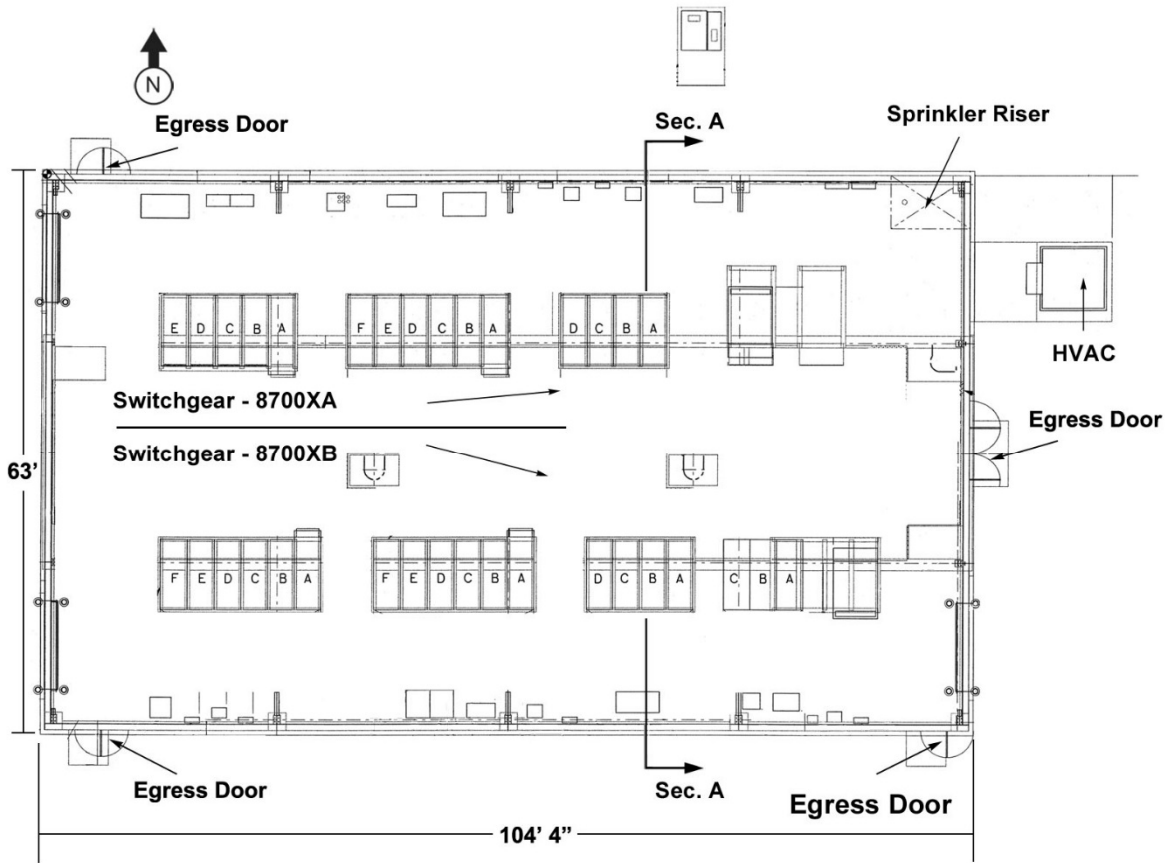
Submitted vendor documents for switchgear building 87 are presented in subcontractor submittal 24590-CM-FC3-AKBP-00001-47-XX series. Additional product data, manuals, and other information are available in the 24590-CM-FC3-AKBP-00001-XX-XX series.

Some vendor drawings may deviate from current installation due to constructability. Change documents against the applicable vendor submittals have been created to show these deviations but are not included in the list below. These changes meet the standard requirements for the WTP Project.

The structure is protected throughout with an automatic fire sprinkler system. The structure is a Type II Noncombustible (II-N) construction, Group F Division 2 Occupancy per Table 6-A in the UBC. The exterior wall and roof systems are insulated metal sandwich panels. The interior face of the exterior walls and ceilings are the exposed metal liner of the exterior panel assemblies.



Figure 6-15 Switchgear Building 87 Layout



The switchgear building 87 design is in compliance with requirements for allowable height, allowable area, fire resistance, and exterior wall and opening protection per 24590-BOF-RPT-ENG-01-001, *Building Code Evaluations for BOF*.

The switchgear building 87 foundation and the at-grade floor slab are constructed of reinforced concrete. The building and associated equipment foundation designs are detailed in the following list of vendor documents. Included in this list are as-built building details, contract documents, calculations, and some design drawings:

- 24590-BOF-DBC-87-00001, *Switchgear Building 87 Vault Design*

- 24590-BOF-DBC-87-00002, *Switchgear Building 87 Foundation Design*
- 24590-BOF-DBC-87-00003, *A/C Unit Foundation for Bldg. #87*
- 24590-BOF-DB-S13T-00001, *Switchgear Building Foundation & Slab Plans at EL 0'-0" and EL (-) 9'-0"*
- 24590-BOF-DB-S13T-00002, *Switchgear Building Foundation Sections and Details*
- 24590-BOF-DB-S13T-00003, *Switchgear Building Foundation Vault Reinforcing Details*
- 24590-BOF-DB-S13T-00004, *Switchgear Building Foundation - Grade Beams and Slab Reinforcing Details*
- 24590-BOF-DB-S13T-00005, *BOF Switchgear Building Concrete Foundation Plans*
- 24590-BOF-DB-S13T-00006, *BOF Switchgear Building Foundation - Grade Beams, Footing and Slab Reinf Details*
- 24590-BOF-DB-S13T-00007, *BOF Switchgear Building Equipment Foundation Plans, Sections and Details*
- 24590-BOF-DB-S13T-00038, *Switchgear Building 87 Electrical Equipment Anchoring System Plan, Sections, and Details*
- 24590-CM-FC3-AKBP-00001-47-04, *Switchgear Building 87 Erection Notes*
- 24590-CM-FC3-AKBP-00001-47-06, *Switchgear Building 87 - Reaction Load Calculation*
- 24590-CM-FC3-AKBP-00001-47-07A, *Switchgear Building 87 - Notes and Legends 1, 009-3, Rev. 001*
- 24590-CM-FC3-AKBP-00001-47-08, *Switchgear Building 87 - Anchor Bolt Plan*
- 24590-CM-FC3-AKBP-00001-47-09, *Switchgear Building 87 - Frame Cross Section at Frame Line(S) 1*
- 24590-CM-FC3-AKBP-00001-47-10, *Switchgear Building 87 - Frame Cross Section at Frame Line(S) 2*
- 24590-CM-FC3-AKBP-00001-47-11, *Switchgear Building 87 - Frame Cross Section at Frame Line(S) 3*
- 24590-CM-FC3-AKBP-00001-47-12, *Switchgear Building 87 - Frame Cross Section at Frame Line(S) 4*
- 24590-CM-FC3-AKBP-00001-47-13, *Switchgear Building 87 - Frame Cross Section at Frame Line(S) 5*
- 24590-CM-FC3-AKBP-00001-47-14, *Switchgear Building 87 - Primary and Roof Bracing Plan*
- 24590-CM-FC3-AKBP-00001-47-15, *Switchgear Building 87 - Roof Secondary Plan*
- 24590-CM-FC3-AKBP-00001-47-16A, *Switchgear Building 87 - Roof Covering Plan 009-3, Rev. 001*
- 24590-CM-FC3-AKBP-00001-47-17, *Switchgear Building 87 - Secondary Elevation at 1*
- 24590-CM-FC3-AKBP-00001-47-18, *Switchgear Building 87 - Secondary Elevation at A*
- 24590-CM-FC3-AKBP-00001-47-19, *Switchgear Building 87 - Secondary Elevation at 5*
- 24590-CM-FC3-AKBP-00001-47-20, *Switchgear Building 87 - Secondary Elevation at D*
- 24590-CM-FC3-AKBP-00001-47-21A, *Switchgear Building 87 - Covering Elevation at 1, 009-3, Rev. 001*
- 24590-CM-FC3-AKBP-00001-47-22A, *Switchgear Building 87 - Covering Elevation at A, 009-3, Rev. 001*
- 24590-CM-FC3-AKBP-00001-47-23A, *Switchgear Building 87 - Covering Elevation at 5, 009-3, Rev. 001*
- 24590-CM-FC3-AKBP-00001-47-24A, *Switchgear Building 87 - Covering Elevation at D, 009-3, Rev. 001*
- 24590-CM-FC3-AKBP-00001-47-26, *Switchgear Building 87 - Schedule of Finish Hardware*
- 24590-CM-FC3-AKBP-00001-47-27, *Switchgear Building 87 - Metal Building Erection Drawings SEDS*
- 24590-BOF-A2-87-00001, *Switchgear Bldg #87 Architectural Elevations*
- 24590-CM-FC3-AKBP-00001-47-30, *Building 87 - As-Built - Mechanical Plan, M-01*
- 24590-CM-FC3-AKBP-00001-47-31, *Switchgear Building 87 Electrical Plan Schedule and Details*
- 24590-CM-FC3-AKBP-00001-47-33, *Building 87 - As-Built - Mechanical Sections, M-02*
- 24590-CM-FC3-AKBP-00001-47-46, *Switchgear Building 87 - Metal Building Erection Drawings, Shear Lug Location, Plan, and Notes*
- 24590-CM-FC3-AKBP-00001-47-49, *Switchgear Building 87 - Air Distribution - Shop Drawings of Duct Support*
- 24590-CM-FC3-AKBP-00001-47-50, *Switchgear Building 87 - Mechanical HVAC Shop Drawings*
- 24590-CM-FC3-AKBP-00001-64-01, *Base Plate Design Calculations for Building 87, 91 and 82*

- 24590-B87-E22-E54T-00001, *Switchgear Building 87 Underground Ductbank Yard Layout*
- 24590-B87-E22-E54T-00002, *Switchgear Building 87 SDG Concrete Slab Stup Up Locations*
- 24590-B87-E22-GRE-00001, *Switchgear Building 87 Grounding Plan*
- 24590-B87-E22-GRE-00002, *Switchgear Building 87 Lightning Protection Plan*
- 24590-B87-E22-GRE-00003, *Switchgear Building 87 Lightning Protection Details*
- 24590-BOF-E1-MVE-00001, *BOF Facilities Power Distribution (MVE) Main Single Line Diagram*
- 24590-BOF-E1-LVE-00010, *BOF/EMF Secondary Unit Substation LVE-LC-27001 Single Line Diagram*

Switchgear building 87 has four distinct egress door locations discussed in Section 6.2.21.12. This structure also has a vault, located on the lower level of the building, from elevation 0 ft 0 in. to elevation -9 ft 0 in. Access to the vault is available by six ladders that are located in the middle of the structure and on both sides of the walkway, next to the east and west walls of the structure (24590-BOF-P1-87-00002, *Switchgear Building Equipment Location Plan and Sections*). The vault design is calculated in 24590-BOF-DBC-87-00001.

#### 6.2.20.1.1 Wall Penetrations

Above ground wall penetrations are on the northeast side of the building for the HVAC ductwork. Below ground vault penetration seals are documented in 24590-BOF-FIR-CON-12-00140, *Field Inspection Report, B87*, and 24590-CM-POA-E000-00003-14-00513, Dow Corning 3-6548 Silicone RTV Foam Kit (Part A & Part B) - WE-1874.

#### 6.2.20.1.2 Ladders

Six sets of ladders provide exit/egress from the ground level of switchgear building 87 to the vault. Ladders 1 and 2 are located at the east end of the building and serve the floors at 0 ft and -9 ft elevations. Ladders 3 and 4 are located at the west end of the building and serve the floors at elevations 0 ft and -9 ft. Ladders 5 and 6 are located at the center of the first floor of the building and serve the floors at elevations 0 ft and -9 ft.

#### 6.2.20.1.3 Bollard Posts

Bollard posts are provided in doorways where protection is required from expected vehicle travel, as shown in drawing 24590-BOF-P1-87-00002, *Switchgear Building Equipment Location Plan and Sections*. These bollard posts are 4-in. diameter schedule 40 carbon steel pipe filled with concrete and painted with bands of reflective sheeting. Details of these bollard posts are provided in the yard utility drawing 24590-BOF-C2-C12T-00037.

#### 6.2.20.2 Systems

The system locators are described in 24590-WTP-RPT-ENG-02-009, *Systems and Area Locators List and System Division of Responsibility*. Systems and related documents in switchgear building 87 are provided in the following list.

- MVE: 24590-WTP-3ZD-MVE-00001, *LAW BOF and Lab Medium Voltage Electrical (MVE) Low Voltage Electrical (LVE) and DC Electrical (DCE) System Design Description*
- LVE: See MVE
- DCE: See MVE
- UPE: 24590-WTP-3YD-UPE-00001, *System Description for the UPE Power System*
- LTE: 24590-WTP-3YD-LTE-00001, *System Description for Lighting Systems (LTE)*

- PCJ, MHJ, and ASJ: 24590-WTP-3ZD-PCJ-00001, *Process Control (PCJ), Mechanical Handling Control (MHJ), and Autosampling Control (ASJ) System Design Discription*
- CME and FNJ: 24590-WTP-3YD-CME-00001, *System Description for the Communications Electrical System (CME) and Facility Network Infrastructure (FNJ)*
- FSW, FPW, and FDE: 24590-WTP-3YD-FSW-00001, *System Description for the Fire Service Water (FSW), Fire Protection Water (FPW), and the Fire Detection and Alarm (FDE) Systems*
- GRE: 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lightning Protection System*

### 6.2.20.3 Facility Interfaces

Equipment in switchgear building 87 receives power from the A6 substation and distributes power to many different locations.

Load groups A and B of normal 13.8 kV power feeds to the HLW and PT Facilities come from switchgear MVE-SWGR- 87002A and 87002B, and SWGR-87003A and 87003B in switchgear building 87 via underground duct-banks.

The LAW facility 13.8 kV power feeds come from MVE-SWGR-87002A, -87002B, -87003A, and -87003B in switchgear building 87 via underground duct-banks. The switchgears supply power to MVE-XFMR-20603, -20604, MVE-SWGR-20603, and -20604 in the LAW facility. MVE-XFMR-20603 and -20604 receive standby power from building 87 switchgear MVE-SWGR-87003A and -87003B.

The Lab Facility does not have any 13.8 kV switchgear assemblies. Two 13.8 kV-480 V-unit substation transformers MVE-XFMR-60001 and MVE-XFMR-60002 in the Lab Facility receive 13.8 kV power from load groups A and B normal power feeds from switchgear MVE-SWGR-87001A and MVE-SWGR-87001B in switchgear building 87. There standby power feed to LVE-LC-60002 from MVE-SWGR-87003B. Switchgear building 87 design incorporates features and capabilities necessary to ensure efficient WTP operations and meets the permitting, process control, authorization basis and waste form qualification requirements as defined in the baseline document 24590-WTP-PL-G-01-001, *Functional Specification*.

### 6.2.20.4 Utilities

#### 6.2.20.4.1 Power

##### 6.2.20.4.1.1 Normal Power 13.8 kV Switchgear

Switchgear building 87 contains the following 13.8 kV switchgear assemblies for the normal 13.8 kV power distribution:

- MVE-SWGR-87001A; powered directly from utility bus # 1 (load group A)
- MVE-SWGR-87001B; powered directly from utility bus # 2 (load group B)
- MVE-SWGR-87002A; powered directly from utility bus # 1 (load group A)
- MVE-SWGR-87002B, powered directly from utility bus # 2 (load group B)

Switchgear line-ups MVE-SWGR-87001A and MVE-SWGR-87001B provide power feeds to the following equipment:

- MVE-XFMR-91001A/91001B; BOF 13.8 kV – 4.16 kV transformers

- MVE-XFMR-87031A/87031B; BOF 13.8 kV – 480 V transformer
- MVE-XFMR-60001/60002; Lab 13.8 kV – 480 V transformers
- MVE-SWGR-10001; PT Facility 13.8 kV switchgear

Switchgear building 87 line-ups MVE-SWGR-87002A and MVE-SWGR-87002B provide power feeds to the following equipment:

- MVE-XFMR-91002A/91002B; BOF 13.8 kV – 4.16 kV transformers
- MVE-SWGR-30001; HLW 13.8 kV switchgear
- MVE-SWGR-20603/20604; LAW 13.8 kV switchgear
- MVE-SWGR-87003A/87003B; BOF 13.8 kV switchgear
- MVE-XFMR-89002A/89002B; BOF 13.8kV - 4.16 kV transformers

#### **6.2.20.4.1.2 Standby Power 13.8 kV Switchgear**

Switchgear building 87 contains the following 13.8 kV switchgear assemblies for the SDG-backed standby 13.8 kV power distributions:

- MVE-SWGR-87003A: Normal power supplied from MVE-SWGR-87002A (breaker C2), and standby power supplied directly from the MVE-SWGR-87004 bus.
- MVE-SWGR-87003B: Normal power supplied from MVE-SWGR-87002B (breaker C2), and standby power supplied directly from MVE-SWGR-87004.
- MVE-SWGR-87004: SDG bus via bus tie circuit breakers MVE-SWGR-87003A-A1 and MVE-SWGR-87003B-A1.

Switchgear building 87 line-ups MVE-SWGR-87003A and MVE-SWGR-87003B provide power feeds to the following equipment:

- MVE-XFMR-20603/20604; LAW 13.8 kV – 480 V Transformers
- LVE-LC-91004; BOF 480 V Load Center
- LVE-SWGR-30002; HLW 13.8 kV Switchgear
- MVE-XFMR-87031A; BOF 13.8 kV – 480 V Transformers
- LVE-LC-60002; LAB 480 V Load Center

#### **6.2.20.4.1.3 Other Switchgear Building 87 Equipment**

Next to the north wall of the building, the following equipment is located left to right in Figure 6–7:

- UPE-UPS-870001: UPS cabinet, powered from LVE-PNL-87001A
- MVE-ENCL-00013: PCJ control
- MVE-ENCL-00014: remote input/output (RIO) station cabinet
- FNJ-ENCL-00092: communications cabinet
- UPE-SW-87001: battery disconnect switch
- UPE-BATT-87001 and DCE-BATT-87001A: 125 volts direct current (VDC) “A” battery system
- UPE-CAB-87002: battery monitoring cabinet
- DCE-CAB-87001A: battery monitoring cabinet
- DCE-PNL-87001A: 125 VDC distribution panel, powered from LVE-PNL-87001A

- DCE-CHGR-87001C: battery charger
- DCE-CHGR-87001A: battery charger
- LVE-PNL-87001A: 480-V VAC distribution panel, powered from SWGR-87003A
- UPE-CAB-87001: battery monitoring cabinet

Next to the south side wall of the building, the following equipment is located left to right in Figure 6–7:

- LTE-XFMR-87002: 480-480/277 VAC 112.5 kVA transformer
- LTE-PNL-87002: 480-480/277 VAC lighting panel (rack mounted)
- LVE-XFMR-87002A: 480-208/120 VAC 45 kVA transformer
- LVE-PNL-87002A: 120/208 VAC power panel
- LVE-PNL-87001: 480V VAC distribution panel, powered either from LVE-PNL-87001A or B
- LVE-ATS-87001: automatic transfer switch
- LVE-PNL-87001B: 480V VAC distribution panel, powered from SWGR-87003B
- DCE-CHGR-87001B: battery charger
- DCE-PNL-87001B: 125 VDC distribution panel (rack mounted), powered from LVE-PNL-87001B
- DCE-CAB-87001B: battery monitoring cabinet
- DCA-BATT-87001B: 125 VDC “B” battery system
- DCE-CHGR-87001D: battery charger
- MVE-PNL-87005: diesel generator control panel
- MVE-PNL-87004: diesel generator control panel
- LTE-CTR-87001: high mast lighting contactor
- LTE-PHCL-87001: high mast lighting photocell
- LTE-XFMR-87001: 480-480/277 VAC, 45 kVA.3PH.4W.60 Hz transformer
- LTE-PNL-87001: high mast lighting panel rack mounted

#### 6.2.20.4.2 Lighting

A complete and operable lighting system is provided in switchgear building 87 in accordance with NFPA 70, *National Electric Code*, Sections 410 and 700; *IESNA Lighting Handbook* (IESNA 2000); NFPA 101 (1997 and 2000 Editions); and ANSI/IESNA RP-7.

Both normal and emergency lighting is provided. Fixtures are selected from the electrical lighting fixture schedule. Nonstandard fixture selection is designed per the individual requirements of each facility.

All lighting fixtures are compatible with the environment in which they are installed (areas subject to decontamination, outdoor areas, radiation, etc.). Lighting fixtures installed in industrial areas and subjected to possible physical damage are equipped with appropriate protection. [ALARA]

The details of light locations for switchgear building 87, types of lighting used, and the exact location of all the light fixtures are provided in drawing 24590-CM-FC3-AKBP-00001-47-31; 24590-B87-E6-LTE-00001, *LTE-CTR-87001 Lighting Contactor Main Switchgear Building Schematic Diagram*; and 24590-BOF-FIR-CON-13-00013, *LTE-PNL-87002 - BOF/0 FT-0 IN & VAULT/B8*.

Twenty-one light fixtures provide lighting for switchgear building 87. Fixtures are distributed in three rows running the length of the building; each row has seven light fixtures. Above every exit, the combination of

emergency lights and exit signs are installed. In addition, one row of three lights is installed in the vault. One exit light is installed at each of the six ladder exits. Wall pack light fixtures are located outside, over each door, and one on the west side of the structure.

#### 6.2.20.4.3 Ventilation

Switchgear building 87 is one open room served by an outdoor packaged heat pump. The heat pump is located on a slab outdoors, east of the building as shown in 24590-BOF-A2-87-00001, *Switchgear Bldg #87 Architectural Elevations*, and 24590-CM-FC3-AKBP-00001-47-30, *Building 87 - As-Built - Mechanical Plan, M-01*. The heat pump includes an evaporator fan with variable pitch belt drive, direct expansion (DX) evaporator coil, low efficiency filter, electric heating coil, condenser fan and semi-hermetic compressor. A built-in economizer system is included and allows up to 100 % outdoor air to be introduced through the air inlet opening. The economizer is designed to provide “free cooling” when the outside air is cool enough to satisfy the cooling requirements without running the compressor. A remote mounted thermostat controls the heat pump to maintain the room temperature at 95°F during the summer and 50°F during the winter. More detailed descriptions can be found in 24590-BOF-3YD-C1V-00002, *System Description for the BOF CIV HVAC Systems*, and drawings 24590-BOF-A2-87-00001, *Switchgear Bldg #87 Architectural Elevations*, and 24590-CM-FC3-AKBP-00001-47-30, *Building 87 - As-Built - Mechanical Plan, M-01*.

A C1V exhaust fan is in the ceiling of the battery enclosure of Building 87. This fan was added to support battery continuous hydrogen mitigation of the VRLA batteries contained in Building 87. Uninterruptible power is provided to maintain the battery enclosure environment conditions during a loss of off-site power (LOSP) scenario, but it is not provided to the C1V exhaust fan. The C1V fan will not function during a loss of off-site power scenario.

#### 6.2.20.4.4 Fire Protection

Fire detectors are installed per design 24590-CM-HC4-JQ05-00001-T01-01-00005, *Switchgear Building 87 - Fire Alarm System - Plan View*. Fire alarm systems supervise the fire protection systems. This building is protected with an automatic pre-action sprinkler system. These systems meet the requirements of the NFPA and FM data sheets.

The FACP (FDE-PNL-87001) and pre-action panel (FDE-PNL-87002) are located on the northeast wall of the building next to the sprinkler riser area (24590-BOF-P1-87-00002, *Switchgear Building Equipment Location Plan and Sections*).

The main control valve for the fire protection system is located in the northeast corner of the building. The FDC is located on the outside of the building on the northeast side. Details of the fire protection system are listed in the following documents:

- 24590-CM-HC1-PY21-00001-11-00004, *As-Built Drawings and for Bldg 87*
- 24590-CM-HC4-JQ05-00001-T01-01-00001, *Typical Radio Fire Alarm Reporter Box Installation Detail*
- 24590-CM-HC4-JQ05-00001-T01-01-00005, *Switchgear Building 87 - Fire Alarm System - Plan View*
- 24590-CM-HC4-JQ05-00001-T01-01-00006, *Switchgear Building 87 - Riser Diagram & Logic Matrix*
- 24590-CM-HC4-JQ05-00001-T01-01-00007, *Switchgear Building 87 - Fire Alarm Panel PNL-87001*

#### 6.2.20.4.5 Lightning Protection and Grounding

The lightning protection system description is discussed in detail in 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lightning Protection System*. The as-built vendor lightning protection details are shown in 24590-CM-FC3-AKBP-00001-47-43, *Building 87- As-Built - Electrical Lightning Plan, E-02*.

#### 6.2.20.4.6 Capacity

The function of switchgear building 87 is to support the need of other systems and facilities that require 13.8 kV power.

Switchgear building 87 is designed to host 13.8 kV switchgear that belongs to the following systems: MVE, LVE, DCE and UPE.

There are two different types of switchgear located in this building: normal power 13.8 kV switchgear and standby power 13.8 kV switchgear.

#### 6.2.20.5 Energy Conservation

Switchgear building 87 is designed in accordance with the energy conservation requirements set forth in ASHRAE 90.1. Exterior openings are sealed to minimize air leakage.

#### 6.2.20.6 Health and Safety

##### 6.2.20.6.1 Communications

An intra-building public address and telephone communication system is provided for switchgear building 87. Visual and/or audio alarms are located in the building, as shown on the following drawing:

- 24590-B87-EF-CME-00002, *BOF Switchgear Bldg Communication Layout Plan Building 87*

##### 6.2.20.6.2 Means of Egress

Switchgear building 87 is defined as a special-purpose industrial occupancy per NFPA 101. Consistent with Section 10 of DOE-STD-1066-97, compliance with NFPA 101 is considered to satisfy the exit requirements of the applicable building code and the fire protection basis of design. Means of egress and other life safety provisions are designed in accordance with NFPA 101. Switchgear building 87 has four distinct egress door locations with a minimum width of 36 in. each. There are three 7 ft high by 3 ft wide doors; two are located in the southeast and southwest corners of the building, and one is located in the northwest corner of the building. There is one set of 7 ft high by 3 ft wide double doors located on the east side of the building. The structure has two 10 ft high by 10 ft wide roll-up doors, each protected by two interior and two exterior bollards. These doors are located on the northwest and southwest side of the building. These doors are shown in detail in 24590-BOF-A1-87-00001.

The structure evaluation concluded that the egress capacity of exits meets or exceeds the required minimum width. The travel distances to the closest exit in the building (65 ft) are within the maximum travel distance allowed by NFPA 101, *Life Safety Code*. Common paths of travel in switchgear building 87 are within the maximum allowed (24590-BOF-RPT-ENG-01-002, *Life Safety Code Means of Egress Evaluations for BOF*; note that CR 24590-WTP-GCA-MGT-17-00760 may impact this document for this facility).

Locations of exit doors are shown in the general arrangement plan and architectural design drawings, and are in accordance with the architectural design criteria. Continuous and unobstructed access to the exits is available from the operational area floor and each of these exits discharges outdoors at grade level. Exit signs are posted. Integral self-contained dry battery packs/inverters compose each lighting fixture identified as egress lighting.

##### 6.2.20.6.3 High Noise Areas

Switchgear building 87 may require PPE for entry and other high-noise areas within the building are designed to provide sufficient space to accommodate additional noise reduction equipment (if needed), and/or communications



equipment (such as acoustical booths, loud ringers, visual signaling devices, speakers, or speaker phones) if needed. Exemptions may be granted by the Operations Facility Lead or Commissioning Operations Manager. High noise areas will be determined or designated during startup and operations.

#### 6.2.20.6.1 Portable Fire Extinguishers

Portable fire extinguishers are provided in accordance with NFPA 10-2002. These fire extinguishers are placed in easily accessible locations, such as near exit doors and along routes of travel. Fire extinguishers are selected for the class of hazards to be protected and are located in cabinets that are semi recessed or surface mounted. Field sketches currently document the location of extinguishers while under construction (24590-WTP-FSK-CON-T-13-00006001, *Field Sketch - RPP-WTP - Building 87 Switchgear Fire Extinguisher Layout*). The permanent plant design document establishing the number, type, and location of fire extinguishers in switchgear building 87 is 24590-B87-U2-M36T-00001, *Switchgear Bldg 87 Fire Protection Fire Extinguisher Locations*.

#### 6.2.20.6.2 Access

Access to areas within switchgear building 87 is facilitated and controlled by the following:

- Four personnel doors at primary entries and exits
- Roll-up doors
- Lighted exit signs at exit doors
- Access door locks

#### 6.2.20.6.3 Building Code

Switchgear building 87 is classified and constructed as Type II Noncombustible (II-N) construction per Table 6-A, *1997 Uniform Building Code*. Switchgear building 87 is considered a Special Purpose Industrial Occupancy per NFPA 101, *Life Safety Code*, Section 28-1.4.1(b), Group F Division 2 Occupancy with building elements non-rated, except shaft enclosures are 1-hour. This building design is in compliance with requirements for allowable height, allowable area, fire resistance, and exterior wall and opening protection.

#### 6.2.20.6.4 Hazards

##### 6.2.20.6.4.1 Radioactive/Contamination Hazards

There are no radiation or contamination hazards identified in switchgear building 87.

##### 6.2.20.6.4.2 Chemical Hazards

Switchgear building 87 does not present a chemical hazard, and is not required for the prevention or mitigation of any chemical hazards associated with the WTP. As identified in 24590-BOF-RPT-ENS-12-002, *Process Hazards Analysis for Balance of Facilities (BOF)*, chemicals within this building are limited to lubricants and low levels of transient materials being used in maintenance of the equipment and facility.

##### 6.2.20.6.4.3 General Hazards

General site hazards are discussed in 24590-BOF-RPT-ENS-12-002, *Process Hazards Analysis for Balance of Facilities (BOF)*. The most significant hazard in the Switchgear building 87 is electrical shock. Specific electrical hazards are discussed in 24590-BOF-RPT-ENS-12-002.

#### 6.2.20.6.5 Personnel Safety Features

No additional personal safety features are identified beyond standard industrial requirements.

#### 6.2.21 Standby Diesel Generator Area 87S

A facility description will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.22 Dangerous Waste Storage Pad A (90A); Dangerous Waste Storage Pad B (90B)

Facility descriptions will be included in a future revision to support WTP construction turnover schedules.

#### 6.2.23 BOF Switchgear Building 91

BOF switchgear building 91 will support normal power supply (not important-to-safety electrical) to support the BOF buildings. Switchgear building 91 houses 4.16 kV switchgear and 480 V unit substations. Adjacent to BOF switchgear building 91 are four 13.8/4.16 kV power transformers. BOF switchgear building 91 is located north of B road, on the east side of chiller/compressor plant 82, and north of the water treatment building and storage tanks 86. The building's location on the site is identified in 24590-BOF-C2-C12T-00002, *RPP-WTP Site General Arrangement Plan*.

The BOF switchgear building 91 is a one-story pre-engineered metal structure approximately 130 ft long by 35 wide by 18 ft high (interior height) constructed at top of concrete elevation of 682 ft. The actual area of this building is approximately 4,550 ft<sup>2</sup>. Building occupancy classification is "Special Purpose Industrial Occupancy" per Section 28-1.4.1 (b) of NFPA 101 (24590-BOF-RPT-ENG-01-002, *Life Safety Code Means of Egress Evaluations for BOF*). The building's location on the Hanford Site is identified in 24590-BOF-C2-C12T-00002, *RPP-WTP Site General Arrangement Plan*. The four power transformer pads adjacent to BOF switchgear building 91 are at the top of concrete pad elevation of 675 ft 4 in.

Figure 6–16 Deleted BOF switchgear building 91 provides space to support the functions of the hosting of the power distribution processes and equipment and personnel protection. Design features are illustrated in the general arrangement drawings 24590-BOF-P1-91-00001, *BOF Switchgear Building General Arrangements Plan and Sections* and 24590-BOF-P1-91-00002, *BOF Switchgear Building Equipment Location Plan and Sections*. Switchgear building 91 and its system do not present a radiological or chemical hazard, and are not required for the prevention or mitigation of any radiological or chemical hazards associated with the WTP.

##### 6.2.23.1 Facility Layout

The BOF switchgear building 91 houses power distribution equipment for power distribution activities and equipment for the ventilation system.

Personnel entrances to BOF switchgear building 91 are at the 0 ft elevation and are located at the north/east and south/east side of the building. The operating, maintenance, and storage areas of the building can be accessed through this personnel entrance. The aisles provide personnel access to operating and maintenance areas and emergency exits.

The BOF switchgear building 91 receives its power from switchgear building 87 and distributes power from switchgear assemblies to various RPP-WTP BOF buildings. Figure 6–17 shows a general layout of BOF switchgear building 91. For a detailed listing of all equipment, refer to drawings 24590-BOF-P1-91-00001, *BOF Switchgear Building General Arrangements Plan and Sections*.

The exterior wall and roof systems are insulated metal sandwich panels. The interior face of exterior walls and ceilings are the exposed metal liners of the exterior panel assemblies.

The building design was subcontracted per service requisition 24590-CM-SRA-AKBP-00001, Issue for Closeout of Subcontract, to Include Work not Completed to be Completed by Contractor. The service requisition provided the subcontractor with the scope of work for the listed buildings.

The deliverable from the subcontractor provided BSII with documents and drawings that were reviewed by the subcontract technical representative.

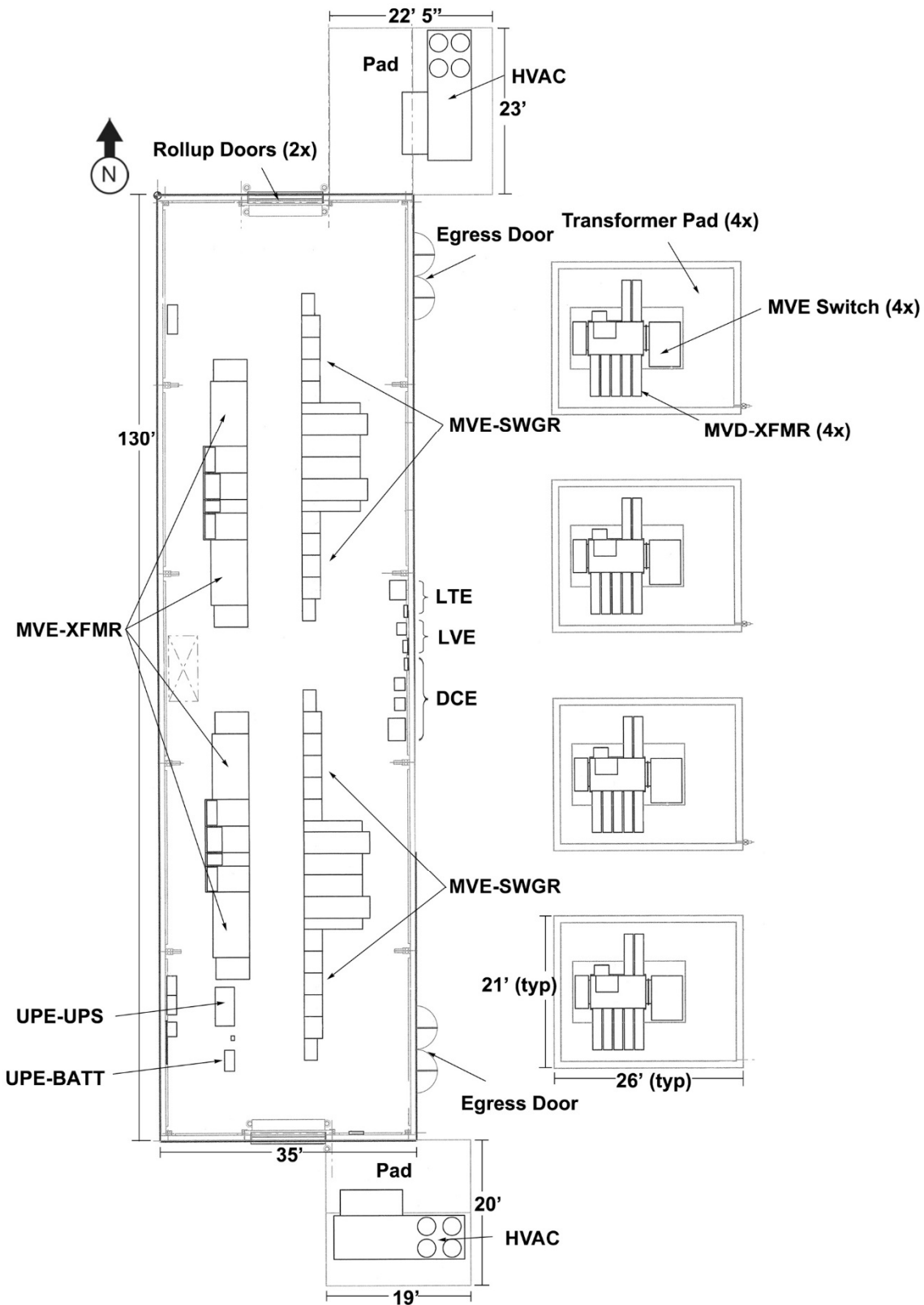
Submitted vendor documents for switchgear building 91 are presented in subcontractor submittal 24590-CM-FC3-AKBP-00001-47-XX series. Additional product data, manuals, and other information are available in the 24590-CM-FC3-AKBP-00001-XX-XX series.

Some vendor drawings may deviate from current installation due to constructability. Change documents against the applicable vendor submittals have been created to show these deviations but are not included in the list below. These changes meet the standard requirements for the WTP Project.

The structure is protected throughout with an automatic fire sprinkler system. The structure is a Type II Noncombustible (II-N) construction, Group F Division 2 Occupancy per Table 6-A in the UBC. The exterior wall and roof systems are insulated metal sandwich panels. The interior face of the exterior walls and ceilings are the exposed metal liner of the exterior panel assemblies.

The BOF switchgear building 91 design is in compliance with requirements for allowable height, allowable area, fire resistance, and exterior wall and opening protection per 24590-BOF-RPT-ENG-01-001, *Building Code Evaluations for BOF*.

Figure 6-17 BOF Switchgear Building 91 Layout



The switchgear building 91 foundation and the at-grade floor slab are constructed of reinforced concrete. The building and associated equipment foundation designs are detailed in the following list of vendor documents.

Included in this list are the vendor submitted as-built building details, contract documents, and some design drawings:

- 24590-B91-E22-E54T-00001, *BOF Switchgear Bldg 91 Underground Duct Bank Yard Layout*
- 24590-B91-E22-E54T-00002, *BOF Switchgear Bldg 91 Underground Duct Bank Sections and Details*
- 24590-BOF-DBC-91-00001, *BOF Switchgear Bldg 91 Foundation Design for Main Columns*
- 24590-BOF-DBC-91-00002, *BOF Switchgear Building 91 Foundation Design for Wind Columns*
- 24590-BOF-DBC-91-00003, *HVAC Equipment Foundations for Bldg. # 91*
- 24590-BOF-DBC-91-00004, *Building #91 and #87 Electrical Equipment Support Design*
- 24590-BOF-DBC-91-00005, *BOF Transformer/Switchgear Foundations and Anchorage for BOF Switchgear Building B91*
- 24590-BOF-DB-S13T-00005, *BOF Switchgear Building Concrete Foundation Plans*
- 24590-BOF-DB-S13T-00006, *BOF Switchgear Building Foundation - Grade Beams, Footing and Slab Reinf Details*
- 24590-BOF-DB-S13T-00007, *BOF Switchgear Building Equipment Foundation Plans, Sections and Details*
- 24590-CM-FC3-AKBP-00001-47-00053, *Bldg 91-As-Built- Lightning Protection Plan & Notes - BOF-91-LP-01*
- 24590-CM-FC3-AKBP-00001-47-36, *Bldg 91-As-Built- HVAC Plans, M-01*
- 24590-CM-FC3-AKBP-00001-47-48, *BOF Switchgear Building 91 - Metal Building Erection Drawings*
- 24590-CM-FC3-AKBP-00001-47-51, *Switchgear Building 91 - Mechanical HVAC Shop Drawings*
- 24590-CM-FC3-AKBP-00001-47-52, *Switchgear Building 91 - Mechanical Ductwork Support Drawings*
- 24590-CM-FC3-AKBP-00001-48-28, *Switchgear BOF #91, PEB-2*
- 24590-CM-FC3-AKBP-00001-48-29, *Switchgear BOF #91, PEB-3*
- 24590-CM-FC3-AKBP-00001-48-30, *Switchgear BOF #91, PEB-4*
- 24590-CM-FC3-AKBP-00001-48-31, *Switchgear BOF #91, PEB-5*
- 24590-CM-FC3-AKBP-00001-48-36, *Switchgear BLDG 91 BOF - Schedule of Finish Hardware*
- 24590-CM-FC3-AKBP-00001-48-42, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Frame Cross Section at Frame Line(s) 2*
- 24590-CM-FC3-AKBP-00001-48-43, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Frame Cross Section at Frame Line(s) 3*
- 24590-CM-FC3-AKBP-00001-48-44, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Frame Cross Section at Frame Line(s) 4*
- 24590-CM-FC3-AKBP-00001-48-45, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Frame Cross Section at Frame Line(s) 5*
- 24590-CM-FC3-AKBP-00001-48-49, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Roof Covering Plan*
- 24590-CM-FC3-AKBP-00001-48-50, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Secondary Elevation at 1*
- 24590-CM-FC3-AKBP-00001-48-51, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Secondary Elevation at A*
- 24590-CM-FC3-AKBP-00001-48-52, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Secondary Elevation at 6*
- 24590-CM-FC3-AKBP-00001-48-53, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Secondary Elevation at D*
- 24590-CM-FC3-AKBP-00001-48-54, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Covering Elevation at 1*

- 24590-CM-FC3-AKBP-00001-48-55, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Covering Elevation at A*
- 24590-CM-FC3-AKBP-00001-48-56, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Covering Elevation at 6*
- 24590-CM-FC3-AKBP-00001-48-57, *BOF Switchgear 91, VP Buildings, Inc. Drawings - Covering Elevation at D*
- 24590-CM-FC3-AKBP-00001-48-59, *Switchgear Building 91 Lighting and Power Plan Notes, Legends and Schedules, 1-Line Diagram and Details*
- 24590-CM-FC3-AKBP-00001-48-63, *BOF Switchgear 91 - Design for Column Anchors (Shear Lugs) P. E. Stamped*
- 24590-CM-FC3-AKBP-00001-48-64, *Bldg 91-As-Built- HVAC Sections, Details and Sections, M-02*
- 24590-CM-FC3-AKBP-00001-56-02, *Switchgear 91 Building, BOF Rollup Doors*
- 24590-CM-FC3-AKBP-00001-57-01, *Switchgear 91 Building, BOF Structural Design Data*
- 24590-CM-FC3-AKBP-00001-59-05, *Switchgear Building - Bldg. No. 91 - HVAC Load Calculations HVAC Duct Pressure Calculations & HVAC Equipment Vendor Data*
- 24590-BOF-ERC-E57T-00003, *RPP-WTP Engineered Cable Tray Supports for BOF Building 91*
- 24590-CM-FC3-AKBP-00001-61-00020, *As Built - Metal Panel Shop Drawings - Building 91*
- 24590-CM-FC3-AKBP-00001-64-01, *Base Plate Design Calculations for Building 87, 91 and 82*
- 24590-CM-FC3-AKBP-00001-65-00003, *Bldg 91 As-Built Project Spec, 91-D018*
- 24590-CM-FC3-AKBP-00001-66-01, *Section 05500-Metal Fabrications, BOF Building #87 and #91*
- 24590-CM-FC3-AKBP-00001-69-00013, *BOF Switchgear Building - Bldg. 91 - Electrical Calculation*
- 24590-BOF-A1-91-00001, *BOF Switchgear Bldg #91 Floor Plan, Notes, Legend, Schedule &Details*
- 24590-BOF-A2-91-00001, *BOF Switchgear Bldg #91 Exterior Elevations*

BOF switchgear building 91 has two distinct egress door locations discussed in Section 6.2.23.6.2. BOF switchgear building 91 has only one room where all the electrical equipment is located. Ventilation equipment is located outside both doors as shown in 24590-BOF-A2-91-00001, *BOF Switchgear Bldg #91 Exterior Elevations* .

#### 6.2.23.1.1 Wall Penetrations

Wall penetrations are on the north and south side of the building for the HVAC ductwork.

#### 6.2.23.1.2 Bollard Posts

Bollard posts are provided in doorways where protection is required from expected vehicle travel, as shown in drawing 24590-BOF-P1-91-00001, *BOF Switchgear Building General Arrangements Plan and Sections*. These bollard posts are 4-in. diameter schedule 40 carbon steel pipe filled with concrete and painted with bands of reflective sheeting. Details of these bollard posts are provided in the yard utility drawing 24590-BOF-C2-C12T-00037.

#### 6.2.23.2 Systems

System locators are described in 24590-WTP-RPT-ENG-02-009, *Systems and Area Locators List and System Division of Responsibility*. Systems and related documents in switchgear building 91 are provided in the following list:

- MVE: 24590-WTP-3ZD-MVE-00001, *LAW BOF and Lab Medium Voltage Electrical (MVE) Low Voltage Electrical (LVE) and DC Electrical (DCE) System Design Description*

- LVE: See MVE
- DCE: See MVE
- UPE: 24590-WTP-3YD-UPE-00001, *System Description for the UPE Power System*
- LTE: 24590-WTP-3YD-LTE-00001, *System Description for Lighting Systems (LTE)*
- PCJ, MHJ, and ASJ: 24590-WTP-3ZD-PCJ-00001, *Process Control (PCJ), Mechanical Handling Control (MHJ), and Autosampling Control (ASJ) System Design Discription*
- CME and FNJ: 24590-WTP-3YD-CME-00001, *System Description for the Communications Electrical System (CME) and Facility Network Infrastructure (FNJ)*
- FSW, FPW, and FDE: 24590-WTP-3YD-FSW-00001, *System Description for the Fire Service Water (FSW), Fire Protection Water (FPW), and the Fire Detection and Alarm (FDE) Systems*
- GRE: 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lightning Protection System*

### 6.2.23.3 Facility Interfaces

The BOF switchgear building 91 receives power from switchgear building 87 and distributes power to many different locations.

The BOF switchgear building 91 design incorporates features and capabilities necessary to ensure efficient WTP operations and meets the permitting, process control, authorization basis and waste form qualification requirements as defined in the baseline document 24590-WTP-PL-G-01-001, *Functional Specification*.

The four-pad mounted 13.8 and 4.16 kV transformers are fed from switchgear building 87 via underground duct-banks. These transformers subsequently feed the transformers in BOF switchgear building 91 via underground duct-banks. Power is further transformed to provide facilities with 408 V, 208 V, and 120 V.

### 6.2.23.4 Utilities

#### 6.2.23.4.1 Power

The facility is provided with onsite power.

BOF switchgear building 91 is designed to host equipment belonging to the MVE, LVE, DCE, and UPE systems.

BOF switchgear building 91 contains the following equipment on the east side of the middle aisle from north to south:

- MVE-PNL-91002A; current transformer control panel, 208/120 V, 3 Phase
- MVE-SWGR-91002A; medium voltage switchgear, 4.16 kV, 3000A, 41 kA
- MVE-SWGR-91002B; medium voltage switchgear, 4.16 kV, 3000A, 41 kA
- MVE-PNL-91002B; current transformer control panel, 208/120 V, 3 Phase
- MVE-PNL-91001A; current transformer control panel, 208/120 V, 3 Phase
- MVE-SWGR-91001A; medium voltage switchgear, 4.16 kV, 3000A, 41 kA

- MVE-SWGR-91001B; medium voltage switchgear, 4.16 kV, 3000A, 41 kA
- MVE-PNL-91001B; current transformer control panel, 208/120 V, 3 Phase

BOF switchgear building 91 contains the following equipment on the west side of the middle Aisle from north to south:

- MVE-SW-91004B; load interrupter switch feeds MVE-XFMR-91004B, 15 kV, 600A
- MVE-XFMR-91004B; main power transformer, 13800-480 V 2500/3333 kVA AA/FA
- LVE-LC-91004; low voltage load center, train A/B 480V, 4000A, 100 kA
- MVE-XFMR-91004A; main power transformer, 2500/3333 kVA AA/FA
- MVE-SW-91004A; load interrupter switch feeds MVE-XFMR-91004A, 15kV, 600A
- MVE-SW-91003B; load interrupter switch feeds MVE-XFMR-91003B, 15kV, 600A
- MVE-XFMR-91003B; main power transformer, 13800-480 V 2500/3333 kVA AA/FA
- LVE-LC-91003; low voltage load center, train A/B 480 V, 4000 A, 100 kA
- MVE-XFMR-91003A; main power transformer, 13800-480 V, 2500/3333 kVA AA/FA
- MVE-SW-91003A; load interrupter switch feeds MVE-XFMR-91003A, 15kV, 600A

BOF switchgear building 91 contains the following equipment on the east wall running north to south:

- LTE-XFMR-91003; lighting transformer feeds lighting panel, 300 kVA, 480-480/277 V
- LTE-PNL-91003; lighting panel, 480/277 V
- LVE-XFMR-91001; distribution transformer, 480-208/120 V, 30 kVA
- LVE-PNL-91001; distribution panel, 208/120 V, 3 Phase
- DCE-PNL-91001; DC distribution panel, 12-60 AT distribution breakers
- DCE-CHGR-91001A; battery charger A, 3 phase, 480 V input 1 phase 130 V DC out, 50A
- DCE-CHGR-91001B; battery charger B, 3 phase, 480 V input 1 phase 130 V DC out, 50A
- DCE-BATT-91001; valve-regulated lead-acid (VRLA) battery bank, 3 Hr RTIME, 125 VDC, 100 AH

BOF switchgear building 91 contains the following equipment on the west wall running north to south:

- MVE-ENCL-00015; enclosure remote IO
- Fire riser area (NIC)
- MVE-ENCL-00007; integrated control network (ICN) controller enclosure
- MVE-ENCL-00008; enclosure remote IO
- FNJ-ENCL-00095; FNJ enclosure

#### 6.2.23.4.2 Lighting

A complete and operable lighting system is provided in switchgear building 91 in accordance with NFPA 70 (1999), Sections 410 and 700; the IESNA Lighting Handbook; the NFPA 101 (1997 and 2000 Editions), and ANSI/IESNA RP-7.

Both normal and emergency lighting is provided. Fixtures are selected from the electrical lighting fixture schedule. Non-standard fixture selection is designed per the individual requirements of each facility.



All lighting fixtures are compatible with the environment in which they are installed (areas subject to decontamination, outdoor areas, radiation, etc.). Lighting fixtures installed in industrial areas and subjected to possible physical damage are equipped with appropriate protection.

Details of light locations for BOF switchgear building 91, types of lighting used, and the exact location of all the light fixtures were provided in drawing 24590-CM-FC3-AKBP-00001-48-59. Additionally, the lighting level requirements called out in the service requisition for the switchgear building are lower than the project design criteria.

Modifications were made to the B91 lighting installation per 24590-WTP-FC-E-15-0522, *BOF - B91- Rewire Lighting Off of LTE-PNL-91003 and LTE-PNL-91006*, by BNI construction to improve the lighting illumination levels and illumination surveys were conducted.

Sixty five light fixtures provide lighting for BOF switchgear building 91. Fixtures are distributed in two outer rows and one staggered middle row running the length of the building. Each outer row has 10 light fixtures with the remaining 27 fixtures in the middle. Above every exit the combination of Emergency light and Exit sign is installed. Wall pack light fixtures are located on the north and south ends of the building and one in the middle on the east side.

#### 6.2.23.4.3 Ventilation

BOF switchgear building 91 is one big open room and is served by two outdoor packaged air conditioning units with electric heat. One unit is located on the north end of the building and is ducted to serve the north half of the room while the other unit is located outdoors on the south end of the building and is ducted to serve the south half of the room. Each air conditioning unit includes an evaporator fan with variable pitch belt drive, DX evaporator coil, low efficiency filter, electric heating coil, condenser fan and semi-hermetic compressor. The heat pumps use R-22 refrigerant for cooling. A remote mounted thermostat controls the air conditioning units to maintain the room temperature at no greater than 95°F during the summer and no less than 50°F during the winter. A duct mounted smoke detector is also provided for each air conditioning unit to shut down the unit in the event smoke is detected. More detailed description can be found in 24590-BOF-3YD-C1V-00002, *System Description for the BOF C1V HVAC Systems*, and drawings 24590-BOF-A2-91-00001, *BOF Switchgear Bldg #91 Exterior Elevations* and 24590-CM-FC3-AKBP-00001-47-36, *Bldg 91 - As-Built - HVAC Plans, M-01*.

A C1V exhaust fan is in the ceiling of the battery enclosure of Building 91. This fan was added to support battery continuous hydrogen mitigation of the VRLA batteries contained in Building 91. Uninterruptible power is provided to maintain the battery enclosure environment conditions during a loss of off-site power (LOSP) scenario, but it is not provided to the C1V exhaust fan. The C1V fan will not function during a loss of off-site power scenario.

#### 6.2.23.4.4 Fire Protection

Fire detectors are installed per design 24590-CM-HC4-JQ05-00001-T01-01-00002, *BOF Switchgear Building 91 - Fire Alarm System - Plan View*. Fire alarm systems supervise the fire protection systems. This building is protected with an automatic pre-action sprinkler system. These systems meet the requirements of NFPA and FM data sheets.

The FACP (FDE-PNL-91001) is located on the south wall as shown in 24590-BOF-P1-91-00002, *BOF Switchgear Building Equipment Location Plan and Sections*.

The main control valve for the fire protection system is located in the center of the west wall of the building. The FDC is located on the outside of the building on the north side. Details of the fire protection system are listed in the following documents:

- 24590-CM-HC1-PY21-00001-11-00005, *As-Built Drawings and for Bldg 91*

- 24590-CM-HC1-PY21-00002-10-00162, *Shop Drawing Bldg. 91 - Relocate Fire Department Connection and Add Riser Check Valve*
- 24590-CM-HC4-JQ05-00001-T01-01-00001, *Typical Radio Fire Alarm Reporter Box Installation Detail*
- 24590-CM-HC4-JQ05-00001-T01-01-00002, *BOF Switchgear Building 91 - Fire Alarm System - Plan View*
- 24590-CM-HC4-JQ05-00001-T01-01-00003, *BOF Switchgear Building 91 - Riser Diagram & Logic Matrix*
- 24590-CM-HC4-JQ05-00001-T01-01-00004, *BOF Switchgear Building 91 - Fire Alarm Panel PNL-91001*

#### 6.2.23.4.5 Lightning Protection and Grounding

The lightning protection system description is discussed in detail in 24590-WTP-3YD-GRE-00001, *System Description for Grounding and Lightning Protection System*. The as-built vendor lightning protection details are shown in 24590-CM-FC3-AKBP-00001-47-00053.

#### 6.2.23.4.6 Capacity

The function of BOF switchgear building 91 is to support the need of other systems and facilities that require 4.16 kV, 480 V, 208 V, and 120 V power.

#### 6.2.23.5 Energy Conservation

BOF switchgear building 91 is designed in accordance with the energy conservation requirements set forth in ASHRAE Standard 90.1-1989. Exterior openings are sealed to minimize air leakage.

#### 6.2.23.6 Health and Safety

##### 6.2.23.6.1 Communications

An intra-building public address and telephone communication system is provided for BOF switchgear building 91. Visual and/or audio alarms are located in the building, as shown on the following drawing:

- 24590-B91-EF-CME-00001, *BOF Switchgear Bldg Communication Layout Plan Building 91*

##### 6.2.23.6.2 Means of Egress

BOF switchgear building 91 is defined as a special-purpose industrial occupancy per NFPA 101. Consistent with Section 10 of DOE-STD-1066-97, compliance with NFPA 101 is considered to satisfy the exit requirements of the applicable building code and the fire protection basis of design. Means of egress and other life safety provisions are designed in accordance with NFPA 101. BOF switchgear building 91 has two distinct egress door locations with a minimum width of 36 in. each. There are two 7 ft high by 3 ft wide doors located in the northeast and southeast corners of the building. The structure has two 10 ft high by 10 ft wide roll-up doors, each protected by two interior and two exterior bollards. These doors are located on the north and south side of the building. These doors are shown in detail in 24590-BOF-A1-91-00001, *BOF Switchgear Bldg Floor Plan & Door Schedule Procurement Drawing*.

The structure evaluation concluded that the egress capacity of exits meets or exceeds the required minimum width. The travel distances to the closest exit in the building, 65 ft, are within the maximum travel distance allowed by NFPA 101, *Life Safety Code*. The common paths of travel in switchgear building 87 are within the maximum allowed (24590-BOF-RPT-ENG-01-002, *Life Safety Code Means of Egress Evaluations for BOF*; note that CR 24590-WTP-GCA-MGT-17-00760 may impact this document for this facility).

Locations of exit doors are shown in the general arrangement plan and architectural design drawings, and are in accordance with the architectural design criteria. Continuous and unobstructed access to the exits is available from

the operational area floor and each of these exits discharges outdoors at grade level. Exit signs are posted. Integral self-contained dry battery packs/inverters compose each lighting fixture identified as egress lighting.

#### 6.2.23.6.3 High Noise Areas

BOF switchgear building 91 may require PPE for entry and other high-noise areas. The building is designed to provide sufficient space to accommodate additional noise reduction equipment if needed, and/or communications equipment (such as acoustical booths, loud ringers, visual signaling devices, speakers, or speaker phones) if needed. Exemptions may be granted by the operations facility lead or commissioning operations manager. High noise areas will be determined or designated during startup and operations.

#### 6.2.23.6.4 Portable Fire Extinguishers

Portable fire extinguishers are provided in accordance with NFPA 10. These fire extinguishers are placed in easily accessible locations, such as near exit doors and along travel routes. Fire extinguishers are selected for the class of hazards to be protected and are located in cabinets that are semi-recessed or surface mounted. Currently, field sketches document the location of extinguishers while under construction (24590-WTP-FSK-CON-T-13-00007001, *Field Sketch - RPP-WTP - Building 91 Switchgear Fire Extinguisher Layout*). The permanent plant design document establishing the number, type, and location of fire extinguishers in BOF switchgear building 91 is 24590-B91-U2-M36T-00001, *BOF Switchgear Building 91 Fire Protection Fire Extinguisher Locations*.

#### 6.2.23.6.5 Access

Access to areas within the BOF switchgear building 91 are facilitated and controlled by the following:

- Two personnel doors at primary entries and exits
- Two roll-up doors
- Lighted exit signs at exit doors
- Access door locks

#### 6.2.23.6.6 Building Code

BOF switchgear building 91 is classified and constructed as Type II Noncombustible (II-N) construction per Table 6-A in the UBC. Switchgear building 87 is considered a Special Purpose Industrial Occupancy per NFPA 101, *Life Safety Code*, Section 28-1.4.1 (b), Group F Division 2 Occupancy with building elements non-rated, except shaft enclosures are 1-hour. This building design is in compliance with requirements for allowable height, allowable area, fire resistance, and exterior wall and opening protection.

#### 6.2.23.6.7 Hazards

##### 6.2.23.6.7.1 Radioactive/Contamination Hazards

There are no radiation or contamination hazards identified in BOF switchgear building 91.

##### 6.2.23.6.7.2 Chemical Hazards

Switchgear building 91 does not present a chemical hazard, and is not required for the prevention or mitigation of any chemical hazards associated with the WTP. As identified in 24590-BOF-RPT-ENS-12-002, *Process Hazards Analysis for Balance of Facilities (BOF)*, chemicals within this building are limited to lubricants and low levels of transient materials being used in maintenance of the equipment and facility.

### 6.2.23.6.7.3 General Hazards

General site hazards are discussed in 24590-BOF-RPT-ENS-12-002, *Process Hazards Analysis for Balance of Facilities (BOF)*. The most significant hazard in the Switchgear building 91 is electrical shock. Specific electrical hazards are discussed in 24590-BOF-RPT-ENS-12-002.

### 6.2.23.6.8 Personnel Safety Features

No additional personal safety features are identified beyond standard industrial requirements.

## 7 Operations

WTP is operated according to the philosophical approaches in DOE Order 422.1, *Attachment 1, Guidelines for the Conduct of Operations for DOE Facilities*, as stated in 24590-WTP-RPT-OP-01-001.

The scope of this document is limited to the features that support production and/or protect equipment, personnel, and the environment not otherwise addressed in system descriptions or in other descriptions such as 24590-WTP-3YD-50-00002, *WTP Integrated Processing Strategy Description*.

### 7.1 Facility Operations for Wet Chemical Storage Facility 11; Wet Chemical Storage Facility Support Building 11S

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

### 7.2 Facility Operations for Glass Former Storage Facility and Glass Former Storage Facility Blend Building 21; Glass Former Storage Facility Control Building 21S

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

### 7.3 Facility Operations for Anhydrous Ammonia Facility 23

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

### 7.4 Facility Operations for Low-Activity Waste Facility Switchgear Building 24

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

### 7.5 Deleted

### 7.6 Facility Operations for Future Immobilized High-Level Waste Canister Storage Facility 33

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

### 7.7 Facility Operations for Administration Building 51

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.8 Facility Operations for Warehouse 52**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.9 Facility Operations for Non-Dangerous, Non-Radioactive Effluent Facility 54; Non-Radioactive Liquid Waste Disposal Wastewater Trihalomethane Air Strippers, and Motor Control Building**

The principal functions of NDNR effluent facility 54 and NLD wastewater THM air strippers is to collect, treat, and transfer NDNR effluent; and meet permitting, process control, and authorization basis requirements.

### **7.9.1 Facility Startup**

Startup of the systems contained in each BOF building is described in their individual system descriptions.

### **7.9.2 Normal Operations**

Electrical power is normally energized within NDNR effluent facility 54. Normal operations of the NLD systems are described in their individual system descriptions.

All the walkways in the building are designed to be part of a route for removing or supplying materials and equipment to and from the operating areas of NDNR effluent facility 54. When a walkway is being used for transfer of large equipment, an egress path will be established and maintained until the equipment is placed at the laydown area.

### **7.9.3 Off-Normal Operations**

Off-normal operations include operations to handle spills and loss of power. Off-normal operations of each BOF system are described in their individual system descriptions.

### **7.9.4 Facility Shutdown**

System description documents include the shutdown operations for each BOF system.

### **7.9.5 Instrumentation and Controls**

Non-dangerous, non-radioactive effluent facility 54 contains various types of instrumentation to provide indication of system conditions and control of the systems. All instruments and controls belong to systems that are housed in the facility and described by respective system descriptions. All automated operations are controlled by the PCJ.

## **7.10 Facility Operations for Maintenance Shop (Combination Shop) 56**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.11 Facility Operations for Simulator Building 58**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.12 Facility Operations for Personnel Access Facility 59**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.13 Facility Operations for Fuel Oil Facility 81**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.14 Facility Operations for Chiller/Compressor Plant 82**

The principal functions of chiller/compressor plant 82 is to provide chilled water and compressed air to WTP operations while meeting permitting, process control, and authorization basis requirements.

Chiller/compressor plant 82 contains various types of instrumentation to provide indication of system conditions and control. These instruments are discussed in the system descriptions of the respective individual systems.

### **7.14.1 Facility Startup**

Startup of the systems contained in each BOF building is described in their individual system descriptions.

### **7.14.2 Normal Operations**

Electrical power is normally energized within the chiller/compressor plant 82. Normal operations of chiller/compressor plant 82 systems are described in their individual system descriptions. The building ventilation system will operate to maintain the building temperature within design parameters.

Outdoor lighting is energized by photoelectric sensor when ambient light falls below minimum illumination. Interior lighting is controlled by manual switches located at entry doors to the building and interior spaces.

All the walkways in the building are designed to be part of a route for removing or supplying materials and equipment to and from the operating areas of the facility. When a walkway is being used for transfer of large equipment, an egress path will be established and maintained until the equipment is placed at the laydown area.

### **7.14.3 Off-Normal Operations**

Off-normal operations include operations to handle spills and loss of power. When the refrigerant leak detection system alarms, ventilation fans are automatically activated. Manual activation switches are also provided. Off-normal operations of each BOF system are described in their individual system descriptions.

### **7.14.4 Facility Shutdown**

System description documents include the shutdown operations for each BOF system.

### **7.14.5 Instrumentation and Controls**

All the instruments and controls found in chiller/compressor plant 82 belong to systems that are hosted in the facility and described by system descriptions. All automated operations are controlled by the PCJ.

## **7.15 Facility Operations for Cooling Tower Facility 83; Cooling Tower Facility Support Building 83S**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.16 Facility Operations for Fire Water Pump House A and B (84A and 84B)**

Facility operation, including startup, normal operation, off-normal operation, and shutdown are covered in this section. Individual system descriptions describe the operations of equipment located in the facility.

The principal function of fire water pump houses 84A and 84B is to supply fire water at sufficient flows and pressures to the WTP facilities for fire suppression in correspondence with permitting and authorization basis requirements.

Electrical power is normally energized within fire water pump houses A and B (84A and 84B).

Fire water pump houses A and B (84A and 84B) contain various types of instrumentation to provide indication of system conditions and control of systems. All instruments and controls belong to systems that are housed in the facility and described by respective system descriptions.

## **7.17 Facility Operations for Steam Plant 85**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.18 Facility Operations for Water Treatment Building and Storage Tanks 86**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.19 Facility Operations for Switchgear Building 87**

Electrical power is normally energized within switchgear building 87. Normal operations of switchgear building 87 systems are described in their individual system descriptions.

### **7.19.1 Facility Startup**

Startup of the systems contained in each BOF building is described in their individual system descriptions.

### **7.19.2 Normal Operations**

The principal functions of switchgear building 87 are to support power distribution function and associated operations; and meet permitting, process control, and authorization basis requirements.

Switchgear building 87 contains various types of instrumentation to provide indication of system conditions and control of the systems. These instruments are discussed in the system descriptions of the individual systems.

All automated operations are controlled by the PCJ.

All the walkways in the building are designed to be part of a route for removing or supplying materials and equipment to and from the operating areas of the building. When a walkway is being used for transfer of large equipment, an egress path will be established and maintained until the equipment is placed at the laydown area.

### **7.19.3 Off-Normal Operations**

Off-normal operations include operations to handle spills and loss of power. Off-normal operations of each BOF system are described in their individual system descriptions.

### **7.19.4 Facility Shutdown**

System description documents include the shutdown operations for each BOF system.

### **7.19.5 Instrumentation and Controls**

All the instruments and controls that can be found in the Switchgear 87 Building belong to systems that are hosted in the building and described by system descriptions. System description documents include the instrument and controls for each switchgear building 87 system.

## **7.20 Facility Operations for Standby Diesel Generator Area 87S**

A facility description will be included in a future revision to support WTP construction turnover schedules.

## **7.21 Facility Operations for Emergency Turbine Generator Facility 89**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.22 Facility Operations for Dangerous Waste Storage Pad A (90A); Dangerous Waste Storage Pad B (90B)**

Operations within this facility will be included in a future revision to support WTP construction turnover schedules.

## **7.23 Facility Operations for BOF Switchgear Building 91**

The principal function of BOF Switchgear Building 91 is to provide electrical power to BOF facilities to support associated operations, while meeting permitting, process control, and authorization basis requirements.

### **7.23.1 Facility Startup**

Startup of the systems contained in each BOF building is described in their individual system descriptions.

### **7.23.2 Normal Operations**

Electrical power is normally energized within BOF switchgear building 91. Normal operations of the building 91 systems are described in their individual system descriptions.

The principal functions of BOF switchgear building 91 are to support power distribution function and associated operations; and meet permitting, process control, and authorization basis requirements.

BOF switchgear building 91 contains various types of instrumentation to provide indication of system conditions and control of the systems. These instruments are discussed in the system descriptions of the individual systems.



All the walkways in the building are designed to be part of a route for removing or supplying materials and equipment to and from the operating areas of the building. When a walkway is being used for transfer of large equipment, an egress path will be established and maintained until the equipment is placed at the laydown area.

### 7.23.3 Off-Normal Operations

Off-normal operations include operations to handle spills and loss of power. Off-normal operations of each BOF system are described in their individual system descriptions.

### 7.23.4 Facility Shutdown

System description documents include the shutdown operations for each BOF system.

### 7.23.5 Instrumentation and Controls

All the instruments and controls in BOF switchgear building 91 belong to systems that are hosted in the building and described by system descriptions. System description documents include the instrument and controls for each BOF switchgear building 91 system. All automated operations are controlled by the PCJ.

## 8 Maintenance

The WTP follows the requirements of DOE Order 433.1, *Maintenance Management Program for DOE Nuclear Facilities* as tailored (24590-WTP-PSAR-ESH-01-002-01).

As construction turns over facilities, the buildings will undergo a baseline condition assessment. At present, most of the buildings are under preservation maintenance. When in operation, periodic testing and maintenance of all buildings and systems will be performed in accordance with the manufacturers' operation and maintenance manuals (unless otherwise specified by engineering).

### 8.1 Maintenance for Wet Chemical Storage Facility 11; Wet Chemical Storage Facility Support Building 11S

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

### 8.2 Maintenance for Glass Former Storage Facility and Glass Former Storage Facility Blend Building 21; Glass Former Storage Facility Control Building 21S

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

### 8.3 Maintenance for Anhydrous Ammonia Facility 23

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

### 8.4 Maintenance for Low-Activity Waste Facility Switchgear Building 24

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.5 Deleted**

## **8.6 Maintenance for Future Immobilized High-level Waste Canister Storage Facility 33**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.7 Maintenance for Administration Building 51**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.8 Maintenance for Warehouse 52**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.9 Maintenance for Non-Dangerous, Non-Radioactive Effluent Facility 54; Non-Radioactive Liquid Waste Disposal Wastewater Trihalomethane Air Strippers, and Motor Control Building**

### **8.9.1 Maintenance Approach**

Non-dangerous, non-radioactive effluent facility 54, NLD wastewater THM air strippers, and motor control building are designed for contact (hands-on) maintenance to the maximum extent practical. All maintenance activities performed are conducted in a manner that meets industrial safety principles.

Facility space, work platforms, and ladders provide access to equipment to perform routine maintenance, and periodic functional testing while the WTP electrical systems are in normal operation.

### **8.9.2 Maintenance Procedures**

Procedures are being drafted that will govern the maintenance process.

## **8.10 Maintenance for Maintenance Shop (Combination Shop) 56**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.11 Maintenance for Simulator Building 58**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.12 Maintenance for Personnel Access Facility 59**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

### **8.13 Maintenance for Fuel Oil Facility 81**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

### **8.14 Maintenance for Chiller/Compressor Plant 82**

#### **8.14.1 Maintenance Approach**

Chiller/compressor plant 82 is designed for contact (hands-on) maintenance to the maximum extent practical using conventional equipment. All maintenance activities performed in the plant are conducted in a manner that meets industrial safety principles.

Facility space, work platforms, and ladders provide access to equipment to perform routine maintenance, and periodic functional testing while the systems are in normal operation.

#### **8.14.2 Maintenance Procedures**

Procedures are being drafted that will govern the maintenance process.

### **8.15 Maintenance for Cooling Tower Facility 83; Cooling Tower Facility Support Building 83S**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

### **8.16 Maintenance for Fire Water Pump House A and B (84A and 84B)**

#### **8.16.1 Maintenance Approach**

Fire water pump houses A and B (84A and 84B) are designed for contact (hands-on) maintenance to the maximum extent practical. All maintenance activities performed are conducted in a manner that meets industrial safety principles.

Facility space, work platforms, and ladders provide access to equipment to perform routine maintenance, and periodic functional testing while the WTP electrical systems are in normal operation.

#### **8.16.2 Maintenance Procedures**

Procedures are being drafted that will govern the maintenance process.

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

### **8.17 Maintenance for Steam Plant 85**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

### **8.18 Maintenance for Water Treatment Building and Storage Tanks 86**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.19 Maintenance for Switchgear Building 87**

### **8.19.1 Maintenance Approach**

Switchgear building 87 is designed for contact (hands-on) maintenance to the maximum extent practical. All maintenance activities performed in switchgear building 87 are conducted in a manner that meets industrial safety principles.

Facility space, work platforms, and ladders provide access to equipment to perform routine maintenance, and periodic functional testing while the WTP electrical systems are in normal operation.

Switchgear building 87 systems are designed with redundancy, allowing for continued service while maintenance is being performed.

### **8.19.2 Maintenance Procedures**

Procedures are being drafted that will govern the maintenance process.

## **8.20 Maintenance for Standby Diesel Generator Area 87S**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.21 Maintenance for Emergency Turbine Generator Facility 89**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.22 Maintenance for Dangerous Waste Storage Pad A (90A); Dangerous Waste Storage Pad B (90B)**

The maintenance approach and applicable procedures will be included in a future revision to support WTP construction turnover schedules.

## **8.23 Maintenance for BOF Switchgear Building 91**

### **8.23.1 Maintenance Approach**

BOF switchgear building 91 is designed for contact (hands-on) maintenance to the maximum extent practical. All maintenance activities performed in BOF switchgear building 91 are conducted in a manner that meets industrial safety principles.

Facility space, work platforms, and ladders provide access to equipment to perform routine maintenance, and periodic functional testing while the WTP electrical systems are in normal operation.

BOF switchgear building 91 systems are designed with redundancy, allowing for continued service while maintenance is being performed.

### **8.23.2 Maintenance Procedures**

Procedures are being drafted that will govern the maintenance process.

## 9 Interfacing Systems

### 9.1 Interface of BOF Buildings with Other Systems

BOF buildings interface with many systems. Table 9–1 lists the interfacing systems.

**Table 9–1 BOF System Interface**

System Description Document Number	System Locator	System name
24590-BOF-3YD-C1V-00002	C1V	<i>System Description for the BOF CIV Systems</i>
24590-WTP-3YD-CHW-00001	CHW	<i>System Description for Lab, BOF, LAW, HLW and BOF-Supplied PTF Chilled Water System (CHW)</i>
24590-WTP-3YD-CME-00001	CME	<i>System Description for the Communications Electrical System (CME) and Facility Network Infrastructure (FNI)</i>
24590-WTP-3YD-CPE-00001	CPE	<i>System Description for Waste Treatment Plant Cathodic Protection (CPE)</i>
24590-WTP-3YD-DIW-00001	DIW	<i>System Description for the Demineralized Water System (DIW)</i>
24590-WTP-3YD-DOW-00001	DOW	<i>System Description for the Waste Treatment Plant Domestic Water System (DOW)</i>
24590-WTP-3YD-FSW-00001	FSW/FDE	<i>System Description for the Fire Service Water (FSW), Fire Protection Water (FPW), and the Fire Detection and Alarm (FDE) Systems</i>
24590-WTP-3YD-GRE-00001	GRE	<i>System Description for Grounding and Lightning Protection System</i>
24590-WTP-3YD-HPS-00001	HPS/SCW	<i>System Description for the Waste Treatment Plant High Pressure Steam (HPS), Low Pressure Steam (LPS) and Steam Condensate Water (SCW)</i>
24590-WTP-3YD-LTE-00001	LTE	<i>System Description for Lighting Systems (LTE)</i>
24590-WTP-3YD-NLD-00001	NLD	<i>System Description for the Waste Treatment Plant Non-Radioactive Liquid Waste Disposal (NLD) System</i>
24590-WTP-3YD-PCW-00001	PCW	<i>System Description for the WTP Plant Cooling Water System (PCW)</i>
24590-WTP-3YD-PSA-00002	PSA	<i>System Description for the Waste Treatment Plant (WTP) Plant Service Air (PSA) System</i>
24590-WTP-3YD-PSW-00001	PSW	<i>System Description for the Process Service Water System (PSW)</i>
24590-BOF-3YD-RWW-00001	RWW	<i>System Description for Raw Water System (RWW)</i>
24590-BOF-3YD-SND-00001	SND	<i>System Description for Balance of Facility Sanitary Disposal (SND) System</i>
24590-BOF-3YD-SWD-00001	SWD	<i>System Description for Balance of Facility Storm Water Disposal (SWD) System</i>
24590-WTP-3YD-UPE-00001	UPE	<i>System Description for the UPE Power System</i>
24590-BOF-3ZD-25-00001	DEP, ACV, AVR	<i>WTP Direct Feed Low Activity Waste (DFLAW) Facility and Systems Design Description</i>

**Table 9–1 BOF System Interface**

System Description Document Number	System Locator	System name
24590-WTP-3ZD-MVE-00001	MVE, LVE, DCE	<i>LAW BOF and Lab Medium Voltage Electrical (MVE) Low Voltage Electrical (LVE) and DC Electrical (DCE) System Design Description</i>
24590-WTP-3ZD-PCJ-00001	PCJ, MHJ, ASJ	<i>Process Control (PCJ), Mechanical Handling Control (MHJ), and Autosampling Control (ASJ) System Design Description.</i>

## 10 Applicable Documents

The following documents apply to the facility features in the BOF.

### 10.1 Project Documents

#### 10.1.1 Design Criteria Documents

24590-WTP-COR-MGT-15-00001	<i>Engineering, Procurement, and Construction (EPC) Code of Record</i>
24590-WTP-DB-ENG-01-001	<i>Basis of Design</i>
24590-WTP-DC-C-01-001	<i>Civil Design Criteria</i>
24590-WTP-DC-ST-01-001	<i>Structural Design Criteria</i>
24590-WTP-DC-ST-04-001	<i>Seismic Analysis and Design Criteria</i>
24590-WTP-PL-G-01-001	<i>Functional Specification</i>
24590-WTP-SRD-ESH-01-001-02	<i>Safety Requirements Document Volume II</i>

#### 10.1.2 Design Basis Documents

DE-AC27-01RV14136	<i>DOE Contract, Hanford Tank Waste Treatment and Immobilization Plant, as amended. US Department of Energy, Richland Operations Office, Richland, WA. 2000.</i>
24590-WTP-FHA-RAFP-FP-0001	<i>Fire Hazards Analysis (FHA) for The General/Balance of Facilities (BOF)</i>
24590-WTP-ICD-MG-01-003	<i>ICD 03 - Interface Control Document for Radioactive Solid Waste</i>
24590-WTP-ICD-MG-01-005	<i>ICD 05 - Interface Control Document for Nonradioactive, Nondangerous Liquid Effluents</i>
24590-WTP-ICD-MG-01-009	<i>ICD 09 - Interface Control Document for Land for Siting</i>
24590-WTP-PSAR-ESH-01-002-01	<i>Preliminary Documented Safety Analysis to Support Construction Authorization; General Information</i>
24590-WTP-PSAR-ESH-01-002-02	<i>Preliminary Documented Safety Analysis to Support Construction Authorization; PT Facility Specific Information</i>
24590-WTP-PSAR-ESH-01-002-03	<i>Preliminary Documented Safety Analysis to Support Construction Authorization; LAW Facility Specific Information</i>
24590-WTP-RPP-ESH-01-001	<i>Radiation Protection Program for Design, Construction, Commissioning and Operations</i>

24590-WTP-RPT-ENG-02-009      *Systems and Area Locators List and System Division of Responsibility*  
24590-WTP-RPT-OP-01-001      *Operations Requirements Document*

### 10.1.3 System Descriptions and System Design Descriptions

24590-BOF-3YD-C1V-00002      *System Description for The BOF CIV HVAC Systems*  
24590-BOF-3YD-RWW-00001      *System Description for Raw Water System (RWW)*  
24590-BOF-3YD-SND-00001      *System Description for Balance of Facility Sanitary Disposal (SND) System*  
24590-BOF-3YD-SWD-00001      *System Description for Balance of Facility Storm Water Disposal (SWD) System*  
24590-BOF-3ZD-25-00001      *WTP Direct Feed Low Activity Waste (DFLAW) Facility and System Design Descriptions*  
24590-WTP-3YD-50-00002      *WTP Integrated Processing Strategy Description*  
24590-WTP-3YD-CHW-00001      *System Description for The WTP Chilled Water System (CHW)*  
24590-WTP-3YD-CME-00001      *System Description for The Communications Electrical System (CME) and Facility Network Infrastructure (FNJ)*  
24590-WTP-3YD-CPE-00001      *System Description for Waste Treatment Plant Cathodic Protection (CPE) System*  
24590-WTP-3YD-DOW-00001      *System Description for The Waste Treatment Plant Domestic Water System (DOW)*  
24590-WTP-3YD-FSW-00001      *System Description for The Fire Service Water (FSW), Fire Protection Water (FPW), and The Fire Detection and Alarm (FDE) Systems*  
24590-WTP-3YD-GRE-00001      *System Description for Grounding and Lightning Protection System*  
24590-WTP-3YD-HPS-00001      *System Description for The Analytical Laboratory (Lab), Balance of Facilities (BOF), and Effluent Management Facility (EMF) High Pressure Steam (HPS), Low Pressure Steam (LPS) Systems*  
24590-WTP-3YD-LTE-00001      *System Description for Lighting Systems (LTE)*  
24590-WTP-3YD-NLD-00001      *System Description for The Waste Treatment Plant Non-Radioactive Liquid Waste Disposal (NLD) System*  
24590-WTP-3YD-PCW-00001      *System Description for The WTP Plant Cooling Water System (PCW)*  
24590-WTP-3YD-PSA-00002      *System Description for The Waste Treatment Plant (WTP) Plant Service Air (PSA) System*  
24590-WTP-3YD-PSW-00001      *System Description for The Process Service Water System (PSW)*  
24590-WTP-3YD-UPE-00001      *System Description for The UPE Power System*  
24590-WTP-3ZD-MVE-00001      *LAW BOF and Lab Medium Voltage Electrical (MVE) Low Voltage Electrical (LVE) and Dc Electrical (DCE) System Design Description*  
24590-WTP-3ZD-PCJ-00001      *Process Control (PCJ), Mechanical Handling Control (MHJ), and Auto Sampling Control (ASJ) System Design Description*

### 10.1.4 Piping and Instrumentation Diagrams and Lists

24590-BOF-M6-CHW-00001001      *BOF Chilled Water System Yard Distribution Piping*  
24590-BOF-M6-CHW-00001002      *BOF Chilled Water System Chw-Pmp-00008a/B and Chw-Pmp-00012a/B*  
24590-BOF-M6-CHW-00001003      *BOF Chilled Water System Chw-Pmp-00010a/B and Chw-Pmp-00011a/B*

24590-BOF-M6-CHW-00002001	<i>BOF Chilled Water System Chiller Compressor Plant Chiller Distribution Piping</i>
24590-BOF-M6-CHW-00002002	<i>BOF Chilled Water System Chiller Compressor Plant Distribution Pumps</i>
24590-BOF-M6-CHW-00002003	<i>BOF Chilled Water System Chiller Compressor Plant Train A Chiller</i>
24590-BOF-M6-CHW-00002004	<i>BOF Chilled Water System Chiller Compressor Plant Train A Compressor Oil Circulation</i>
24590-BOF-M6-CHW-00002005	<i>BOF Chilled Water System Chiller Compressor Plant Train B Chiller</i>
24590-BOF-M6-CHW-00002006	<i>BOF Chilled Water System Chiller Compressor Plant Train B Compressor Oil Circulation</i>
24590-BOF-M6-CHW-00002007	<i>BOF Chilled Water System Chiller Compressor Plant Train C Chiller</i>
24590-BOF-M6-CHW-00002008	<i>BOF Chilled Water System Chiller Compressor Plant Train C Compressor Oil Circulation</i>
24590-BOF-M6-CHW-00002009	<i>BOF Chilled Water System Chiller Compressor Plant Train D Chiller</i>
24590-BOF-M6-CHW-00002010	<i>BOF Chilled Water System Chilled Compressor Plant Train D Compressor Oil Circulation</i>
24590-BOF-M6-CHW-00002011	<i>BOF Chilled Water System Chiller Compressor Plant Train E Chiller</i>
24590-BOF-M6-CHW-00002012	<i>BOF Chilled Water System Chiller Compressor Plant Train E Compress Oil Circulation</i>
24590-BOF-M6-CHW-00002013	<i>BOF Chilled Water System Chiller Compressor Plant Train F Chiller</i>
24590-BOF-M6-CHW-00002014	<i>BOF Chilled Water System Chiller Compressor Plant Train F Compressor Oil Circulation</i>
24590-BOF-M6-CHW-00003001	<i>BOF Chilled Water System PSA Dryer Distribution Piping</i>
24590-BOF-M6-CHW-00004001	<i>BOF Chilled Water System Chiller Compressor Plant PSV Distribution Piping</i>
24590-BOF-M6-DOW-00003002	<i>BOF Domestic (Potable) Water System Distribution Buildings 84 A/B and 86</i>
24590-BOF-M6-HPS-00001001	<i>BOF High Pressure Steam System Distribution Header</i>
24590-BOF-M6-HPS-00001002	<i>BOF High Pressure Steam System Distribution Header</i>
24590-BOF-M6-HPS-00001003	<i>BOF High Pressure Steam System Distribution Header</i>
24590-BOF-M6-HPS-00022001	<i>BOF/EMF High Pressure Steam System Distribution</i>
24590-BOF-M6-PCW-00001001	<i>BOF Plant Cooling Water System Cooling Tower-Distribution Piping</i>
24590-BOF-M6-PCW-00002001	<i>BOF Plant Cooling Water System Chiller Compressor Plant Distribution Piping</i>
24590-BOF-M6-PCW-00003001	<i>BOF Plant Cooling Water System Cooling Tower Flow Channel</i>
24590-BOF-M6-PCW-00003002	<i>BOF Plant Cooling Water System Miscellaneous Pumps</i>
24590-BOF-M6-PCW-00003003	<i>BOF Plant Cooling Water System Cooling Tower Miscellaneous Fans</i>
24590-BOF-M6-PCW-00003004	<i>BOF Plant Cooling Water System Cooling Tower Chemical Feed Injection Tanks</i>
24590-BOF-M6-PCW-00003005	<i>BOF Plant Cooling Water System Cooling Tower Control Chemical Feed PCW-FILT-00001</i>
24590-BOF-M6-PCW-00005001	<i>BOF/EMF Plant Cooling Water System Heat Exchanger PCW-HX-00025</i>
24590-BOF-M6-PCW-00005002	<i>BOF/EMF Plant Cooling Water System Distribution PCW-PMP-00030A/B And PCW-VSL-00052</i>
24590-BOF-M6-PSA-00001001	<i>BOF Plant Service Air System Yard Distribution Piping</i>
24590-BOF-M6-PSA-00002001	<i>BOF Plant Service Air System Centrifugal Compressor Stage 1 PSA-CMP-00001A</i>



24590-BOF-M6-PSA-00002002	<i>BOF Plant Service Air System Centrifugal Compressor Stages 2 Thru 4 PSA-CMP-00001A</i>
24590-BOF-M6-PSA-00002003	<i>BOF Plant Service Air System Pneumatic Air Distribution PSA-CMP-00001A &amp; Supervisory Panel Cooling</i>
24590-BOF-M6-PSA-00002004	<i>BOF Plant Service Air System Centrifugal Compressor Lube Oil/Cooling Water PSA-CMP-00001A</i>
24590-BOF-M6-PSA-00002005	<i>BOF Plant Service Air System Gearbox/Motor and Supervisory Control PSA-CMP-00001A</i>
24590-BOF-M6-PSA-00002006	<i>BOF Plant Service Air System Centrifugal Compressor Stage 1 PSA-CMP-00001B</i>
24590-BOF-M6-PSA-00002007	<i>BOF Plant Service Air System Centrifugal Compressor Stages 2 Thru 4 PSA-CMP-00001B</i>
24590-BOF-M6-PSA-00002008	<i>BOF Plant Service Air System Pneumatic Air Distribution PSA-CMP-00001B</i>
24590-BOF-M6-PSA-00002009	<i>BOF Plant Service Air System Centrifugal Compressor Lube Oil/Cooling Water PSA-CMP-00001B</i>
24590-BOF-M6-PSA-00002010	<i>BOF Plant Service Air System Gearbox/Motor and Supervisory Control PSA-CMP-00001B</i>
24590-BOF-M6-PSA-00002011	<i>BOF Plant Service Air System Centrifugal Compressor Stage 1 PSA-CMP-00001C</i>
24590-BOF-M6-PSA-00002012	<i>BOF Plant Service Air System Centrifugal Compressor Stages 2 Thru 4 PSA-CMP-00001C</i>
24590-BOF-M6-PSA-00002013	<i>BOF Plant Service Air System Pneumatic Air Distribution PSA-CMP-00001C</i>
24590-BOF-M6-PSA-00002014	<i>BOF Plant Service Air System Centrifugal Compressor Lube Oil/Cooling Water PSA-CMP-00001C</i>
24590-BOF-M6-PSA-00002015	<i>BOF Plant Service Air System Gearbox/Motor and Supervisory Control PSA-CMP-00001C</i>
24590-BOF-M6-PSA-00002016	<i>BOF Plant Service Air System Centrifugal Compressor Stage 1 PSA-CMP-00001D</i>
24590-BOF-M6-PSA-00002017	<i>BOF Plant Service Air System Centrifugal Compressor Stages 2 Thru 4 PSA-CMP-00001D</i>
24590-BOF-M6-PSA-00002018	<i>BOF Plant Service Air System Pneumatic Air Distribution PSA-CMP-00001D</i>
24590-BOF-M6-PSA-00002019	<i>BOF Plant Service Air System Centrifugal Compressor Lube Oil/Cooling Water PSA-CMP-00001D</i>
24590-BOF-M6-PSA-00002020	<i>BOF Plant Service Air System Gearbox/Motor and Supervisory Control PSA-CMP-00001D</i>
24590-BOF-M6-PSA-00003002	<i>BOF Plant Service Air System Rotary Screw Compressor Disch, Lube Oil &amp; Drive PSA-CMP-00002A</i>
24590-BOF-M6-PSA-00003005	<i>BOF Plant Service Air System Rotary Screw Compressor PSA-CMP-00002B</i>
24590-BOF-M6-PSA-00003006	<i>BOF Plant Service Air System Rotary Screw Compressor Disch, Lube Oil &amp; Drive PSA-CMP-00002B</i>
24590-BOF-M6-PSA-00003009	<i>BOF Plant Service Air System Rotary Screw Compressor PSA-CMP-00002C</i>
24590-BOF-M6-PSA-00003010	<i>BOF Plant Service Air System Rotary Screw Compressor Disch, Lube Oil &amp; Drive PSA-CMP-00002C</i>
24590-BOF-M6-PSA-00003011	<i>BOF Plant Service Air System Rotary Screw Compressor PSA-CMP-00002D</i>
24590-BOF-M6-PSA-00003012	<i>BOF Plant Service Air System Rotary Screw Compressor Disch, Lube Oil &amp; Drive PSA-CMP-00002D</i>
24590-BOF-M6-PSA-00004001	<i>BOF Plant Service Air System Heat-Of-Compression Dryer Air Supply Headers</i>

24590-BOF-M6-PSA-00004002	<i>BOF Plant Service Air System Compression Heater Dryer Outlet Headers</i>
24590-BOF-M6-PSA-00004003	<i>BOF Plant Service Air System Desiccant Towers PSA-DRY-00001A</i>
24590-BOF-M6-PSA-00004004	<i>BOF Plant Service Air System Condensate Removal PSA-DRY-00001A</i>
24590-BOF-M6-PSA-00004005	<i>BOF Plant Service Air System Pneumatic Air Distribution PSA-DRY-00001A</i>
24590-BOF-M6-PSA-00004006	<i>BOF Plant Service Air System Desiccant Towers PSA-DRY-00001B</i>
24590-BOF-M6-PSA-00004007	<i>BOF Plant Service Air System Condensate Removal PSA-DRY-00001B</i>
24590-BOF-M6-PSA-00004008	<i>BOF Plant Service Air System Pneumatic Air Distribution PSA-DRY-00001B</i>
24590-BOF-M6-PSA-00004009	<i>BOF Plant Service Air System Desiccant Towers PSA-DRY-00001C</i>
24590-BOF-M6-PSA-00004010	<i>BOF Plant Service Air System Condensate Removal PSA-DRY-00001C</i>
24590-BOF-M6-PSA-00004011	<i>BOF Plant Service Air System Pneumatic Air Distribution PSA-DRY-00001C</i>
24590-BOF-M6-PSA-00004012	<i>BOF Plant Service Air System Desiccant Towers PSA-DRY-00001D</i>
24590-BOF-M6-PSA-00004013	<i>BOF Plant Service Air System Condensate Removal PSA-DRY-00001D</i>
24590-BOF-M6-PSA-00004014	<i>BOF Plant Service Air System Pneumatic Air Distribution PSA-DRY-00001D</i>
24590-BOF-M6-PSA-00004015	<i>BOF Plant Service Air System Desiccant Towers PSA-DRY-00001e</i>
24590-BOF-M6-PSA-00004016	<i>BOF Plant Service Air System Condensate Removal PSA-DRY-00001e</i>
24590-BOF-M6-PSA-00004017	<i>BOF Plant Service Air System Pneumatic Air Distribution PSA-DRY-00001e</i>
24590-BOF-M6-PSA-00005001	<i>BOF Plant Service Air System Air Receivers PSA-VSL-00004/-00005</i>
24590-BOF-M6-PSA-00006001	<i>BOF Plant Service Air System Yard Distribution Piping to BOF Facilities</i>
24590-BOF-M6-PSA-00006002	<i>BOF Plant Service Air System Yard Distribution Piping to BOF Facilities</i>
24590-BOF-M6-PSA-00007001	<i>BOF / EMF Plant Service Air System Distribution to EMF PSA-VSL-00150</i>
24590-BOF-M6-SCW-00002001	<i>BOF Steam Condensate Water System Collection and Distribution</i>

### 10.1.5 Plan Drawings

24590-BOF-P1-50-00001	<i>RPP-WTP Plot Plan</i>
24590-BOF-P1-50-00002	<i>RPP-WTP Equipment Location Plan Chilled Water Booster Pumps Partial Plans</i>
24590-BOF-P1-50-00003	<i>RPP-WTP Equipment Location Plan SCW Pumping Trap Skid Partial Plans</i>
24590-BOF-P1-54-00001	<i>Non-Dangerous/Non-Radioactive Effluent Facility General Arrangement Plan</i>
24590-BOF-P1-54-00002	<i>Non-Dangerous/Non-Radioactive Effluent Facility General Arrangement Section</i>
24590-BOF-P1-54-00003	<i>NLD Wastewater THM Air Strippers General Arrangement Plan</i>
24590-BOF-P1-54-00004	<i>NLD Wastewater THM Air Strippers Equipment Location Plan</i>
24590-BOF-P1-82-00001	<i>Chiller / Compressor Plant General Arrangement Roof Plan</i>
24590-BOF-P1-82-00002	<i>Chiller / Compressor Plant General Arrangement Plan at Grade</i>
24590-BOF-P1-82-00003	<i>Chiller / Compressor Plant General Arrangement Sections A, B &amp; C</i>
24590-BOF-P1-82-00004	<i>Chiller / Compressor Plant General Arrangement Sections D, E &amp; F</i>
24590-BOF-P1-82-00005	<i>Chiller/Compressor Plant Equipment Location Roof Plan</i>
24590-BOF-P1-82-00006	<i>Chiller/Compressor Plant Equipment Location Plan at Grade</i>
24590-BOF-P1-82-00007	<i>Chiller/Compressor Plant Equipment Location Sections A, B &amp; C</i>

24590-BOF-P1-82-00008	<i>Chiller/Compressor Plant Equipment Location Sections D, E &amp; F</i>
24590-BOF-P1-82-00009	<i>Chiller/Compressor Plant Equipment Location Point of Support/Schedule/General Notes</i>
24590-BOF-P1-84-00001	<i>Fire Water Pump House Facility - Buildings 84A &amp; 84B General Arrangement Plan</i>
24590-BOF-P1-84-00002	<i>Fire Water Pump House Facility - Buildings 84A &amp; 84B General Arrangement Section</i>
24590-BOF-P1-87-00001	<i>Switchgear Building General Arrangement Plan and Sections</i>
24590-BOF-P1-87-00002	<i>Switchgear Building Equipment Location Plan and Sections</i>
24590-BOF-P1-91-00001	<i>BOF Switchgear Building General Arrangements Plan and Sections</i>
24590-BOF-P1-91-00002	<i>BOF Switchgear Building Equipment Location Plan and Sections</i>

### 10.1.6 Architectural Drawings

24590-BOF-A1-54-00001	<i>BOF Non-Dangerous Non-Radioactive Effluent Facility Floor Plan, Exterior Elevations &amp; Building Section</i>
24590-BOF-A1-58-00001	<i>Simulator Building Architectural Floor Plan</i>
24590-BOF-A1-58-00002	<i>Simulator Building Architectural Reflected Ceiling Plan</i>
24590-BOF-A1-84-00001	<i>BOF Pump House Facilities Fire Pump House-Bldg 84A Architectural Plan &amp; Elevations</i>
24590-BOF-A1-84-00002	<i>BOF Pump House Facilities Fire Pump House-Bldg 84B Architectural Plan &amp; Elevations</i>
24590-BOF-A1-87-00001	<i>Switchgear Bldg #87 Architectural Plan, Schedules and Details</i>
24590-BOF-A1-91-00001	<i>BOF Switchgear Bldg #91 Floor Plan, Notes, Legend, Schedules &amp; Details</i>
24590-BOF-A2-58-00001	<i>Simulator Building Architectural Exterior Elevations &amp; Building Section</i>
24590-BOF-A2-87-00001	<i>Switchgear Bldg #87 Architectural Elevations</i>
24590-BOF-A2-91-00001	<i>BOF Switchgear Bldg #91 Exterior Elevations</i>
24590-BOF-A3-58-00001	<i>Simulator Building Architectural Schedules, Interior Elevations and Details</i>
24590-WTP-A3-A10T-04600001	<i>WTP Process Buildings Architectural Common Interior/Exterior Sign Types</i>
24590-WTP-A3-A10T-04600002	<i>WTP Process Buildings Architectural Common Interior Signage Details</i>

### 10.1.7 Structural Drawings

24590-BOF-S1-S15T-00005	<i>Balance of Facilities Fire Water Pump House Fuel Tank Service Platform Plan, Sections and Details</i>
24590-BOF-SSC-S15T-00008	<i>Chiller/Compressor Plant - Pipe Sleeper Steel Design</i>
24590-BOF-SSC-S15T-00009	<i>Chiller/Compressor Plant Utility Rack Steel and Connection Design</i>
24590-BOF-SSC-S15T-00014	<i>Guardrail Design for Buildings 82, 85 and 86</i>

### 10.1.8 Mechanical Plans and Drawings

24590-B54-U2-M36T-00001	<i>BOF Non-Dangerous Non-Radioactive Effluent Building 54 Fire Protection Fire Extinguisher Locations</i>
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24590-B58-M0X-C1V-00001	<i>HVAC Equipment List for B58 Simulator Bldg. CIV System</i>
24590-B82-U2-M36T-00001	<i>Chiller/Compressor Plant Fire Protection Fire Extinguisher Locations</i>
24590-B84-U2-M36T-00001	<i>Fire Water Pump House 84A Fire Protection Fire Extinguisher Locations</i>
24590-B84-U2-M36T-00002	<i>Fire Water Pump House 84B Fire Protection Fire Extinguisher Locations</i>
24590-B87-U2-M36T-00001	<i>Switchgear Bldg 87 Fire Protection Fire Extinguisher Locations</i>
24590-B91-U2-M36T-00001	<i>BOF Switchgear Building 91 Fire Protection Fire Extinguisher Locations</i>
24590-B91-U2-M36T-00001	<i>BOF Switchgear Building 91 Fire Protection Fire Extinguisher Locations</i>
24590-BOF-MT-FSW-00001	<i>Equipment Assembly Fire Water Storage Tank FSW-TK-00001 &amp; FSW-TK-00002</i>
24590-BOF-MTD-FSW-00001	<i>24590-BOF-MT-FSW-TK-00001 &amp; 24590-BOF-MT-FSW-TK-00002 - Fire Water Storage Tank</i>

### 10.1.9 Concrete Plans and Drawings

24590-BOF-DB-80-00002	<i>Balance of Facilities Miscellaneous Yard Pipe Support Foundations</i>
24590-BOF-DB-80-00003	<i>Balance of Facilities Miscellaneous Yard Pipe Support Foundations</i>
24590-BOF-DB-80-00008	<i>NLD Wastewater THM Air Stripper Foundation Plan, Sections and Details</i>
24590-BOF-DB-80-00009	<i>NLD Pipe Support Foundation Plan, Sections and Details</i>
24590-BOF-DB-80-00022	<i>NLD Powerhouse Foundation Plan, Sections and Details</i>
24590-BOF-DB-S13T-00001	<i>Switchgear Building Foundation &amp; Slab Plans at El 0 Ft - 0 In and El (-) 9 Ft - 0 In</i>
24590-BOF-DB-S13T-00002	<i>Switchgear Building Foundation Sections and Details</i>
24590-BOF-DB-S13T-00003	<i>Switchgear Building Foundation Vault Reinforcing Details</i>
24590-BOF-DB-S13T-00004	<i>Switchgear Building Foundation - Grade Beams and Slab Reinforcing Details</i>
24590-BOF-DB-S13T-00005	<i>BOF Switchgear Building Concrete Foundation Plans</i>
24590-BOF-DB-S13T-00006	<i>BOF Switchgear Building Foundation - Grade Beams, Footing and Slab Reinf Details</i>
24590-BOF-DB-S13T-00007	<i>BOF Switchgear Building Equipment Foundation Plans, Sections and Details</i>
24590-BOF-DB-S13T-00008	<i>Chiller/Compressor Plant Mat Foundation Reinforcement Plan and Section</i>
24590-BOF-DB-S13T-00009	<i>Chiller/Compressor Plant Mat Foundation Reinforcement Details and Sections</i>
24590-BOF-DB-S13T-00010	<i>Chiller/Compressor Plant Mat Foundation Floor Slab Plan at El 0 Ft-0 In</i>
24590-BOF-DB-S13T-00011	<i>Chiller/Compressor Plant Mat Foundation Equipment and Column Bolt Setting Plans, Sections and Details</i>
24590-BOF-DB-S13T-00012	<i>Chiller/ Compressor Plant Mat Foundation Equipment Bolt Setting Plans, Sections and Details</i>
24590-BOF-DB-S13T-00013	<i>Non-Radioactive Effluent Tank-Foundation Plan, Section and Details</i>
24590-BOF-DB-S13T-00015	<i>Firewater Storage Tanks Foundation Plan, Section and Details</i>
24590-BOF-DB-S13T-00038	<i>Switchgear Building 87 Electrical Equipment Anchoring System Plan, Sections and Details</i>
24590-BOF-DB-S13T-00041	<i>Chiller/Compressor Plant NLD Sump &amp; Equipment Pads and Details</i>
24590-BOF-DB-S13T-00044	<i>Non-Dangerous Non-Radioactive Effluent Facility Tank Pipe Support Foundations Plan and Sections</i>

24590-BOF-DB-S13T-00046	<i>Chiller/Compressor Plant Mat Foundation Pipe Rack / Pipe Sleepers Bolt Setting Plan, Embed Plates and Drains</i>
24590-BOF-DB-S13T-00047	<i>Firewater Storage Tanks Pipe Support Foundations Plan and Sections</i>
24590-BOF-DB-S13T-00048	<i>Chiller/Compressor Plant Mat Foundation Reinforcement Details and Sections</i>
24590-BOF-DB-S13T-00070	<i>Balance of Facilities Concrete Forming &amp; Reinforcing Building 84A &amp; 84B Platforms Plans, Sections &amp; Details</i>
24590-BOF-DB-S13T-00074	<i>Chiller/Compressor Plant Concrete Mat Foundation Sections &amp; Details</i>

**10.1.10 Electrical/Controls/Communications Drawings**

24590-B54-J1-NLD-00001	<i>Balance of Facilities System NLD System Block Diagram Non-Radioactive Liquid Waste Disposal System</i>
24590-B58-E1-LVE-00001	<i>Simulator Building 480v Power Distribution Diagram</i>
24590-B58-E2-E53T-00001	<i>BOF Simulator Building Equip and Elec Rooms Sf-0116 &amp; Sf-0117 Raceway Layout Plan</i>
24590-B58-E2-E53T-00002	<i>BOF Simulator Building Grounding Power Layout and Raceway Plan</i>
24590-B58-E2-E53T-00003	<i>BOF Simulator Building Roof Power Plan</i>
24590-B58-E2-E53T-00004	<i>BOF Simulator Building Electrical Notes, Legend, Schedules Section and Details</i>
24590-B58-E2-LTE-00001	<i>BOF Simulator Building Lighting Plan</i>
24590-B58-EF-CME-00001	<i>BOF Simulator Building Communications Plan</i>
24590-B82-E22-E54T-00001	<i>Chiller Compressor Plant Electrical Underground Conduit Plan - Area 1</i>
24590-B82-E22-E54T-00002	<i>Chiller Compressor Plant Electrical Underground Conduit Plan - Area 2</i>
24590-B82-E22-E54T-00003	<i>Chiller Compressor Plant Electrical Underground Conduit Plan - Area 3</i>
24590-B82-E22-E54T-00004	<i>Chiller Compressor Plant Electrical Underground Conduit Plan - Area 4</i>
24590-B82-E22-E54T-00005	<i>Chiller Compressor Plant Electrical U.G. Conduit Sections and Details</i>
24590-B82-E22-GRE-00001	<i>Chiller Compressor Plant Electrical Grounding Plan Area 1</i>
24590-B82-E22-GRE-00002	<i>Chiller Compressor Plant Electrical Grounding Plan Area 2</i>
24590-B82-E22-GRE-00003	<i>Chiller Compressor Plant Electrical Grounding Plan Area 3</i>
24590-B82-E22-GRE-00004	<i>Chiller Compressor Plant Electrical Grounding Plan Area 4</i>
24590-B82-EF-CME-00007	<i>BOF Chiller/Compressor Plant Communication Layout Plan Building 82</i>
24590-B84-E2-E53T-00001	<i>Fire Water Storage Tanks FSW-TK-00001/2 Lighting &amp; Raceway Plan</i>
24590-B84-E22-GRE-00001	<i>Fire Water Storage Tanks FSW-TK-00001/2 Grounding &amp; Lightning Protection Plan</i>
24590-B84-E9-E53T-00001	<i>Fire Water Storage Tanks FSW-TK-00001/2 Lighting, Grounding &amp; Aboveground Raceway Sections &amp; Details</i>
24590-B84-J1-FSW-00001	<i>Balance of Facilities System FSW System Block Diagram Fire Water System</i>
24590-B84-VDCN-E-10-00001	<i>Fire Water Pump Houses Building 84A and 84B Exit Sign Removal</i>
24590-B87-E22-E54T-00001	<i>Switchgear Building 87 Underground Ductbank Yard Layout</i>
24590-B87-E22-E54T-00002	<i>Switchgear Building 87s SDG Concrete Slab Stub Up Locations and Grounding</i>
24590-B87-E22-GRE-00001	<i>Switchgear Building 87 Grounding Plan</i>
24590-B87-E22-GRE-00002	<i>Switchgear Building B87 Lightning Protection Plan</i>

24590-B87-E22-GRE-00003	<i>Switchgear Building B87 Lightning Protection Details</i>
24590-B87-E6-LTE-00001	<i>LTE-CTR-87001 Lighting Contactor Main Switchgear Building Schematic Diagram</i>
24590-B87-EF-CME-00002	<i>BOF Switchgear Bldg Communication Layout Plan Building 87</i>
24590-B91-E22-E54T-00001	<i>BOF Switchgear Bldg 91 Underground Duct Bank Yard Layout</i>
24590-B91-E22-E54T-00002	<i>BOF Switchgear Bldg 91 Underground Duct Bank Sections and Details</i>
24590-B91-EF-CME-00001	<i>BOF Switchgear Bldg Communication Layout Plan Building 91</i>
24590-BOF-E1-LVE-00010	<i>BOF/EMF Secondary Unit Substation LVE-LC-27001 Single Line Diagram</i>
24590-BOF-E1-MVE-00001	<i>BOF Facilities Power Distribution (MVE) Main Single Line Diagram</i>
24590-BOF-VDCN-E-13-00003	<i>Removal of Building 84A and 84B Emergency Lighting</i>
24590-WTP-EFK-E65T-00001	<i>RPP - WTP Vitrification System CME Sketch Site Wide Fiber Optic Cabling</i>
24590-WTP-FC-E-15-0522	<i>BOF - B91- Rewire Lighting Off of LTE-PNL-91003 and LTE-PNL-91006 (Supersedes 24590-WTP-FC-E-15-0314)</i>

### 10.1.11 Specifications

24590-BOF-3PI-CY11-00001	<i>Technical Specification for Fence and Gates</i>
24590-BOF-3PS-CY11-T0001	<i>Technical Specification for Fence and Gates</i>
24590-WTP-3PS-EY00-T0006	<i>Engineering Specification for NLD Powerhouse and Motor Control Center</i>

### 10.1.12 Calculations

24590-BOF-DBC-80-00013	<i>NLD Airstripper Anchors and Foundation</i>
24590-BOF-DBC-80-00014	<i>NLD Pipe Support Foundation</i>
24590-BOF-DBC-82-00001	<i>Chiller Compressor Plant Mat Foundation Design</i>
24590-BOF-DBC-82-00002	<i>Chiller / Compressor Plant-Pipe Rack Segments 1, 2 &amp; 5 Anchorage Design</i>
24590-BOF-DBC-82-00003	<i>Chiller/Compressor Plant Pipe Rack Segment # 3 and # 4 Anchorage Design</i>
24590-BOF-DBC-82-00004	<i>Chiller Compressor Plant Building Column Anchorage Design</i>
24590-BOF-DBC-82-00005	<i>Chiller/Compressor Plant-Sleeper Anchor Design</i>
24590-BOF-DBC-82-00006	<i>Chiller/Compressor Plant Equipment Anchorage</i>
24590-BOF-DBC-82-00007	<i>Chiller/Compressor Plant: Post Installed Anchor Design for Equipment Anchorage</i>
24590-BOF-DBC-82-00011	<i>Chiller Compressor Plant Fnj-Encl-00088 Anchorage</i>
24590-BOF-DBC-87-00001	<i>Switchgear Building 87 Vault Design</i>
24590-BOF-DBC-87-00002	<i>Switchgear Building 87 Foundation Design</i>
24590-BOF-DBC-87-00003	<i>A/C Unit Foundation for Bldg. # 87</i>
24590-BOF-DBC-91-00001	<i>BOF Switchgear Bldg 91 Foundation Design for Main Columns</i>
24590-BOF-DBC-91-00002	<i>BOF Switchgear Building 91 Foundation Design for Wind Columns</i>
24590-BOF-DBC-91-00003	<i>HVAC Equipment Foundations for Bldg. # 91</i>
24590-BOF-DBC-91-00004	<i>Building #91 and #87 Electrical Equipment Support Design</i>
24590-BOF-DBC-91-00005	<i>BOF Transformer/Switchgear Foundations and Anchorage for BOF Switchgear Building B91</i>

24590-BOF-DBC-FSW-00001	<i>Design of Ringwall Foundation for Fire Water Storage Tank FSW-TK-00001 &amp; 00002</i>
24590-BOF-DBC-NLD-00001	<i>Design of Ringwall Foundation for Non Radioactive Effluent Tank NLD-TK-00001</i>
24590-BOF-DBC-NLD-00003	<i>Design of NLD Powerhouse Mat Foundation and Anchorage</i>
24590-BOF-DBC-S13T-00002	<i>Design of Pipe Support Foundations in NLD Tank Area</i>
24590-BOF-DBC-S13T-00004	<i>Design of Pipe Support Foundations in The Fire Service Water Tanks Area</i>
24590-BOF-MTC-FSW-00001	<i>BOF Fire Water Storage Tank Sizing</i>
24590-BOF-MTC-FSW-00003	<i>Acceptable Loads for N05, N08, N09 on BOF-FSW-TK-00001 and BOF-FSW-TK-00002</i>

## 10.2 Codes and Standards

10 CFR 851, *Worker Safety and Health Program*

29 CFR 1910. *Occupational Safety and Health Standards*. Code of Federal Regulations, as amended.

AASHTO. 1994. *A Policy on Geometric Design of Highways and Streets*. American Association of State Highway and Transportation Officials, Washington, DC.

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ACI 349-01/349R-01. *Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary*. American Concrete Institute, Farmington Hills, MI.

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ANSI/AISC N690-94. *Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities*. American Institute of Steel Construction, Chicago, IL.

ANSI/ASHRAE 15. *Safety Standards for Refrigeration Systems*. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, GA.

ANSI/IESNA RP-7. *Lighting Industrial Facilities ANSI Approved*. American Institute of Steel Construction, Chicago, IL; and Illuminating Engineering Society, New York, NY.

ASCE 4-98. *Seismic Analysis of Safety-Related Nuclear Structures*. American Society of Civil Engineers, Reston, VA.

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### 10.4 Building-Specific Supplier Drawings and Documents

24590-CM-FC3-AKBP-00001-31-00060	<i>Chiller Compressor Plant Building-Building #82-Insulated Panels (13121)</i>
24590-CM-FC3-AKBP-00001-31-00065	<i>Chiller Compressor Plant Building - Building No. 82 - Controls and Instrumentation - Product Data and Wiring Diagram (15900)</i>
24590-CM-FC3-AKBP-00001-31-00066	<i>Chiller Compressor Plant Building - Building No. 82 - Lighting Fixtures, Lamps, Relay Panel, Remote Switching Stations, Photocell-Product Data (16510-001-002-003)</i>
24590-CM-FC3-AKBP-00001-31-00068	<i>Chiller Compressor Plant Building - Building No. 82 - Unit Heater - Product Data (15500)</i>
24590-CM-FC3-AKBP-00001-31-00069	<i>Supplier Document - B82 LVE-PNL-82001b With Grounding Bus Kit</i>
24590-CM-FC3-AKBP-00001-31-00070	<i>Chiller Compressor Plant Building - Building No. 82 - Mechanical Identification - Accent Signs and Engraving - Product Data (15190)</i>

24590-CM-FC3-AKBP-00001-31-00073	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Hm Doors and Frames, Product Data (08100)</i>
24590-CM-FC3-AKBP-00001-31-00085	<i>Chiller Compressor Plant Building - Bldg 82 - Roof Curbs - Product Data, Calculations, Shop Drawings (13121)</i>
24590-CM-FC3-AKBP-00001-31-00086	<i>Chiller Compressor Plant Building - Bldg 82 - Exhaust Fans - Product Data (15500)</i>
24590-CM-FC3-AKBP-00001-31-00087	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Lower Product Data and Shop Drawings</i>
24590-CM-FC3-AKBP-00001-31-00088	<i>Chiller Compressor Plant Building - Building No 82 - Overhead Door - (08360)</i>
24590-CM-FC3-AKBP-00001-31-00089	<i>Chiller Compressor Plant Building - Building No 82 - Window Glazing Product Data-(08800)</i>
24590-CM-FC3-AKBP-00001-31-00091	<i>Chiller Compressor Plant - Building #82 - Flashing and Sheet Metal - Product Data (07600)</i>
24590-CM-FC3-AKBP-00001-31-00093	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Joint Sealers - Product Data (07900)</i>
24590-CM-FC3-AKBP-00001-31-00095	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Lightning Protection Product Data (16610)</i>
24590-CM-FC3-AKBP-00001-31-00096	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Electrical Conduits and Conductors (Section 16100)</i>
24590-CM-FC3-AKBP-00001-31-00098	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Electrical Grounding (Section 16450)</i>
24590-CM-FC3-AKBP-00001-31-00105	<i>Chiller Compressor Plant Building - Bldg. 82 - Electrical Wiring Devices Product Data (16141)</i>
24590-CM-FC3-AKBP-00001-31-00106	<i>Chiller Compressor Plant Building - Bldg. 82 - Electrical Safety Switches Product Data (16010/16100)</i>
24590-CM-FC3-AKBP-00001-31-00110	<i>Chiller Compressor Plant Building - Bldg. 82 - Electrical - NEMA 12 Materials - Product Data (16141)</i>
24590-CM-FC3-AKBP-00001-31-00111	<i>Chiller Compressor Plant Building - Bldg. 82 - Structural Grating for Intake Filter Platforms - Product Data (05500)</i>
24590-CM-FC3-AKBP-00001-31-00112	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Light Gage Metal Framing (05400)</i>
24590-CM-FC3-AKBP-00001-31-00113	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Roof Curb Flashing and Cricket Details - Product Data (13121)</i>
24590-CM-FC3-AKBP-00001-31-00118	<i>Chiller Compressor Plant Building - Building No. 82 - Gypsum Board Product Data (09250)</i>
24590-CM-FC3-AKBP-00001-31-00120	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Safety- Walk Product Data (13121)</i>
24590-CM-FC3-AKBP-00001-31-00134	<i>Chiller Compressor Plant Building (CCP) - Bldg. 82 - Exhaust Fan Rigging &amp; Lifting Information (Reference Submittal 24590-Cm-Fc3-Akbp-00001-31-00086)</i>
24590-CM-FC3-AKBP-00001-31-00135	<i>Chiller Compressor Plant Building - Bldg. #82 - Testing Report for Lifting Beam Device for CCP Cable Tray Supports</i>
24590-CM-FC3-AKBP-00001-31-00136	<i>Chiller Compressor Plant Building (CCP) - Bldg. 82 - CCP Cable Tray Unistrut Support Product Data (16000)</i>

24590-CM-FC3-AKBP-00001-31-00138	<i>Chiller Compressor Plant Building - Bldg. 82 - Controls and Instrumentation- Outdoor Air Sensor (Reference Submittal 24590-Cm-Fc3-Akbp-00001-31-00065)</i>
24590-CM-FC3-AKBP-00001-31-00145	<i>Chiller Compressor Plant Building - Building No. 82 - Resilient Wall Base Sample (09653)</i>
24590-CM-FC3-AKBP-00001-31-00153	<i>Chiller Compressor Plant Building - Bldg. #82 - Roof Ladder and Cages</i>
24590-CM-FC3-AKBP-00001-31-00171	<i>Chiller Compressor Plant - Bldg. 82 - Paint Product Data CCP Building</i>
24590-CM-FC3-AKBP-00001-47-00053	<i>Bldg 91-As-Built- Lightning Protection Plan &amp; Notes - BOF-91-LP-01</i>
24590-CM-FC3-AKBP-00001-47-004	<i>Switchgear Building 87 Erection Notes</i>
24590-CM-FC3-AKBP-00001-47-06	<i>Switchgear Building 87 - Reaction Load Calculation</i>
24590-CM-FC3-AKBP-00001-47-07A	<i>Switchgear Building 87 - Notes and Legends 1, 009-3, Rev. 001</i>
24590-CM-FC3-AKBP-00001-47-08	<i>Switchgear Building 87 - Anchor Bolt Plan</i>
24590-CM-FC3-AKBP-00001-47-09	<i>Switchgear Building 87 - Frame Cross Section at Frame Line(S) 1</i>
24590-CM-FC3-AKBP-00001-47-10	<i>Switchgear Building 87 - Frame Cross Section at Frame Line(S) 2</i>
24590-CM-FC3-AKBP-00001-47-11	<i>Switchgear Building 87 - Frame Cross Section at Frame Line(S) 3</i>
24590-CM-FC3-AKBP-00001-47-12	<i>Switchgear Building 87 - Frame Cross Section at Frame Line(S) 4</i>
24590-CM-FC3-AKBP-00001-47-13	<i>Switchgear Building 87 - Frame Cross Section at Frame Line(S) 5</i>
24590-CM-FC3-AKBP-00001-47-14	<i>Switchgear Building 87 - Primary and Roof Bracing Plan</i>
24590-CM-FC3-AKBP-00001-47-15	<i>Switchgear Building 87 - Roof Secondary Plan</i>
24590-CM-FC3-AKBP-00001-47-16A	<i>Switchgear Building 87 - Roof Covering Plan 009-3, Rev. 001</i>
24590-CM-FC3-AKBP-00001-47-17	<i>Switchgear Building 87 - Secondary Elevation at 1</i>
24590-CM-FC3-AKBP-00001-47-18	<i>Switchgear Building 87 - Secondary Elevation at A</i>
24590-CM-FC3-AKBP-00001-47-19	<i>Switchgear Building 87 - Secondary Elevation at 5</i>
24590-CM-FC3-AKBP-00001-47-20	<i>Switchgear Building 87 - Secondary Elevation at D</i>
24590-CM-FC3-AKBP-00001-47-21A	<i>Switchgear Building 87 - Covering Elevation at 1, 009-3, Rev. 001</i>
24590-CM-FC3-AKBP-00001-47-22A	<i>Switchgear Building 87 - Covering Elevation at A, 009-3, Rev. 001</i>
24590-CM-FC3-AKBP-00001-47-23A	<i>Switchgear Building 87 - Covering Elevation at 5, 009-3, Rev. 001</i>
24590-CM-FC3-AKBP-00001-47-24A	<i>Switchgear Building 87 - Covering Elevation at D, 009-3, Rev. 001</i>
24590-CM-FC3-AKBP-00001-47-26	<i>Switchgear Building 87 - Schedule of Finish Hardware</i>
24590-CM-FC3-AKBP-00001-47-27	<i>Switchgear Building 87 - Metal Building Erection Drawings Seds</i>
24590-CM-FC3-AKBP-00001-47-30	<i>Building 87 - Mechanical Plan, M-01</i>
24590-CM-FC3-AKBP-00001-47-31	<i>Switchgear Building 87 Electrical Plan Schedule and Details</i>
24590-CM-FC3-AKBP-00001-47-33	<i>Building 87 - Mechanical Sections, M-02</i>
24590-CM-FC3-AKBP-00001-47-36	<i>Bldg 91-As-Built- HVAC Plans, M-01</i>
24590-CM-FC3-AKBP-00001-47-43	<i>Building 87 - Electrical Lightning Plan, E-02</i>
24590-CM-FC3-AKBP-00001-47-46	<i>Switchgear Building 87 - Metal Building Erection Drawings, Shear Lug Location, Plan, and Notes</i>
24590-CM-FC3-AKBP-00001-47-48	<i>BOF Switchgear Building 91 - Metal Building Erection Drawings</i>
24590-CM-FC3-AKBP-00001-47-49	<i>Switchgear Building 87 - Air Distribution - Shop Drawings of Duct Support</i>

24590-CM-FC3-AKBP-00001-47-50	<i>Switchgear Building 87 - Mechanical HVAC Shop Drawings</i>
24590-CM-FC3-AKBP-00001-47-51	<i>Switchgear Building 91 - Mechanical HVAC Shop Drawings</i>
24590-CM-FC3-AKBP-00001-47-52	<i>Switchgear Building 91 - Mechanical Ductwork Support Drawings</i>
24590-CM-FC3-AKBP-00001-48-28	<i>Switchgear BOF #91, Peb-2</i>
24590-CM-FC3-AKBP-00001-48-29	<i>Switchgear BOF #91, Peb-3</i>
24590-CM-FC3-AKBP-00001-48-30	<i>Switchgear BOF #91, Peb-4</i>
24590-CM-FC3-AKBP-00001-48-31	<i>Switchgear BOF #91, Peb-5</i>
24590-CM-FC3-AKBP-00001-48-36	<i>Switchgear Bldg 91 BOF - Schedule of Finish Hardware</i>
24590-CM-FC3-AKBP-00001-48-42	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Frame Cross Section at Frame Line(S) 2</i>
24590-CM-FC3-AKBP-00001-48-43	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Frame Cross Section at Frame Line(S) 3</i>
24590-CM-FC3-AKBP-00001-48-44	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Frame Cross Section at Frame Line(S) 4</i>
24590-CM-FC3-AKBP-00001-48-45	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Frame Cross Section at Frame Line(S) 5</i>
24590-CM-FC3-AKBP-00001-48-49	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Roof Covering Plan</i>
24590-CM-FC3-AKBP-00001-48-50	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Secondary Elevation at 1</i>
24590-CM-FC3-AKBP-00001-48-51	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Secondary Elevation at A</i>
24590-CM-FC3-AKBP-00001-48-52	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Secondary Elevation at 6</i>
24590-CM-FC3-AKBP-00001-48-53	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Secondary Elevation at D</i>
24590-CM-FC3-AKBP-00001-48-54	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Covering Elevation at 1</i>
24590-CM-FC3-AKBP-00001-48-55	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Covering Elevation at A</i>
24590-CM-FC3-AKBP-00001-48-56	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Covering Elevation at 6</i>
24590-CM-FC3-AKBP-00001-48-57	<i>BOF Switchgear 91, VP Buildings, Inc. Drawings - Covering Elevation at D</i>
24590-CM-FC3-AKBP-00001-48-59	<i>Switchgear Building 91 Lighting and Power Plan Notes, Legends and Schedules, 1-Line Diagram and Details</i>
24590-CM-FC3-AKBP-00001-48-63	<i>BOF Switchgear 91 - Design for Column Anchors (Shear Lugs) P. E. Stamped</i>
24590-CM-FC3-AKBP-00001-48-64	<i>Bldg 91-As-Built- HVAC Sections, Details and Sections, M-02</i>
24590-CM-FC3-AKBP-00001-49-00044	<i>BOF Chiller Compressor Bldg</i>
24590-CM-FC3-AKBP-00001-49-07	<i>Chiller Compressor Plant Building - Building #82 - Reaction Loads, Design and Calculations</i>
24590-CM-FC3-AKBP-00001-56-02	<i>Switchgear 91 Building, BOF Rollup Doors</i>
24590-CM-FC3-AKBP-00001-57-01	<i>Switchgear 91 Building, BOF Structural Design Data</i>
24590-CM-FC3-AKBP-00001-59-05	<i>Switchgear Building - Bldg. No. 91 - HVAC Load Calculations HVAC Duct Pressure Calculations &amp; HVAC Equipment Vendor Data</i>

24590-CM-FC3-AKBP-00001-59-08	<i>Chiller Compressor Plant - Building No. 82 - 100% HVAC Calculations</i>
24590-CM-FC3-AKBP-00001-61-00018	<i>BOF Chiller Compressor Plant - Building #82 - Electrical Lightning Protection Plan Drawing, BOF-82-LP-01</i>
24590-CM-FC3-AKBP-00001-61-00019	<i>BOF Chiller Compressor Plant - Building #82 - Roof Plan - BOF-82-A-04</i>
24590-CM-FC3-AKBP-00001-61-00020	<i>Metal Panel Shop Drawings - Building 91</i>
24590-CM-FC3-AKBP-00001-61-00036	<i>BOF Chiller Compressor Plant - Building #82 - Roof Plan - BOF-82-E-04</i>
24590-CM-FC3-AKBP-00001-61-00044	<i>Chiller Compressor Plant Building-Building #82 - Metal Wall and Roof Panel Shop Drawing, Removable Frame Calculations and Shop Drawings (Sections 05500 &amp; 13121)</i>
24590-CM-FC3-AKBP-00001-61-00046	<i>Chiller Compressor Plant Building - Building No. 82 - Overhead Door - Shop Drawings-(08360)</i>
24590-CM-FC3-AKBP-00001-61-00048	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Material List - CT-SK-01</i>
24590-CM-FC3-AKBP-00001-61-00049	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-02</i>
24590-CM-FC3-AKBP-00001-61-00050	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-03</i>
24590-CM-FC3-AKBP-00001-61-00051	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-04</i>
24590-CM-FC3-AKBP-00001-61-00052	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-05</i>
24590-CM-FC3-AKBP-00001-61-00053	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Plan - CT-SK-06</i>
24590-CM-FC3-AKBP-00001-61-00054	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-07</i>
24590-CM-FC3-AKBP-00001-61-00055	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-08</i>
24590-CM-FC3-AKBP-00001-61-00056	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-09</i>
24590-CM-FC3-AKBP-00001-61-00057	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-10</i>
24590-CM-FC3-AKBP-00001-61-00058	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Section - CT-SK-11</i>
24590-CM-FC3-AKBP-00001-61-00059	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Details - CT-SK-12</i>
24590-CM-FC3-AKBP-00001-61-00060	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Details - CT-SK-13</i>
24590-CM-FC3-AKBP-00001-61-00061	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Details - CT-SK-14</i>
24590-CM-FC3-AKBP-00001-61-00062	<i>Chiller Compressor Plant - Bldg. 82 - Cable Tray Supports - Cable Tray Support Details- CT-SK-15</i>
24590-CM-FC3-AKBP-00001-61-00063	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Cable Tray Supports - Drawing CT-SK-17 - Cable Tray Support Details</i>
24590-CM-FC3-AKBP-00001-61-00064	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Cable Tray Supports - Drawing CT-SK-16 - Cable Tray Support Details</i>

24590-CM-FC3-AKBP-00001-61-00065	<i>Chiller Compressor Plant Building - Building #82 - Roof Ladder and Platform Sketch Fabrication, Construction - Mi-21662-01</i>
24590-CM-FC3-AKBP-00001-61-00066	<i>Chiller Compressor Plant Building - Building #82 - Roof Ladder and Platform Sketch Fabrication, Construction - Mi-21662-02</i>
24590-CM-FC3-AKBP-00001-61-09	<i>Chiller Compressor Plant - Building #82 - Floor Plan, Notes &amp; Legend - BOF-82-A-01</i>
24590-CM-FC3-AKBP-00001-61-10	<i>BOF Chiller Compressor Plant - Building #82 - Exterior Elevation &amp; Sections- BOF-82-A-02</i>
24590-CM-FC3-AKBP-00001-61-11	<i>BOF - Chiller Compressor Plant Building - Bldg #82 - Exterior Elevations &amp; Schedules - BOF-82-A-03</i>
24590-CM-FC3-AKBP-00001-61-12	<i>Chiller Compressor Plant - Bldg. #82 - Notes, Legend, &amp; Schedules - BOF-82-M-01</i>
24590-CM-FC3-AKBP-00001-61-13	<i>BOF Chiller Compressor Plant - Building #82 - HVAC Plan - BOF-82-M-02</i>
24590-CM-FC3-AKBP-00001-61-14	<i>BOF Chiller Compressor Plant - Building #82 - Notes, Legend, Schedules &amp; Details - BOF-82-E-01</i>
24590-CM-FC3-AKBP-00001-61-15	<i>BOF Chiller Compressor Plant - Building #82 - Power Plan BOF-82-E-02</i>
24590-CM-FC3-AKBP-00001-61-16	<i>BOF Chiller Compressor Plant - Building #82 - Lighting Plan - BOF-82-E-03</i>
24590-CM-FC3-AKBP-00001-64-01	<i>Base Plate Design Calculations for Building 87, 91 and 82</i>
24590-CM-FC3-AKBP-00001-65-00003	<i>Project Specification - Bldg 91 As-Built Project Spec, 91-D018</i>
24590-CM-FC3-AKBP-00001-65-01	<i>Chiller Compressor Plant - Building #82 - Project Specifications</i>
24590-CM-FC3-AKBP-00001-66-01	<i>Section 05500-Metal Fabrications, BOF Building #87 and #91</i>
24590-CM-FC3-AKBP-00001-69-00003	<i>Bldg 82, Chiller Compressor Plant - 100% Design Lighting Calculation</i>
24590-CM-FC3-AKBP-00001-69-00009	<i>Chiller Compressor Plant Building - Bldg #82 - Wall and Roof Panel Structural Calculations</i>
24590-CM-FC3-AKBP-00001-69-00011	<i>Chiller Compressor Plant Building - Bldg. No. 82 - Louver Calculations Letter of Clarification (Reference: 24590-Cm-Fc3-Akbp-00001-59-08 Rev. 00c)</i>
24590-CM-FC3-AKBP-00001-69-00012	<i>Chiller Compressor Plant Building - Bldg. 82 - Hoisting and Rigging Calculation for Lifting Beam for Cable Tray Supports</i>
24590-CM-FC3-AKBP-00001-69-00013	<i>BOF Switchgear Building - Bldg. 91 - Electrical Calculation</i>
24590-CM-FC3-AKBP-00001-69-00014	<i>Chiller Compressor Plant Building - Bldg. 82 - Cable Tray Supports Structural Calculations</i>
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24590-CM-FC3-AKBP-00001-69-02	<i>Chiller Compressor Plant Building # 82-Electrical Calculations</i>
24590-CM-FC3-AKBP-00001-70-00006	<i>Chiller Compressor Plant Building - Building 82 - Base Plate Repair Procedure</i>
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24590-CM-HC1-AKBS-00001-07-46	<i>Final - 100% Design - Simulator Building Fire Alarm Riser and Wiring Diagrams</i>
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24590-CM-HC1-MPGP-00001-15-25	<i>BOF Pump House Facilities NLD Pump House Lighting/Heating/Fan Schedule and Locations</i>
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24590-CM-HC1-MPGP-00001-15-31	<i>BOF Pump House Facilities - Fire Pump House - Bldg 84A - Instrumentation Location and Wiring</i>
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24590-CM-HC1-MPGP-00001-15-43	<i>BOF Pump House Facilities - NLD Pump House Control Panel Wiring Diagram NLD-Encl-00003 (Vendor Dwg # 621)</i>
24590-CM-HC1-MPGP-00001-15-45	<i>BOF Pump House Facilities - Support Layout &amp; Details - NLD Pump House</i>
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24590-CM-HC1-MPGP-00001-15-51	<i>BOF Pump House Facilities NLD Pump House Main Control Panel (CP-100) Layout NLD-Encl-00003 (Vendor Dwg # 618)</i>
24590-CM-HC1-MPGP-00001-15-56	<i>BOF Pump House Facilities - Framing Plan and Elevation Fire Pump House 84A and 84B</i>
24590-CM-HC1-MPGP-00001-15-57	<i>BOF Pump House Facilities Piping Layout Firewater Pump House Bldgs 84A &amp; 84B</i>
24590-CM-HC1-MPGP-00001-31-01	<i>Submittal 054.1 - Stress Seismic Calculation Package</i>
24590-CM-HC1-MPGP-00001-36-00006	<i>UL Master Label Certificates - FSW, NLD, DFO Pumphouses</i>
24590-CM-HC1-MPGP-00001-38-00005	<i>Emergency Fire Water Pump Houses - Buildings 84A and 84B</i>
24590-CM-HC1-MTF5-00001-03-00085	<i>Fire Water Storage Tank FSW-TK-00001 Sht # &amp; Appurtenance</i>
24590-CM-HC1-MTF5-00001-03-00086	<i>Fire Water Storage Tank FSW-TK-00001 - Shell Rollout</i>
24590-CM-HC1-MTF5-00001-03-00087	<i>Fire Water Storage Tank FSW-TK-00001 - Chine and Rim Details</i>
24590-CM-HC1-MTF5-00001-03-00088	<i>Fire Water Storage Tank FSW-TK-00001 - Anchor Chair</i>
24590-CM-HC1-MTF5-00001-03-00089	<i>Fire Water Storage Tank FSW-TK-00001- Bottom Layout</i>
24590-CM-HC1-MTF5-00001-03-00090	<i>Fire Water Storage Tank FSW-TK-00001 - Bottom Sketches</i>
24590-CM-HC1-MTF5-00001-03-00091	<i>Fire Water Storage Tank FSW-TK-00001 - Roof Layout</i>
24590-CM-HC1-MTF5-00001-03-00092	<i>Fire Water Storage Tank FSW-TK-00001- Roof Sketches</i>
24590-CM-HC1-MTF5-00001-03-00093	<i>Fire Water Storage Tank FSW-TK-00001 - 20 Inch Roof Opening W/Vent (M2b)/(N06)</i>
24590-CM-HC1-MTF5-00001-03-00094	<i>Fire Water Storage Tank FSW-TK-00001 - 24 Inch Diameter Shell Manhole</i>
24590-CM-HC1-MTF5-00001-03-00095	<i>Fire Water Storage Tank FSW-TK-00001 - Manhole Details</i>
24590-CM-HC1-MTF5-00001-03-00096	<i>Fire Water Storage Tank FSW-TK-00001- 36 Inch Roof Manhole (M2a)</i>
24590-CM-HC1-MTF5-00001-03-00097	<i>Fire Water Storage Tank FSW-TK-00001 - 14 Inch Outlet (N01)</i>
24590-CM-HC1-MTF5-00001-03-00098	<i>Fire Water Storage Tank FSW-TK-00002 - 8 Inch Inlet (N02)</i>
24590-CM-HC1-MTF5-00001-03-00099	<i>Fire Water Storage Tank FSW-TK-00001 - 4 Inch Diameter Inlet (N03)</i>
24590-CM-HC1-MTF5-00001-03-00100	<i>Fire Water Storage Tank FSW-TK-00001- 10 Inch Diameter Overflow (N04)</i>
24590-CM-HC1-MTF5-00001-03-00102	<i>Fire Water Storage Tank FSW-TK-00001- 3/4 Inch Diameter Temperature (N07)</i>
24590-CM-HC1-MTF5-00001-03-00103	<i>Fire Water Storage Tank FSW-TK-00001 - 8 Inch Diameter Inlet (N08)</i>
24590-CM-HC1-MTF5-00001-03-00104	<i>Fire Water Storage Tank FSW-TK-00001 - 8 Inch Diameter Drain (N09)</i>
24590-CM-HC1-MTF5-00001-03-00105	<i>Fire Water Storage Tank FSW-TK-00001 - 8 Inch Diameter Spare Nozzle (N10)</i>
24590-CM-HC1-MTF5-00001-03-00106	<i>Fire Water Storage Tank FSW-TK-00001 - 8 Inch Diameter Spare Nozzle (N11)</i>
24590-CM-HC1-MTF5-00001-03-00107	<i>Fire Water Storage Tank FSW-TK-00001 - 1/2 Inch Diameter Level Transmitter (N05)</i>
24590-CM-HC1-MTF5-00001-03-00109	<i>Fire Water Storage Tank FSW-TK-00001 - Exterior Ladder</i>
24590-CM-HC1-MTF5-00001-03-00110	<i>Fire Water Storage Tank FSW-TK-00001 - Ladder Details</i>
24590-CM-HC1-MTF5-00001-03-00111	<i>Fire Water Storage Tank - FSW-TK-00001 - Upper Platform</i>

24590-CM-HC1-MTF5-00001-03-00112	<i>Fire Water Storage Tank - FSW-TK-00001 - Platform Details</i>
24590-CM-HC1-MTF5-00001-03-00113	<i>Fire Water Storage Tank - FSW-TK-00001 - Roof Stairs</i>
24590-CM-HC1-MTF5-00001-03-00114	<i>Fire Water Storage Tank - FSW-TK-00001 - Peak Platform</i>
24590-CM-HC1-MTF5-00001-03-00115	<i>Fire Water Storage Tank FSW-TK-00001 Cathodic Protection</i>
24590-CM-HC1-MTF5-00001-03-00117	<i>Fire Water Storage Tank FSW-TK-00001 Insulation Details</i>
24590-CM-HC1-MTF5-00001-03-00118	<i>Fire Water Storage Tank - FSW-TK-00001 - Interior Ladder</i>
24590-CM-HC1-MTF5-00001-03-00255	<i>Fire Water Storage Tank FSW-TK-00002 Plan &amp; Appurtenance</i>
24590-CM-HC1-MTF5-00001-03-00256	<i>Fire Water Storage Tank - FSW-TK-00002- Shell Rollout</i>
24590-CM-HC1-MTF5-00001-03-00257	<i>Fire Water Storage Tank - FSW-TK-00002 - Chine and Rim Details</i>
24590-CM-HC1-MTF5-00001-03-00258	<i>Fire Water Storage Tank - FSW-TK-00002- Anchor Chair</i>
24590-CM-HC1-MTF5-00001-03-00259	<i>Fire Water Storage Tank - FSW-TK-00002- Bottom Layout</i>
24590-CM-HC1-MTF5-00001-03-00260	<i>Fire Water Storage Tank - FSW-TK-00002 - Bottom Sketches</i>
24590-CM-HC1-MTF5-00001-03-00261	<i>Fire Water Storage Tank - FSW-TK-00002 - Roof Layout</i>
24590-CM-HC1-MTF5-00001-03-00262	<i>Fire Water Storage Tank - FSW-TK-00002 - Roof Sketches</i>
24590-CM-HC1-MTF5-00001-03-00263	<i>Fire Water Storage Tank FSW-TK-00002 20 Inch Diameter Roof Opening W/ Vent (M2b) (N06)</i>
24590-CM-HC1-MTF5-00001-03-00264	<i>Fire Water Storage Tank - FSW-TK-00002 - 24 Inch Diameter Shell Manhole</i>
24590-CM-HC1-MTF5-00001-03-00265	<i>Fire Water Storage Tank - FSW-TK-00002- Manhole Details</i>
24590-CM-HC1-MTF5-00001-03-00266	<i>Fire Water Storage Tank - FSW-TK-00002 - 36 Inch Diameter Roof Manhole (M2a)</i>
24590-CM-HC1-MTF5-00001-03-00267	<i>Fire Water Storage Tank - FSW-TK-00002- 14 Inch Diameter Outlet (N01)</i>
24590-CM-HC1-MTF5-00001-03-00268	<i>Fire Water Storage Tank - FSW-TK-00002 - 8 Inch Diameter Inlet (N02)</i>
24590-CM-HC1-MTF5-00001-03-00269	<i>Fire Water Storage Tank - FSW-TK-00002 - 4 Inch Diameter Inlet (N03)</i>
24590-CM-HC1-MTF5-00001-03-00270	<i>Fire Water Storage Tank - FSW-TK-00001 - 10 Inch Diameter Overflow (N04)</i>
24590-CM-HC1-MTF5-00001-03-00272	<i>Fire Water Storage Tank - FSW-TK-00002 - 3/4 Inch Diameter Temperature (N07)</i>
24590-CM-HC1-MTF5-00001-03-00273	<i>Fire Water Storage Tank - FSW-TK-00001 - 8 Inch Diameter Inlet (N08)</i>
24590-CM-HC1-MTF5-00001-03-00274	<i>Fire Water Storage Tank - FSW-TK-00002 - 8 Inch Diameter Drain (N09)</i>
24590-CM-HC1-MTF5-00001-03-00275	<i>Fire Water Storage Tank - FSW-TK-00002 - 8 Inch Diameter Spare Nozzle (N10)</i>
24590-CM-HC1-MTF5-00001-03-00276	<i>Fire Water Storage Tank - FSW-TK-00002 - 8 Inch Diameter Spare Nozzle (N11)</i>
24590-CM-HC1-MTF5-00001-03-00277	<i>Fire Water Storage Tank - FSW-TK-00002 - 3/4 Inch Diameter Level Transmitter (N05)</i>
24590-CM-HC1-MTF5-00001-03-00279	<i>Fire Water Storage Tank - FSW-TK-00002 - Exterior Ladder</i>
24590-CM-HC1-MTF5-00001-03-00280	<i>Fire Water Storage Tank - FSW-TK-00002 - Ladder Details</i>
24590-CM-HC1-MTF5-00001-03-00281	<i>Fire Water Storage Tank - FSW-TK-00002 - Upper Platform</i>
24590-CM-HC1-MTF5-00001-03-00282	<i>Fire Water Storage Tank - FSW-TK-00002 - Platform Details</i>
24590-CM-HC1-MTF5-00001-03-00283	<i>Fire Water Storage Tank - FSW-TK-00002 - Roof Stairs</i>

24590-CM-HC1-MTF5-00001-03-00285	<i>Fire Water Storage Tank FSW-TK-00002 Cathodic Protection</i>
24590-CM-HC1-MTF5-00001-03-00286	<i>Fire Water Storage Tank - FSW-TK-00002 - Roof Handrail</i>
24590-CM-HC1-MTF5-00001-03-00287	<i>Fire Water Storage Tank FSW-TK-00002 Insulation Details</i>
24590-CM-HC1-MTF5-00001-03-00288	<i>Fire Water Storage Tank - FSW-TK-00002 - Interior Ladder</i>
24590-CM-HC1-MTF5-00001-03-00292	<i>Fire Water Storage Tank - FSW-TK-00002 - Pipe Support</i>
24590-CM-HC1-MTF5-00001-03-00293	<i>Fire Water Storage Tank - FSW-TK-00002 - Conduit Supports</i>
24590-CM-HC1-MTF5-00001-03-00298	<i>Fire Water Storage Tank - FSW-TK-00001 - Pipe Support</i>
24590-CM-HC1-MTF5-00001-03-00299	<i>Fire Water Storage Tank FSW-TK-00001 Conduit Supports</i>
24590-CM-HC1-MTF5-00001-03-09	<i>Laydown Requirements for NLD and Fire Tanks, Fuel and Water Tanks</i>
24590-CM-HC1-PY21-00001-11-00004	<i>Building 87 Switchgear Fire Piping System</i>
24590-CM-HC1-PY21-00001-11-00005	<i>Building 91 Switchgear Fire Piping System</i>
24590-CM-HC1-PY21-00001-11-00007	<i>Fire Protection Plan for CCP Building (Bldg. 82) - Pg 1 of 2</i>
24590-CM-HC1-PY21-00001-11-00008	<i>Fire Protection Details for CCP Building (Bldg. 82) - Pg 2 of 2</i>
24590-CM-HC1-PY21-00002-10-00162	<i>Building 91 Partial Floor Plan/Riser Section - Bldg. 91 00001, Pg. 1 of 3</i>
24590-CM-HC1-PY21-00002-10-00223	<i>Bldg 82 Piping Plan</i>
24590-CM-HC4-JQ05-00001-T01-01-00001	<i>Typical Radio Fire Alarm Reporter Box Installation Detail</i>
24590-CM-HC4-JQ05-00001-T01-01-00002	<i>BOF Switchgear Building 91 - Fire Alarm System - Plan View</i>
24590-CM-HC4-JQ05-00001-T01-01-00003	<i>BOF Switchgear Building 91 - Surge Suppressor Enclosures PNL 91002 &amp; PNL 91003 Riser Diagram &amp; Logic Matrix</i>
24590-CM-HC4-JQ05-00001-T01-01-00004	<i>BOF Switchgear Building 91 - Fire Alarm Panel PNL-91001</i>
24590-CM-HC4-JQ05-00001-T01-01-00005	<i>Switchgear Building 87 - Fire Alarm System - Plan View</i>
24590-CM-HC4-JQ05-00001-T01-01-00006	<i>Switchgear Building 87 - Riser Diagram &amp; Logic Matrix</i>
24590-CM-HC4-JQ05-00001-T01-01-00007	<i>Switchgear Building 87 - Fire Alarm Panel PNL-87001</i>
24590-CM-HC4-JQ05-00001-T01-01-00008	<i>Chiller Compressor Plant, Building 82, Fire Alarm System - Plan View</i>
24590-CM-HC4-JQ05-00001-T01-01-00145	<i>Fire Pump House/Non-Dangerous Effluent Bldgs 84A, 84B &amp; 54 Fire Alarm System - Plan View</i>
24590-CM-POA-E000-00003-14-00513	<i>Dow Corning 3-6548 Silicone RTV Foam Kit (Part A &amp; Part B) - We-1874</i>
24590-CM-POA-EC00-00004	<i>United Controls International (UCI)</i>
24590-CM-POA-EC00-00004-01-00003	<i>NLD Powerhouse 7 Ft-0 In X 17 Ft-0 In X 10 Ft-10 In</i>
24590-CM-POA-EC00-00004-01-00004	<i>United Controls International 7 Ft - 0 In X 17 Ft - 0 In X 10 Ft - 10 In</i>
24590-CM-POA-EC00-00004-01-00006	<i>MCC Seismic Mounting Req. Info.</i>
24590-CM-POA-MERK-00001-10-07	<i>Chillgard RT Photoacoustic Infrared Refrigerant Monitor</i>
24590-CM-SRA-AKBP-00001	<i>Issue for Closeout of Subcontract, to Include Work Not Completed to Be Completed by Contractor.</i>
24590-CM-SRA-CY20-00002-01-01	<i>Topographic Survey WTP Site</i>
24590-CM-SRA-MPGP-00002	<i>To Design, Fabricate, and Construct The Fuel Oil, Fire Water (2 Buildings), and Non-Dangerous, Non-Radioactive Effluent Pump Houses Per The Attached Documents. Attachments: Exhibit "D" 0- Rev 2, Scope of Work Exhibit "E" - Rev. 2, Technical</i>

24590-CM-TSA-DG01-00001-05-00069	<i>Balance of Facilities - Chiller Compressor Plant, 4.16kv Electrical Duct Bank, Area 2</i>
24590-CM-TSA-DG01-00001-05-00070	<i>Balance of Facilities - Chiller Compressor Plant, 4.16kv Electrical Duct Bank, Area 3</i>
24590-CM-TSA-DG01-00001-05-00071	<i>Balance of Facilities - Chiller Compressor Plant, 4.16kv Electrical Duct Bank, Area 4</i>
24590-CM-TSA-DG01-00001-05-00072	<i>BOF (Balance of Facilities) - Chiller Compressor Plant, Basemat Foundation, Bottom Steel</i>
24590-CM-TSA-DG01-00001-05-00073	<i>BOF (Balance of Facilities) - Chiller Compressor Plant, Basemat Foundation, Top Steel</i>
24590-CM-TSA-DG01-00001-05-00074	<i>BOF (Balance of Facilities) - Chiller Compressor Plant, Basemat Foundation, Additional Steel</i>
24590-CM-TSA-DG01-00001-05-00075	<i>BOF (Balance of Facilities) - Chiller Compressor Plant, Basemat Foundation, Pedestal Steel</i>
24590-CM-TSA-DG01-00001-05-00078	<i>BOF (Balance of Facilities) - Chiller Compressor Plant Basemat Foundation Support Steel</i>
24590-CM-TSA-DG01-00001-05-00079	<i>BOF (Balance of Facilities) - Chiller Compressor Plant Basemat Foundation Additional to #BOF00sI061</i>
24590-CM-TSA-DG01-00001-05-00080	<i>BOF (Balance of Facilities) - Chiller Compressor Plant Basemat Foundation Additional to #BOF00sI059</i>
24590-CM-TSA-DG01-00001-05-00082	<i>BOF (Balance of Facilities) - Fire Water Storage Tanks - Pipe Support Foundations</i>
24590-CM-TSA-DG01-00001-05-00083	<i>BOF (Balance of Facilities) - Chiller Compressor Plant Basemat Foundation Additional Steel for Anchor Bolts</i>
24590-CM-TSA-DG01-00001-05-00123	<i>BOF - Chiller Compressor Plant Basemat Foundation Concrete Aprons and Pads</i>
24590-CM-TSA-DG01-00001-05-00124	<i>BOF (Balance of Facilities) Chiller Compressor Plant Basemat Foundation Pedestal Steel - Additional to #BOF00sI062</i>
24590-CM-TSA-DG01-00001-05-00147	<i>BOF Facility - NLD Pump House Building 54 Sidewalks</i>
24590-CM-TSA-DG01-00001-05-00149	<i>BOF Facility - Fire Water Pump Houses Buildings 84A &amp; 84B Sidewalks</i>
24590-CM-TSA-DG01-00001-05-00150	<i>BOF - NLD Air Stripper Foundation Slab @ El. (-)2'-0" Bottom Steel</i>
24590-CM-TSA-DG01-00001-05-00151	<i>BOF - NLD Air Stripper Foundation Slab @ El. (-)2'-0" Top Steel</i>
24590-CM-TSA-DG01-00001-05-24	<i>BOF - Non-Radio Active Affluent Tank - Foundation for Tank NLD-TK-00001</i>
24590-CM-TSA-DG01-00001-05-26	<i>BOF - Non-Radio Active Affluent Tank - Foundation for Tank FSW-TK-00001</i>
24590-CM-TSA-DG01-00001-05-27	<i>BOF - Non-Radio Active Affluent Tank - Foundation for Tank FSW-TK-00002</i>
24590-CM-TSA-DG01-00001-05-30	<i>BOF- NLD Pump House Foundation</i>
24590-CM-TSA-DG01-00001-05-32	<i>BOF- Fire Water Pump House Foundation</i>

## **10.5 Other Documents**

24590-BOF-FIR-CON-12-00140      *B87*

24590-BOF-FIR-CON-13-00013	<i>LTE-PNL-87002 - BOF/0 Ft-0 In &amp; Vault/B87</i>
24590-BOF-FSW-SOM-0002-04-004	<i>Building 84A Fire Alarm Control Panel</i>
24590-BOF-N1D-FSW-00001	<i>FSW-TK-00001 &amp; FSW-TK-00002 - Fire Water Storage Tanks Corrosion Evaluation</i>
24590-BOF-RPT-ENG-01-001	<i>Building Code Evaluations for BOF</i>
24590-BOF-RPT-ENG-01-002	<i>Life Safety Code Means of Egress Evaluations for BOF</i>
24590-BOF-RPT-ENG-01-033	<i>Building Code Evaluation for The Simulator Building</i>
24590-BOF-RPT-ENG-01-034	<i>Life Safety Code Means of Egress Evaluation for Simulator Building</i>
24590-BOF-RPT-ENS-12-002	<i>Process Hazards Analysis for Balance of Facilities (BOF)</i>
24590-NP-FMR-AE00-03692	<i>Accuform Parts Warning Signs/ Danger Signs / Emergency Signs</i>
24590-NP-FMR-U000-01127	<i>Safe-Hit Barracuda Barricades / Water Filled High Grade Plastic Barrier This is to be Used for Site Maintenance of Roads, and Objects, for Impact Protection. Tricity Sign and Barricade Info. No Substitution Without Approval by Requestor Energite III</i>
24590-NP-FMR-USSC-00756	<i>Signs, Safety, "Caution", "Danger", "Danger High Voltage" - Various Line Items</i>
24590-NP-FMR-USSC-01161	<i>Signs, Safety "Danger" Blank 10"X14" Plastic, National Marker #D-1RB or Approved Project Stock Code Sign003, Tape, Barricade Red &amp; Black 3" X 1000', Reef #50210 [National Tape #Sp745] or Approved Project Stock Code Taps002, Vest, Surveyor's, Class 2</i>
24590-NP-FMR-USSC-01291	<i>Signs, Safety "Danger" Blank 10" X 14" Plastic, National Marker #D-1RB or Approved, Project Stock Code Sign003</i>
24590-NP-FMR-USSC-01316	<i>Signs, Safety "Danger" Blank 10"X14" Plastic, National Marker #D-1RB or Approved, Project Stock Code Sign003, Sign, Notice Blank 10" X 14" Plastic, National Marker #N-1RB or Approved =, Project Stock Code Sign006</i>
24590-WTP-EXPM-CON-P-03-130	<i>Construction of The Fire Water Pump House Facility</i>
24590-WTP-FC-P-06-0059	<i>Painting of Fire Water Yard Piping at BOF Pump House Facility</i>
24590-WTP-FSK-CON-T-13-00005001	<i>Field RPP-WTP - Building 82 Chiller/Compressor Fire Extinguisher Layout</i>
24590-WTP-FSK-CON-T-13-00006001	<i>Field RPP-WTP - Building 87 Switchgear Fire Extinguisher Layout</i>
24590-WTP-FSK-CON-T-13-00007001	<i>Field RPP-WTP - Building 91 Switchgear Fire Extinguisher Layout</i>
24590-WTP-GPP-CON-2103	<i>Escort Process for Work Activities Performed by Non-WTP Site Badged Personnel</i>
24590-WTP-GPP-RASS-SB-0001	<i>WTP Security Badge and Access Requirements</i>
24590-WTP-GPP-SS-010	<i>WTP Security Lock and Key Control</i>
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CCN 082941	<i>Contract No DE-AC27-01RV14136 - Handicap Accessibility of Facilities</i>
CCN 281177	<i>Updated Safety Analysis Direction</i>
DOE. 1998.	<i>Interim Advisory on Straight Winds and Tornadoes, dated January 22, 1998. US Department of Energy, Washington, DC.</i>
DOT-FHWA. 2001.	<i>Manual on Uniform Traffic Control Devices. US Department of Transportation, Federal Highway Administration, Washington, DC.</i>

<i>FM Global Approval Guide.</i>	FM Global, Johnston, RI.
FM Global Data Sheet 1-28/1-29R. 1998.	<i>Roof Systems.</i> FM Global, Johnston, RI.
FM Global Data Sheet 1-57. 1998.	<i>Rigid Plastic Building Materials.</i> FM Global, Johnston, RI.
<i>FM Global Property Loss Prevention Data Sheets.</i>	FM Global, Johnston, RI.
NUMATEC. 1998.	<i>Natural Phenomena Hazards, Hanford Site, Washington,</i> HNF-SD-GN-ER-501, Rev 1. NUMATEC Hanford Company, Richland, WA.
SDI 2002.	<i>Steel Deck Institute Design Manual,</i> Publication No. 30. Steel Deck Institute, Glenshaw, PA.
SPFA. 2008.	<i>Handbook of Fire Protection Engineering,</i> Fourth Edition. Society of National Fire Protection Association, Quincy, MA.
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WTSC99-1036-42-17	<i>Final Report Geotechnical Investigation,</i> Waste Treatment Plant, Rev. 00C; H-1616-51. Shannon & Wilson, Inc., Richland, WA. 2000.

# Appendices

## Appendix A: Test Objectives

Table A-1: Functional Acceptance Criteria (FAC)

Table A-2: Baseline Operating Data



## Appendix A: Test Objectives

Table A-1: Functional Acceptance Criteria (FAC)

Function / Performance Requirement (F&Rs) (requiring testing)	Source	Acceptance Criteria (TAC or GTC)*	Notes/Comments	Test Conditions
Simulate normal operations in BOF to perform noise and ventilation level measurements to verify normal operating noise levels are within ACGIH standard limits in BOF.	Requirement 4.6.3.1.16	<b>(GTC):</b> Measured noise levels in continuous occupancy areas do not exceed 109 dBA.	Measurements are to be evaluated versus the ACGIH limits for the 8-hour time-weighted average for occupational exposure. All areas exceeding 109dBA must be reported to ESH to apply PPE controls. Measurements will be taken using MTE (decibel meter)	Measure ambient noise during normal plant operations for each operating gallery with different anticipated configurations of running equipment. Where timeweighted average noise level exceeds 85dB, noise abatement and/or postings and PPE will be required. HVAC equipment is operating while measurements are taken.

